İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SOCIAL SCIENCES

THE RELATION BETWEEN DISTRIBUTION AND INVESTMENT IN TURKEY

M.A. Thesis by

Özer ERDOĴAN, B.Sc.

Department: Economics

Programme: M.A. in Economics

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M.A. Thesis by
Özer ERDOĞAN, B.Sc.
412031022

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Supervisors (Chairman): Prof. Dr. Burç ÜLENGİN
Assoc. Prof. Dr. Özlem ONARAN

Members of the Examining Committee: Prof. Dr. Nurhan YENTÜRK (BİLGİU.)
Assist. Prof. Dr. Mehtap HİSARCIKLILAR (I.T.U.)

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Müh. Özer ERDOĞAN
412031022

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Tez Danışmanları: Prof. Dr. Burç ÜLENGİN
Doç. Dr. Özlem ONARAN

Diğer Jüri Üyeleri: Prof. Dr. Nurhan YENTÜRK (BİLGİÜ.)
Yrd. Doç. Dr. Mehtap HİSARCIKLILAR (İT.Ü.)

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TÜRKİYE'DE BÖLÜŞÜM ve BÜYÜME İLİŞKİSİ

ÖZET

Bu tez çalışması, Türkiye'de bölüşüm ve büyüme ilişkisini, Türkiye özel imalat sanayi özelinde, talep ve kârlılığın yatırımlar üzerindeki göreli etkilerini inceleyerek ele almaktadır. Neo-klasik iktisadi teorinin beklentilerinin aksine, Türkiye'de 1980'li yılların başından itibaren uygulamaya konulan yapısal uyum politikaları ile birlikte, kâr paylarında yaşanan artışa rağmen yatırımların artırılamaması, bizi genel olarak ücret baskılamaya dayalı olarak artırılan kâr paylarının yatırımlar ile ilişkisini sorgulamaya ve bastırılan ücretlerin talep üzerindeki azaltıcı etkisinin yatırımlardaki durgunluk üzerinde nasıl bir rolünün olduğunu araştırmaya itmiştir.

Bu kapsamda, bu tez çalışmasında ücretlerin yatırımlar üzerindeki çift yönlü etkisini dikkate alan post-Keynesyen teorik yaklaşımlarından Bhaduri-Marglin modeli baz alınarak, Türkiye özel imalat sanayi alt sektörleri için, 1973 ve 2001 yılları arasında talep ve kârlılığın yatırımlar üzerindeki etkileri ekonometrik yöntemler kullanılarak araştırılmıştır. Özel imalat sanayi alt sektörlerine özgü faktörlerin dikkate alınabilmesi ve ortak makroekonomik şokların etkilerinin içselleştirilebilmesi amacıyla SUR (Seemingly Unrelated Regression); özel imalat sanayi üzerinde konuyla ilgili kapsamlı bir bakış açısı elde edebilmek amacıyla da sabit etkili, rassal etkili ve dinamik panel veri metotları kullanılmıştır.

Yapılan SUR analizi neticesinde, sektörlere özgü faktörlerin talep ve kârlılığın yatırımlar üzerindeki göreli etkilerinin belirlenmesinde önemli olduğu ve talebin yatırımlar üzerindeki etkisinin, incelenen sektörlerin yarısından çoğunda, kârlılığınkinden daha büyük olduğu sonuçlarına ulaşılmıştır. Toplulaştırılmış panel veri metotlarının tamamı, kârlılığın özel imalat sanayi yatırımlarını anlamlı olarak etkilemediği, öte yandan talebin yatırımlar üzerinde olumlu ve anlamlı etkisinin olduğu sonuçlarını ortaya çıkarmıştır. Bunun yanında, yapılan ekonometrik analizlerde, ekonominin geneline ilişkin talep beklentilerinin yatırımlar üzerinde etkili olduğu, öte yandan ihracatın yeni yatırımlar yolu ile verimlilik artışına bağlı olmak yerine, mevcut kapasitenin kullanımındaki artışa ve ücret rekabetine dayanması nedeniyle, artan uluslararası rekabetin yatırımları artırmadığı sonuçlarına ulaşılmıştır.

THE RELATION between DISTRIBUTION and INVESTMENT in TURKEY

SUMMARY

This thesis analyzes the relation between distribution and investment in Turkey, by investigating the relative impacts of demand and profitability on investment for Turkish private manufacturing industry. The stagnant accumulation rates, despite the increase in profit share during the structural adjustment episode of Turkey after 1980s, in contrast to the expectations of neo-classical theory, have led us not only to question the relation between increasing profit share, which is provided through reduction in wage share, and investment, but also to investigate the effects of lowering wages on investment through decrease in demand.

In this context, the relative effects of demand and profitability on investment are analyzed by using econometrical techniques, based on the panel data for the sub-sectors of Turkish private manufacturing industry, between 1973 and 2001, on the basis of the theoretical model of Bhaduri-Marglin, which is an extended version of post-Keynesian growth models, where the dual function of wages on determining investment is taken into consideration. SUR (Seemingly Unrelated Regression) method, in order to take into account the sector-specific responses and the common impacts of macroeconomic shocks; fixed effects, random effects and dynamic panel methods, in order to capture the overall view for this issue in private manufacturing industry, are used as econometrical techniques for the analyses.

The results of SUR estimation show that, sector-specific factors are important in determining the relative impacts of demand and profitability on investment and the impact of demand on investment is greater then that of profitability for more than half of the sub-sectors that are analyzed. The estimation results of all pooled panel data methods expose that, profitability has no significant effect on investment, whereas demand has a significant and positive effect on investment. Furthermore, according to the results of the econometrical analyses, the demand expectations for the aggregate economy are found to have significant effects on investment. Additionally, the increase in external competition is found to be ineffective on investment, since the increase in exports depends on wage competition and increasing use of existing capacity, rather than productivity increases via new investments.

1. INTRODUCTION

Many developing countries shifted from import-substituting industrialization policies to export oriented growth strategies in the late 1970s and 1980s, with the goal of integration to the global economy. Structural adjustment programmes, supported and supervised by IMF (International Monetary Fund) and the World Bank, have been the major sources of macro economic policies based on neo-liberal rationale, which argues that redistribution of income in favour of capital and liberalization of all economic transactions within and across economies enhance investment, growth and employment. Wage suppression policies in order to create an exportable surplus have been one of the most important characteristics of export oriented growth strategies, since wages have been considered as only a cost item in the production process. However, in spite of export boom and increasing profitability along with deterioration in the wage share, many developing countries witnessed stagnant and even decreasing accumulation and volatile growth rates, as a result of the implementation of orthodox structural adjustment programs.

Turkey, which has been a strict follower of the recipes of IMF and the World Bank, could not achieve high and sustainable growth and accumulation rates, despite high profitability and export boom during the structural adjustment period, in contrast to the expectations of the neoclassical theory. The inability of pro-capital income policies, provided by labour market deregulations and wage cutting policies, in enhancing accumulation gives rise to questions about demand side effects of these policies.

The motivation behind this thesis is to clarify the reasons of stagnant accumulation rates, despite high profitability, during the structural adjustment period in Turkey. We have benefited from the post-Keynesian theoretical framework, which points out the dual function of wages. According to this theory, wages are not merely a cost item in the production process, but also a determinant of aggregate demand through consumption. Thus, although wage cuts have a positive impact on investment via decreasing input costs, i.e. increasing profitability, they have also a negative impact on investment, since purchasing power of workers decreases as a result of a decrease

in wage share, leading to a decrease in consumption and hence, aggregate demand, which affects investment through the accelerator principle.

Based on the theoretical framework developed by Bhaduri and Marglin (1990), which is a generalized version of the post-Keynesian literature on the relation between functional income distribution and investment, we aim to analyze the relative impacts of demand and profitability on investment for the Turkish private manufacturing industry during the period of 1973-2001. For this purpose, we used a number of econometrical techniques, using the panel data of 26 sub-sectors of the Turkish private manufacturing industry between 1973 and 2001.

Although a number of empirical analyses have been made for the comparison of the relative impacts of demand and profitability on investment for both developing and developed countries, Onaran and Yentürk (2001) is the only one that tests the Bhaduri-Marglin Model for Turkish private manufacturing industry based on panel data for the sub-sectors between 1973 and 1995, using pooled panel data estimation methods. In our thesis, we used not only panel data for a wider time lag (1973-2001), but also employed Seemingly Unrelated Regression (SUR) method to clarify the sector-specific impacts of demand and profitability on investment. We also used pooled panel data estimations to check the robustness of our estimations, and to capture the overall view for the Turkish private manufacturing sector.

This thesis consists of five sections, including this introductory section. In Section 1, the motivation behind analyzing the relation between distribution and investment, and the objective of the study are stated. Section 2 continues with the theoretical framework on the relation between distribution and investment, and the empirical research on this issue. Section 3 discusses the stylized facts on Turkish economy, as well as Turkish private manufacturing industry, from import-substitution period to recent years. Section 4 introduces the data, the models, the methodologies used in the empirical analysis, and the results of the empirical analysis. In Section 5, the conclusions and policy implications of this study are discussed.

2. THEORETICAL FRAMEWORK

2.1. The Relation between Distribution and Investment

2.1.1. Neoclassical versus Post-Keynesian Growth Models

Neoclassical growth models assume full utilization of all factors of production in the long run and emphasize the crucial role of supply side factors in determining the level of capacity utilization and output. In this framework aggregate demand does not play a fundamental role since savings generate investment (Filho, 1999).

Keynesian growth models, however, follow the principle of effective demand where investment generates savings through changes in capacity utilization and income distribution (Filho, 1999). Since Keynesian growth models have independent investment functions and saving propensities differ among income classes, the distribution of income between capital and labour is at the core of these models (Stockhammer, 1999).

Although the independent role of aggregate demand and the assumption of different saving propensities for each class (Kaldorian saving functions) are common in post-Keynesian growth models, the assumptions made in earlier works and more recent ones are different and sometimes contradictory. Lima (2004) argues that the post-Keynesian approach developed in 1950s and 1960s by N. Kaldor, J. Robinson, and L. Pasinetti differs from the approach developed by Kalecki, and Steindl in the 1950s to 1970s, and later in the 1980s by the authors in this tradition like R. Rowthorn and A.K. Dutt. Most important differences between these earlier and recent approaches are about the structure of price setting and the level of capacity utilization assumptions. While earlier approach assumes that the prices are set in a Keynesian competitive environment, the recent ones assume an oligopolistic price setting where prices are set as cost plus profit margin. The other crucial assumption made by the earlier post-Keynesians is full capacity utilization. In contrast, the recent approaches assume variable and endogenous capacity utilization (Lima, 2004).

Full capacity utilization assumption made by the earlier post-Keynesian authors leads to a positive relation between growth and profits. It was Kalecki who assumed variable capacity utilization, which allowed for regimes where higher wages bring about higher growth (Stockhammer, 1999). Since the assumption about the level of capacity usage is crucial in determining the relation between distribution and investment in post-Keynesian growth models, there should be more attention paid on this assumption.

Although long run growth models usually assume full capacity utilization, Steindl (1952) was first who argued full capacity assumption is wrong in an economy where monopolistic competition exists. Within an oligopolistic price setting structure, firms will desire to maintain excess capacity in order to cope with demand deficiencies by just reducing the level of production keeping the prices at earlier levels. Stockhammer (1999) summarizes the reasons why firms are willing and sometimes obliged to maintain excess capacity although it is costly. The first and most important reason is to cope with uncertainty. The second reason is to compete with the other firms entering to the industry. The third reason is about technical limitations detaining oligopolies from full capacity utilization. The last reason is the inability of undoing many investment projects when it is needed to arrange the level of output to the fluctuations in demand.

After the works of Steindl (1952) and Kalecki (1971) where excess capacity is allowed, the macroeconomic model of distribution and growth is modified by more recent post-Keynesian theorists like Rowthorn (1982), Dutt (1984, 1987), Taylor (1985, 1991), Blecker (1989, 1999) and Bhaduri and Marglin (1990).

In the macroeconomic models of Rowthorn (1982), Dutt (1984, 1987) and Taylor (1985) investment demand, an increasing function of both the profit rate and capacity utilization, is endogenous and saving is assumed to be made out of profit. Although different cases and issues are considered in these models, a stagnationist regime, where an increase in the profit share leads to a decrease in capacity utilization and growth, is the outcome of these models.

However, Blecker (1989, 1999), Bhaduri and Marglin (1990), Marglin and Bhaduri (1990), and Taylor (1990) show that the opposite case of a stagnationist regime ï an ñexhilarationistò regime as defined by Bhaduri and Marglin (1990)- may also exist

and stagnationism is not necessarily the only outcome if the response of investment to profit share is strong.

According to Taylor (1990), the possibility of an exhilarationist regime increases if saving out of wages besides profits is allowed, since the stimulating effect of consumption on capacity utilization decreases. Bhaduri and Marglin (1990) and Blecker (1989) explain the possibility of an exhilarationist regime in a different manner. According to this argument, decrease in wages, depressing domestic consumption, may on the other hand positively affect trade balance via increasing external competitiveness. If the positive trade balance effect dominates negative domestic consumption effect, capacity utilization will increase, leading to a regime of exhilarationism.

This study is based on the theoretical foundations of Bhaduri and Marglin (1990), since their model is a generalized version of neo-Kaleckian growth models, where both stagnationist and exhilarationist regimes are allowed in different cases.

2.1.2. Generalized Theoretical Model of Bhaduri and Marglin (1990)

Bhaduri and Marglin (1990) pay attention to the dual roles of wages in the economy, one of which is being a cost item in the production process and the other is being a determinant of aggregate demand since higher wages mean more purchasing power. Since the relative magnitudes of these different effects of wages determine the relation between wage rates and the level of employment and output, Bhaduri and Marglin (1990) aim to develop a macro economic model by which the dual functions of wages can be analyzed.

Unlike the earlier post-Keynesian growth models, capacity utilization is assumed endogenous, and income distribution is exogenous to the model.

A Kaldorian savings equation is formed as:

$$S = sR = s(R/Y)(Y/Y^*)Y^* \qquad (2.1.)$$

where no wage is saved and a constant fraction (s) of profit is saved and,

s: marginal propensity to save out of profit,

R=profit

Y=output (income)

Y^*=full capacity potential output (income)

Normalizing saving by setting Y^*=1, we get:

$S = s\pi z$, Y^*=1 (2.2)

where; $\pi = R/Y =$ share of profit, $1>\pi>0$ and z = Y/Y^* = degree of capacity utilization, 1>z>0. However, letting for savings for wages does not affect the essential theoretical outcome, and in that sense ñsò can also be treated as a positive savings differential between the marginal propensities to save out of profits and wages.

Bhaduri and Marglin (1990) argue that investment depends on profit expectations and use the rate of profit as a proxy for expectations. The rate of profit is defined as:

$r = R/K = (R/Y)(Y/Y^*)(Y^*/K) = \pi z\alpha$ (2.3)

where, K=accountantsô book value of capital, and (Y*/K)=Ŭ=output capital ratio at full capacity, and both are assumed given in the short term.

So, investment is defined as a function of profit share and the rate of capacity utilization:

$I = I(\pi, z)$ where $Y^* = 1$ (2.4)

where $I_\pi > 0, I_z > 0$.

Although it is common to define investment as a function of simply the rate of profit, Bhaduri and Marglin (1990) separate the components of the rate of profit to take into account the possibility of unwillingness of investors to invest in additional capacity in spite of high profit margin if excess capacity exists.

Another advantage of this investment function is that it separates the demand side effect of real wage on investment, through the accelerator effect of an increase in capacity utilization, from the supply side effect of real wage on investment, through the cost increasing effect of higher real wage. Demand side effect of real wage is indicated by the level of capacity utilization, whereas the supply side effect of real wage is indicated by profit share.

In a closed economy, the equality between saving and investment implies:

$$I(\pi, z) = s\pi z \tag{2.5}$$

The local slope of the IS curve in the z and π can be written as:

$$dz/d\pi = (I_{\pi} - sz)/(s\pi - I_z) \tag{2.6}$$

The sign of the slope of the IS curve depends on the relative responses of investment and saving on profit share and on capacity utilization.

It is assumed that saving is more responsive than investment to the changes in capacity utilization for the stability of Keynesian income adjustment process, which leads a sign restriction on the denominator of equation 5:

$$(s\pi - I_z) > 0 \tag{2.7}$$

So the sign of the slope of the IS curve depends on the relative responses of investment and saving to profit share. If the response of investment to profit share is greater than the response of savings to profit share (i.e. $I_{\pi} - sz > 0$), the regime of the economy is called ñexhilarationistò. If the opposite case is valid (i.e. $I_{\pi} - sz < 0$), the regime of the economy is called ñstagnationistò.

In the case of a stagnationist regime, investment responds relatively weakly to changes in profit share, i.e. the increase in investment due to an increase in profit share and a decrease in wage share does not compensate the decrease in consumption due to the decrease in wage share, implying that the demand effect of wage share dominates the cost effect of wage share on aggregate demand. Thus, aggregate demand (C+I) falls due to a decrease in wage share. Profit share inversely affects the capacity utilization (i.e. aggregate demand) in a stagnationist regime.

On the contrary, in the case of an exhilarationist regime, aggregate demand rises due to an increase in profit share (a decrease in wage share). Thus, in an exhilarationist regime profit share positively affects capacity utilization.

The regime of accumulation is ñwage ledò if higher wage share goes along with higher rate of accumulation, and is ñprofit ledò if higher profit share goes along with higher rate of accumulation.

Since the investment function mentioned by Bhaduri and Marglin (1990) has the ability of separating the demand (i.e. capacity utilization) and supply side (i.e. profit share) of wage share, the regime of accumulation can be discussed by investigating the relative effects of capacity utilization and profit share on investment.

In the case of a wage led accumulation regime, the response of investment to capacity utilization is greater than the response of investment to profit share, meaning that the negative effect of a decreasing wage share on investment via consumption implied by capacity utilization is greater than the positive effect implied by profit share. On the opposite case, the accumulation regime is profit led since increasing profit share (decreasing wage share) is associated with increasing investment.

Bhaduri and Marglin (1990) also analyze the relation between distribution, capacity utilization and investment in the context of an open economy. In this framework, the effects of depreciation of the home currency on capacity utilization, through changes in profit share and trade balance determine the regime of the economy. The impact of trade balance on capacity utilization, as a result of depreciation of the home currency is positive, so long as trade elasticities exceed unity, to satisfy the Marshall-Lerner condition. Since the direction of the change in the profit share, following depreciation of the home currency, depends on the relative increases of domestic price and money wage, the effect of depreciation of the home currency through changes in profit share is ambiguous.

In the case of an exhilarationist regime, devaluation resulting in a lower real wage rate and higher profit margin would raise the capacity utilization ratio by stimulating effective demand, since the decrease in domestic demand due to lower wages is compensated by the increase in investment. So long as the Marshall-Lerner condition is satisfied, trade effect of devaluation on capacity utilization, through changes in international competitiveness, is positive. Therefore, a strategy of lowering wages, in the case of depreciation of the home currency, can stimulate capacity utilization unambiguously. On the contrary, in a stagnationist regime the result of lowering wages strategy on economic activity is ambiguous, and depends on the relative magnitudes of the impacts of decreasing effective demand (since the decrease in

domestic demand due to lower wages is not compensated by the increase in investment), and trade balance on capacity utilization.

2.2. Empirical Research on the Relation between Distribution and Investment

Following the theoretical studies based on the link between distribution, accumulation and growth, the ambiguity of the relative responses of growth and accumulation to both demand and profitability has led some post-Keynesian researchers analyze these relations empirically.

While Bhaskar and Glyn (1995), Bowles and Boyer (1995), Stockhammer (2000), and Stockhammer and Onaran (2004) test the relative effects of profitability and demand on investment for advanced capitalist countries (ACCs), Sarkar (1992), Onaran and Yentürk (2001), Onaran and Stockhammer (2005) test this issue with reference to developing countries. Onaran and Stockhammer (2006) summarize and compare the results for both ACCs and developing countries.

Bhaskar and Glynn (1995) model investment as a function of profitability, proxied by profit share, demand expectations, proxied by output growth, and relative factor costs of capital to labour. The data set used in this analysis covers the manufacturing and non-agricultural business sectors in the seven ACCs (Canada, France, Germany, Italy, Japan, UK, and USA) for the years from 1951 to 1988. The results show that, the impacts and significance of demand, profitability and relative factor costs change from country to country and sector to sector and, profitability is not the only condition to explain fluctuations in investment. On the contrary, demand and relative factor costs are important as well.

Bowles and Boyer (1995) test the wage-led hypothesis for five ACCs which are France, Germany, Japan, UK and USA, for the period between the beginning of 1960s and the end of 1980s. It is argued that, distribution has significant effect in most of the cases on aggregate demand. In the closed economy model, all of the countries seem to have wage-led growth regimes, whereas three of them (Germany, France and Japan) become profit-led with the open economy assumption.

Onaran and Stockhammer (2006) aim to clarify whether the economies are profit or wage led in two groups of countries, one of which includes ACCs (USA, UK and France), and the other includes developing countries (Turkey and Korea). In order to

analyze the effects of distribution on accumulation, growth and employment, an extended version of Bhaduri and Marglin (1990) model is estimated by structural vector autoregression (SVAR) method for the two groups of countries. In the case of ACCs, the model is also extended to let for technological change, i.e. productivity increases. According to the results for ACCs, the goods market variables play a crucial role in determining the level of unemployment. Additionally, distribution has little or no effect in determining growth and accumulation. There was also little or no evidence found for the neoclassical labour market hypothesis that expects a positive relation between wage share and unemployment.

Onaran and Stockhammer (2006) analyze Turkey and Korea in the case of developing countries since they represent two different export-oriented growth experiences, which are both in contrast to the expectations of mainstream economics. Like ACCs, demand and accumulation are found to be the main driving sources of employment for Turkey and Korea. In addition, according to the results of SVAR analysis accumulation and employment regimes are not profit led in any countries; on the contrary it is wage led in South Korea, and there exists some evidence that it is wage led in Turkey although the effect is not very strong. The striking differences between the export-oriented growth strategies of these two countries become clearer comparing the responses of investment and employment to exports. Although employment responses to exports strongly and positively in South Korea, the response is negative in Turkey. Additionally, the response of accumulation to exports is strong and persistent in South Korea, whereas it is weak and temporary in Turkey. Another important difference is that export is profit led in Turkey, while it is not in Korea, meaning that increase in exports depends on the decreases in unit labor costs in Turkey. Following these results, Onaran and Stockhammer (2006) argue that Turkey could not stimulate investments since increased use of existing capacity rather than new investments and depressing wages to decrease unit labour costs were the main strategies of export oriented growth, whereas international competitiveness based on improvements in productivity is at the core of export oriented growth strategy in Korea.

Sarkar (1992) aims to test the stagnationist theory for India, who had relatively low growth rates between the end of 1960s and the end of 1980s compared with the planning years of 1950s and 1960s. Two-sector model is used for the analysis to take

into account the demand linkages between agriculture and manufacturing sectors. Sarkar (1992) does not find evidence for a stagnationist regime for the stagnation in Indian economy, rather the reason of stagnation is explained by the linkages between two sectors. Due to relative stagnation in agricultural sector, the intersectoral terms of trade turns in favour of agricultural sector leading to stagnation in industrial growth.

Onaran and Yentürk (2001) analyze the relative effects of demand and profitability on investment in Turkish private manufacturing industry, using the panel data for 26 industries for the period between 1975 and 1995. This empirical research based on the theoretical framework outlined by Bhaduri and Marglin (1990) aims to investigate the reasons of the slowdown in accumulation in manufacturing industry despite high profit margins during the structural adjustment phase of Turkish economy. Investment, standardized by value added is estimated as a function of profitability, proxied by profit share, and demand, proxied by growth rate, using the one way fixed effects linear model for panel data. The results show that, profit share has no significant effect on investment, whereas growth has positive and significant effect. The pro-capital income policies put into practice based on the framework of structural adjustment programs seem to be unable to enhance accumulation. On the contrary, the demand aspects dominate the cost aspects of wages, which enhance accumulation according to the accelerator principle.

3. STYLISED FACTS on TURKISH ECONOMY

This section is dedicated to the analysis of the relationship between distribution, accumulation and growth in Turkey, from often called the second phase of the import-substituting industrialization to the recent years. In the first sub-section we not only aim to analyze the evolution of investment in Turkey, but also shortly summarize the phases of Turkish economy, and in the second sub-section we focus on the distributional dynamics and their effects on investment in Turkish private manufacturing industry.

3.1. Distribution, Accumulation and Growth in Turkey: 1973-2005

The import-substituting economic policies in the second half of 1970s were characterized by high investment levels in both public and private sectors coupled with protectionist trade regime. State economic enterprises were the main tools of the state, aiming at expanding production especially in heavy manufacturing industry. Additionally, private industry was encouraged with the help of protectionist trade regime, giving the industrialists the opportunity of oligopolistic profits. The cheap intermediates produced by state economic enterprises for the use of private sector helped private industrialists minimizing input costs. These two issues made industrialists accept the general increase in the wage level which had a stimulating effect on aggregate demand, since the increase in purchasing power of workers directly affected domestic consumption under the protectionist trade regime with strong non tariff barriers and fixed exchange rate regime. However, the import-substituting industrialization policies reached its limits in 1976, since it became harder to finance investment and current account deficits. 1977-1980 was the period of foreign exchange crises ended with military coup, which altered the economic policies and industrial relations dramatically (Özcan et al, 2001; Kepenek and Yentürk, 2001:152; Onaran and Yentürk, 2001; Yeldan, 2002:38-43).

Table 3.1: Stylised Facts on Accumulation and Growth in Turkey (annual averages, all values in percentage)

	1973-76	1977-79	1980-88	1989-93	1994	1995-97	1998	1999	2000	2001	2002	1973-79	1980-02
GNP (Real rate of growth)	5.8	1.2	4.3	5.2	-6.1	7.8	3.9	-6.1	6.3	-9.5	7.9	3.8	3.7
Agriculture	2.2	0.3	1.6	0.3	-0.7	1.3	8.4	-5.0	3.9	-6.5	6.9	1.4	1.2
Manufacturing	9.3	2.0	6.1	6.0	-5.7	9.9	2.0	-5.0	6.0	-7.5	9.4	6.2	4.9
Services	8.1	1.8	5.0	5.8	-6.6	7.5	2.4	-4.5	8.9	-7.7	7.2	5.4	4.2
Fixed Investment/GNP	22.8	24.4	21.5	23.7	24.5	25.1	24.3	22.1	22.8	19.0	17.4	23.5	22.5
Public Sector	7.4	8.8	9.0	7.3	4.9	5.1	6.3	6.6	6.8	6.4	6.3	8.0	7.4
Private Sector	15.4	15.7	12.6	16.4	19.6	20.0	18.1	15.5	15.9	12.6	11.0	15.5	15.1
Private Investment in Tradables[1]/GNP	7.9	6.8	4.9	4.6	5.4	6.1	5.3	4.4	4.9	3.6	3.7	7.4	4.9
Private Investment in Non-Tradables[1]/GNP	7.5	8.9	7.7	11.8	14.2	13.9	12.7	11.1	11.0	9.0	7.3	8.1	10.2
Manufacturing Investment/Total Investment	36.0	32.5	23.3	17.6	19.3	19.9	18.0	17.4	19.0	17.5	18.8	34.5	20.3
Public Manuf. Inv./Total Public Inv.	24.0	21.9	14.6	4.5	3.1	4.1	2.7	2.6	2.9	4.0	3.2	23.1	8.1
Private Manuf. Inv./Total Private Inv.	41.5	34.8	30.4	23.9	23.8	25.1	23.4	23.8	26.5	24.8	29.7	38.7	27.0

Notes:

[1] Tradable sectors include manufacturing, agriculture and mining. Non-tradable sectors include energy, communication, transportation, tourism, housing, education, health and other services.

Source: State Planning Organisation, Main Economic Indicators: 1973-2002.

Table 3.1 summarizes the evolution of investment and growth in Turkey, in public and private sectors and in tradable and non-tradable sectors. As seen from Table 3.1, in 1973-1976 period, where import-substituting industrialisation policies were implemented, manufacturing investment in both public and private sectors and investment in tradables are relatively higher compared with the other periods as discussed above.

Following the exchange rate crises of late 1970s, a structural adjustment programme was introduced in January 1980, which aimed to liberalise domestic goods and financial markets as well as foreign trade and exchange regimes. Turkey shifted from import-substituting industrialization to export-led growth with this programme, which was supported by international agencies such as IMF and the World Bank.

The reflections of the change in economic policies in 1980s can be seen in Table 3.1. Public manufacturing investment over total public investment declined to about 15%, which was about 24% in the 1973-1976 period. The role of public sector in aggregate and manufacturing investment started to decline from 1980 onwards and reached historically low levels in 1990s.

One of the other important reflections of export led growth strategies was suppression of wages and repression of labour rights, in order to minimize costs and create an exportable surplus via depressing domestic consumption level. Additionally, both exchange rate regime and export subsidies acted as the main instruments for the promotion of exports. However, increase in exports is mainly due to increase in capacity utilization rather than new investments. The economic and political limits of such a growth strategy were reached in 1988, leading to a new phase of liberalization policies (Boratav et al, 2000; Özcan et al, 2001; Onaran and Yentürk, 2001).

1989-1993 is the period, in which capital account liberalization took place coupled with the populist income policies, financed by hot money leading to a financial crisis in 1994. Capital account liberalization includes liberalization of capital movements and declaration of the Turkish Lira as fully convertible in foreign exchange markets. The immediate consequence of capital account liberalization in Turkey, as in other developing countries that had liberalized their capital market, was huge amount of capital inflows with a short term character, since relatively high interest rates in

developing countries compared with ACCs created the opportunity for international finance capital to gain from arbitrage (Boratav et al, 2000; Kepenek and Yentürk, 2001:211-220; Boratav and Yeldan, 2002).

Increased capital inflows from 1989 onwards caused real appreciation of local currency, leading to an increased arbitrage on the one hand, and decreasing cost of imports on the other hand. Ülengin and Yentürk (2001) show that foreign saving does not finance investment directly; rather it stimulates domestic consumption, where consumption enhances investment indirectly via accelerator principle. However the increase in private investment arises from increasing investment in non-tradable sectors.

As seen from Table 3.1, although private sector investment over GNP rose from 12.6% in 1980-1988 period to %16.4 in 1989-1993 period, this increase was mainly due to increasing investment in non tradable sectors. Private investment in tradable sectors as a ratio of GNP fell from %4.9 in 1980-1988 period to %4.6 in 1989-1993 period, whereas private investment in non-tradable sectors increased from %7.7 to %11.8 during the same periods. Private manufacturing investment as a ratio of total private investment also fell from 30.4% to 23.9%.

According to Onaran and Yentürk (2001), the increase in private investment in non-tradable sectors is a result of the decrease in relative prices and profitability in tradable sectors compared with the non-tradable sectors, since non-tradable sectors have greater capacity than tradable sectors in terms of reflecting investment costs to consumers.

The decrease in public sector investment went on in 1989-1993 period, reflecting the changing role of the state. The real appreciation of Turkish Lira leading to rising trade deficit (from 3.5% of GNP in 1985-1988 period to 6% in 1990-1993 period), and deteriorating fiscal balances[1] financed by hot money became unsustainable at the end of 1993. Increasing fragility causing outflow of short termed foreign capital led to 1994 financial crises. The consequences of 1994 financial crises were serious.

[1] The annual average consolidated budget deficit as a ratio of GNP rose from 2.7% in 1980-1988 period to 4.5% in 1989-1993 period. This was mainly due to rise in personnel and interest expenditures. Consolidated budget personnel costs as a ratio of GNP rose from 4.5% to 8.1% for the same period, whereas interest expenditures rose from 1.9% to 4.1% (SPO, Main Economic Indicators).

GDP fell by 5.5%, inflation rate increased to 106% and the state offered 400% interest rate for internal borrowing in May 1994 (Özcan et al, 2001; Yentürk, 1999).

After the financial crisis in 1994, a stabilization programme was introduced on April 5, consisting of tightening in public expenditures and a special wealth tax levy. Wages were repressed in both public and private sectors. However, this stabilization programme did not take any measures against the speculative hot money, which financed and stimulated fiscal and current account deficits in the post crises period. Turkey experienced later Asian and Russian crises in late 1990s, with high levels of fiscal and current account deficits, high inflation, unemployment and real interest rates (Yentürk, 1999; Yeldan, 2002:135-142; Özcan et al, 2001).

The attempt to stabilize the economy in 1998 was based on a disinflation programme, aiming at reducing inflation rate and fiscal deficit, introduced by the Government under the guidance of International Monetary Fund (IMF). However, coupled with the Asian and Russian crises, two earthquakes and general elections, fiscal balances deteriorated and financing of the deficit became more expensive leading to high interest rates. GDP fell by 4.7%, public deficit as of GDP increased to 24.5% and the increase in CPI was by 65% by the end of 1999 (Yeldan, 2001; SPO, Main Economic Indicators).

The Government launched an exchange rate based stabilization programme in December 1999, supported and supervised by IMF with the target of reducing CPI and WPI to 25% and 20% respectively by the end of 2000, and to the single digit level by the end of 2002. Exchange rate was used as a nominal anchor, where the rate of depreciation of the currency basket consisting of 1US$ + 0.77 Euro was pre-announced with a daily calendar. Additionally, monetary expansion rule of Central Bank was limited to changes in net foreign assets, whereas upper ceilings were set on the net domestic assets. The other commitment of Central Bank was not to engage in sterilization since changes in interest rate were expected to adjust to the level of liquidity. Although the monetary authorities successfully implemented the monetary program within the given targets, just eleven months after launching the disinflation program Turkey experienced an alarming crisis in November 2000 which was followed by a severe financial crisis in February 2001 leading to a 7.4 % fell in GDP (Akyüz and Boratav, 2002; Yeldan, 2001).

The financial crises in 2000 and 2001 were mainly due to financial fragility deepened by the speculative capital inflows, the weak structure of banking sector and the program itself[2]. Speculative capital inflows which are the main phenomenon of Turkish economy in 1990s played an important role in both creation and the level of the financial crises in November 2000 and February 2001. High level of incoming hot money caused domestic currency to appreciate leading to an increase in current account deficit by changing relative prices of tradable goods and services in favour of foreign countries. The stickiness of prices contrary to expectations also helped domestic currency to appreciate. Another important consequence of capital inflows was lowering interest rates due to the no sterilization rule. Since monetary rule of Central Bank was limited to changes in net foreign assets under the policy of non sterilization, increased capital inflows caused an increase in monetary base and liquidity leading to decrease in interest rates which supported aggregate demand by stimulating consumption. Supported by the consumer credit expansion, mainly due to decreasing interest rates and increasing competition in banking sector, and appreciation of domestic currency, current account deficit, one of the most important risk parameters of an economy, reached unsustainable levels in the end of 2000[3]. The high level of FX short position in domestic banks[4] was also a risk indicator for the whole economy.

According to Yeldan (2001) increased trouble in the economy, especially high level of current account deficit, made international investors liquidate their assets and international banks call their short term loans to Turkish banks leading to a liquidity crisis in November 2000. Although Central Bank tried to increase liquidity by open market operations violating the ban of the program for a short period, monetary base

[2] See Celasun and Dikmen (2002); Boratav (2001); Akyüz and Boratav (2002); Yeldan (2001); Boratav and Yeldan (2002); Alper and Önik (2002); Ekinci and Ertürk (2004) for a detailed analysis of causes and consequences of Turkish 2000 and 2001 financial crises.

[3] The ratio of current account deficit to Central Bankôs international reserves which was 5.9% by the end of 1999 increased to 49.7% by the end of 2000 (SPO, Main Economic Indicators; Central Bank).

[4]According to Post Keynesian view expectations are endogenous and, lax behavior of economic agents take place (i.e. banks) in the boom periods of an economy (Skott, 1995). In our example increased competition in the banking sector forced banks individually to take risk not to loose market share. Since financing of expanding credit volume is hard in an economy where deposit volume is low, the only way of financing seems to be borrowing from international banks. Assets (both credits and T-bonds) in terms of domestic currency which were mainly medium and long termed and liabilities in terms of foreign currency which were mainly short termed (because of high risk premium of the economy) meant both currency and maturity risk for domestic banks.

contracted by 17% in November 2000. Following the return of Central Bank to non sterilization policy, interest rates climbed to very high levels and eight banks were taken over by Saving Deposits Insurance Fund (SDIF). The liquidity crisis was followed by a serious financial crisis in February 2001. TL started to free float and depreciated by about 50% in two months and the economy suffered from a long recession after the crisis. The consequences of the bust were serious: fall in GDP by 7.4%, bankruptcy of especially small and medium sized enterprises and social deterioration.

The evolution of investment during 1990s and the beginning of 2000s is also interesting. Following the 1994 financial crisis, in 1995-1997 period, the average annual ratio of fixed investment to GNP was 25.1%, consisting of 5.1% public investment and 20% private investment. Reflecting the increased role of financialisation, the ratio of fixed investment to GNP had a decreasing trend following years and fell to 17.4% in 2002. The decrease in fixed investment was due to decrease in private investment, since the ratio of private sector fixed investment to GNP fell to 11% in 2002. The decreases in the shares of private and public manufacturing investment in total private manufacturing investment continued in 1990s. However, there has been a slightly increase in the ratio of manufacturing investment as a ratio of total investment for both public and private sectors between 2000 and 2002 (Table 3.1).

When we compare investment rates between import-substitution (1973-1979) and structural adjustment periods (1980-2002), given in Table 3.1, we can clearly see that fixed investment as a ratio of GNP decreased for both public (from 8.0% to 7.4%) and private sectors (from 15.5% to 15.1%). The decrease in fixed private investment was mainly due to the high decrease in private investment in tradables (the ratio of private investment in tradables to GNP decreased from 7.4% to 4.9% from 1973-79 to 1980-2002 periods). In the meantime, the share of private investment in non-tradables increased from 8.1% to 10.2% from 1973-79 to 1980-2002 periods. The evidences show that, structural adjustment programs not only deteriorated fixed investments, but also altered the structure of investments in favour of non-tradables. This argument can also be supported with the fact that, the share of manufacturing investment in total investment decreased for both public and private sectors with the implementation of structural adjustment programmes. The ratio of public

manufacturing investment to total public investment decreased from 23.1% to 8.1.%, whereas this ratio for private sector decreased from 38.7% to 27.0% from 1973-79 to 1980-2002 periods. The decreasing role of real sector on investment reflects the abandonment of development priorities, which depends on industrialization, with the implementation of structural adjustment programmes.

Following the collapse of exchange rate based disinflation program and free floating of domestic currency, a new programme, ñProgram for Transition to a Strong Economyò, with a stand by agreement was launched in May 2001, under the management of Kemal Dervi, the former Vice President of World Bank and the new technocrat member of the cabinet. The program aimed at stabilizing the economy by reducing the indebtedness of public sector, strengthening the structure of financial sector, reducing inflation rates and restructuring the relationship between the state and the economy according to the rules of the market. Following the elections in November 2001, AKP has come to power with absolute majority as a result of the social reaction to the former coalition. A new letter of intend was presented to IMF in January 2002, sharing the basic principles outlined in the 2001 programme.

According to Pamukçu and Yeldan (2005), the current program focuses on three targets; contractionary fiscal policy aiming at 6.5% primary surplus as a ratio to GDP, privatization, and contractionary monetary policy managed by an independent Central Bank exclusively targeting price stability.

Table 3.2: Key Macroeconomic Indicators of Turkey: 2001-2005

	2001	2002	2003	2004	2005
GNP growth rate (%)	-9.5	7.9	5.9	9.9	7.6
GDP growth rate (%)	-7.5	7.9	5.8	8.9	7.4
Fixed Investment/GNP (%)	19.0	17.4	16.1	19.2	-
Public	6.4	6.3	4.9	4.7	-
Private	12.6	11.0	11.2	14.5	-
Unemployment Rate (%)	8.4	10.3	10.5	10.3	10.4
Urban	11.5	14.2	13.8	13.6	12.7
Rural	4.8	5.7	6.5	5.9	6.8
Employment Rate (%)	45.7	44.7	43.5	43.6	44.5
Sectoral Employment as a share of Total Emp.					
Agriculture (%)	37.6	34.9	33.9	34.0	31.0
Manufacturing (%)	17.5	18.5	18.2	18.3	19.0
Construction and Services (%)	44.9	46.6	47.9	47.7	50.0
CPI (end to end % change)	68.5	29.7	18.4	9.3	7.7
WPI[1] (end to end % change)	88.6	30.8	13.9	13.8	2.7
Change in real effective exchange rate[2] (%)	-17.6	11.4	8.9	5.1	11.5
Current Account Balance (Billion $)	3.4	-1.5	-8.0	-15.6	-23.0
Current Account Balance (% of GNP)	2.3	-0.8	-3.4	-5.3	-6.4
Primary Balance (% of GNP)	6.8	4.3	5.2	6.1	-
Consolidated Budget Total Debt Stock (Billion $)	123.6	148.5	202.7	235.8	247.0
Domestic	84.9	91.7	139.3	167.3	182.4
External	38.7	56.8	63.4	68.5	64.6
Consolidated Budget Total Debt Stock (% of GNP)	100.8	88.2	79.3	73.8	68.4
Domestic	69.2	54.5	54.5	52.3	50.5
External	31.6	33.8	24.8	21.4	17.9
Total Foreign Debt Stock (Billion $)	113.6	130.4	145.8	161.9	170.1
Total Foreign Debt Stock (% of GDP)	92.7	77.5	57.1	50.7	47.1

Notes:

[1] PPI (Production Price Index) for 2005

[2] Real effective exchange rate reflects the relative prices of foreign and domestic goods and calculated by using nominal exchange rate and CPI of domestic country and a group of foreign countries. A positive change in real effective exchange rate shows the real appreciation of domestic currency (the decrease in the prices of foreign goods in terms of domestic goods, thus a change in relative prices in favour of foreign goods). The annual % changes in this ratio are calculated, using real effective exchange rate index for monthly data (TR Central Bank).

Source: Undersecretariat of Treasury (www.treasury.gov.tr), TR Central Bank (www.tcmb.gov.tr)

Table 3.2 summarizes the key macroeconomic parameters of Turkish economy between 2001 and 2005. Following the financial crises in November 2000 and February 2001, the economy had high growth rates during 2000s. However, growth has been unable to cope with unemployment, which has been at the plateau of 10.3%-10.5% at this period. Although there has been a decrease in urban unemployment rate, it has not yet reached to its 2001 level. On the contrary, rural unemployment rate has an increasing trend after 2001, with the exception of 2004.

Fixed investment as a share of GNP has decreased to historically low levels after the financial crises in early 2000s. The deterioration in public investment has continued during this period and its share to GNP has decreased to 4.7% in 2004. Private investment as a share of GNP has also deteriorated during 2001-2003 period, and has only started to recover in 2004. Despite high growth rates following the financial crises, the recovery in investment has started quite late; nevertheless the 2004 recovery has been a remarkable one. In the mean time manufacturing sector capacity utilization rate has increased from 71.6% to 80.4% from 2001 to 2005. The evidences show that, high growth rates in recent years stimulated first increasing use of existing capacity, and only afterwards new investments.

There has been a considerable improvement in terms of inflation borrowing itself mainly to the contraction in domestic demand. The commitment about primary surplus in the letter of intent was successfully realized by cutting public expenditures. Indebtedness of public sector and the economy as a whole have continued to worsen during the period. Consolidated budget total debt stock increased from $124 billion to about $247 billion from 2001 to 2005, reflecting a 99% increase in four years. On the other hand the ratio of consolidated budget debt stock to GNP decreased from 101% level to 68% during the same period. The decrease in the ratio of consolidated budget external debt to GNP from 31.6% to 17.9% from 2001 to 2005, despite the 67% increase in external debt of public sector from 2001 to 2005 ($38.7 billion to $64.6 billion), is closely related to appreciation of domestic currency during this period. Appreciation of domestic currency has let the % increase in GNP in terms of foreign currency be more than that in terms of

domestic currency. According to our calculations[5], if nominal exchange rate did not change from 2001 to 2005, the ratio of external consolidated budget to GNP would be at about 43%. Thus, the ratio of total consolidated budget debt stock to GNP would be at about 94%, if the effect of appreciation of domestic currency is eliminated.

Current account deficit has reached historically high levels during this period. Current account deficit as a share of GNP which was 0.8% in 2002 has increased to 5.3% in 2004 and 6.4% in 2005. Although cumulative sum of current account balance between 2001 and 2005 is a deficit about $44.7 billion, foreign debt stock has increased even more by $57 billion during the same period.

One of the important effects of speculative capital inflows has been the appreciation of domestic currency, widening the current account deficit by changing the relative prices of tradable goods in favour of foreign goods. The positive percentages of real effective exchange rate in Table 3.2 reflect the appreciation of TL during 2000s. The appreciation rate of domestic currency has increased to 11.5% in 2005.

The basic macroeconomic indicators summarized above for 2000s show the unsustainable and fragile nature of growth of Turkish economy which is unable to create new jobs. The sources of growth are heavily dependent on increasing use of existing capacity rather than new investments and external financing which has a short term nature. The risks associated with such a regime of growth are known from the past experiences of Turkey and other developing countries like Latin American countries.

[5] The % increase in real GNP, in terms of domestic currency, is by 22% between 2001 and 2005. The % increase in consolidated budget external debt stock, in terms of foreign currency, is by 67%. Assuming that nominal exchange rate between domestic currency and the basket of foreign currency, with the same proportions forming the external debt, did not change from 2001 to 2005, the increase in the ratio of public external debt to GNP would be by 36.9% [(1.67/1.22)-1)], and the ratio of public external debt to GNP would be 43.3% [31.6%*(1+0.369)] in 2005. Since domestic debt is in terms of domestic currency, the ratio of public domestic debt to GNP is free from the effects of exchange rate. Thus total public debt stock as a ratio of GNP would be 93.8% (43.3%+50.5%) in 2005.

3.2. Stylised Facts on Turkish Private Manufacturing Industry

This sub-section aims to present the developments in investment, distribution, growth and the relations among these economic parameters for private manufacturing industry during the import substitution and structural adjustment period.

Table 3.3: Investment, Growth and Distribution in Private Manufacturing Industry (annual averages, all values in percentage)

	1973-1976	**1977-1979**	**1980-1988**	**1989-1993**	**1994**	**1995-1998**	**1999-2001**	**1973-1979**	**1980-2001**
Investment/Value Added	24.44	18.53	16.28	14.37	14.19	17.40	14.75	21.91	15.75
Profit/Value Added	66.56	67.17	76.93	79.17	86.38	82.44	79.50	66.82	79.22
Annual % change in real value added[10]	21.04	-0.01	7.37	16.32	-9.95	6.14	1.05	10.52	7.53
Exports/Output	3.51	2.51	12.81	14.18	20.82	21.29	26.50	3.08	16.89
Imports/Output	19.24	14.94	18.83	22.44	25.53	36.14	38.04	17.40	25.72
Net Exports/Output	-15.74	-12.43	-6.02	-8.25	-4.71	-14.85	-11.54	-14.32	-8.83
Annual % change in real wage per worker	12.12	-0.73	-4.79	19.07	-31.58	6.86	-0.89	6.61	2.06
Annual % change in productivity[1]	18.04	-3.13	2.27	15.97	-6.93	-3.25	3.74	8.97	4.16
Capacity utilization rate[2]	64.85[3]	60.63	65.72	76.17	70.90	75.28	70.30	63.04[7]	70.69
Cons. Budget Interest Paym./Total Exp.	2.77[4]	2.5	11.51	20.63	33.24	34.9	44.43	2.65[8]	23.32
Annual % change in real cons. budget interest pay.[10]	12.81[9]	11.12	29.31	24.00	11.12	26.53	20.47	11.54[8]	25.56
Interest income/GDP[5]			3.48	7.18	9.66	9.99[6]			

Notes:
[1] Annual % change in real value added per worker
[2] State Planning Organization, Main Economic Indicators; Onaran and Yentürk (2001)
[3] 1971-1976 [4] 1975-1976 [5] Temel and Kelleci (1996) [6] 1995 [7] 1971-1979 [8] 1976-1979 [9] 1976
[10] Deflated by manufacturing sector WPI, 1987=100

Source: Turkish Institute of Statistics, Survey of Employment, Payments, Production and Tendencies in Manufacturing Industry, 1973-2001; State Planning Organization, Main Economic Indicators; Onaran and Yentürk (2001); Temel and Kelleci (1996); TR Central Bank

Table 3.3 summarizes the changes in investment, growth and distributional dynamics in Turkish private manufacturing industry. The period given in Table 3.3 ends in 2001 because of data availability at the time of the beginning of the study. Public interest expenditures and the share of interest in GDP are additionally given for the aim of reflecting the rise of rentier income with financial liberalization.

During the second phase of import substitution period (1973-1976), the average annual share of private manufacturing investment in value added is about 24.5%. The high level of investment depends heavily on accelerating effects of the rise in real wages on demand via the increase in purchasing power of workers. The average annual percentage change in real wage per worker is 12.1%, and the average annual percentage change in value added in real terms is 21.0%, in this era of rapid industrialization. High increase in real wages is accompanied with high increase in productivity, which rises at an annual average rate of 18.0% during this period. Protectionist trade regime coupled with non-tariff barriers and cheap intermediaries provided by the Public Economic Enterprises for the use of private manufacturing industry led private industrialists accept the general increase in the level of wages, since oligopolistic profits were still maintained. However, this alliance of industrial workers and industrialists provided by the State via mediation policies was interrupted at late 1970s, with the collapse of import-substituting industrialization era, when the financing of current account became harder to sustain.

During the crises years of late 1970s, investment as a share of value added decreased to 18.5%. The decrease in investment was mainly due to deterioration in domestic demand which can be explained by the dramatic decrease in wage level reflecting its effects on capacity utilization and annual percentage change in real value added. Annual average change in real wage during this period was -0.7%, whereas average capacity utilization rate decreased to 60.6% (it was 64.9% before the crises years) and average annual change in real value added decreased to -0.01%. Despite the contraction in the industry and the economy as a whole, industrial oligopolists maintained and even enhanced high levels of profit share.

The shift from import-substituting industrialization to export-led growth based on structural adjustment programmes in 1980 altered the distributional dynamics of Turkish private manufacturing industry. Private manufacturing industry witnessed a dramatic deterioration in the wage level coupled with restrictions on labour rights

during the export led growth era (1980-1988) of Turkish economy based on the structural adjustment programmes. Despite the increase in profit share and the boom in exports, investment as a share of value added decreased further to levels lower than those in the crises years during late 1970s. Although the percentage change of value added could not reach the rates during import-substitution era, it increased by 7.37% annually mostly due to the increased use of excess capacity rather than new investments. The relative decrease in the growth rate of value added coupled with the decline in the wage share during export-led growth regime compared with 1973-1976 period shows significant evidences about the demand-driven reasons behind the decline in investment.

The main characteristic of 1989-1993 period, in which liberalization of capital movements took place is the reluctance of firms to invest despite the increase in profit share and high growth rates of value added. It may be explained by the increase in interest income after the liberalization of capital movements. Since the state is the main borrower in Turkey through T-bonds, the share of interest expenditures in total expenditures may be a good indicator of the rise in rentier income. Consolidated budget interest payments as a share of total consolidated budget expenditures reached 20.63% in average terms during 1989-1993 period. The annual average increase in consolidated budget interest payments was 24.00% in this period, whereas it increased further in 1990s. The second indicator of the rise in interest income after financial liberalization is based on the calculations of Temel and Kelleci (1996), where they estimate annual average ratio of interest income as a share of GDP to be 7.18% reflecting more than 100% increase compared with 1980-1988 period. This ratio was 9.66% for 1994, and 9.99% for 1995.

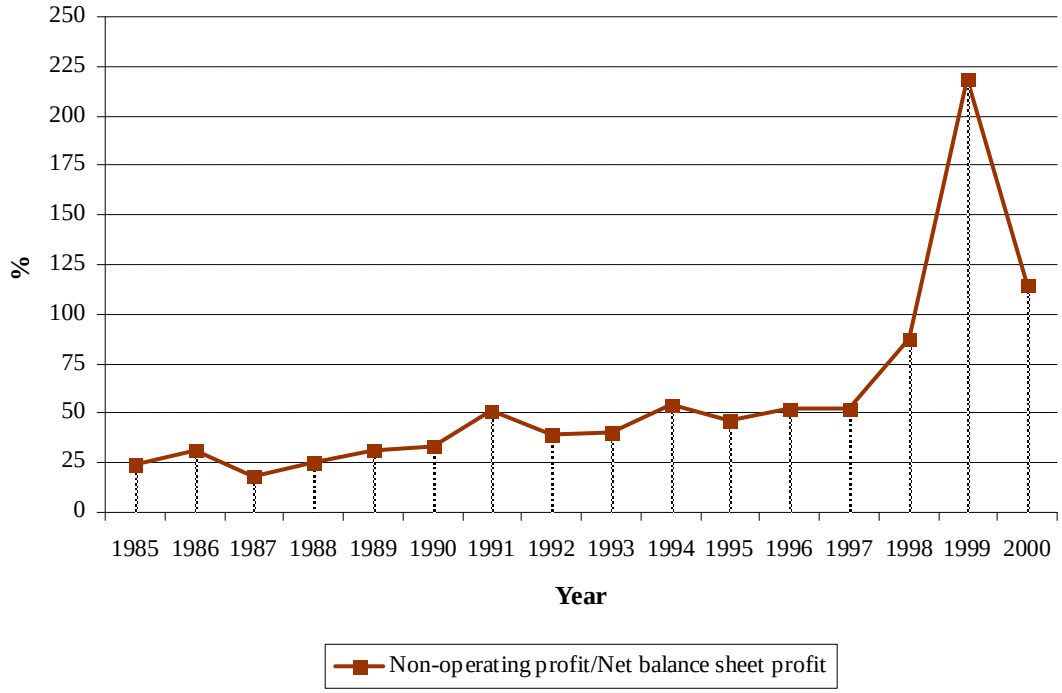


Figure 3.1: Non-Operating Profit as a Share of Net Balance Sheet Profit for 500 Large Manufacturing Firms

Source: İSO, 2000. Türkiye'nin 500 büyük sanayi kuruluşu, *İSO Dergisi*, Eylül 2000.

The effects of increasing availability of financial transactions for private manufacturing firms[6] after financial liberalization can better be seen on Figure 3.1, which presents the evolution of non-operating profit as a share of net balance sheet profit between 1985 and 2000. Average annual rate of non-operating profit as a share of net balance sheet profit, which was at a level of 24.5% during 1985-1988 period, reached 39.0% level during 1989-1993, and 89.7% level during 1994-2000. Real production has become less profitable for manufacturing industries after financial liberalization leading these firms towards speculative financial profit seeking activities rather than new investments.

Second half of 1990s did not witness a recovery of investment since the speculation-led economic growth regime dominated this era. Following the increase in real wages in private manufacturing industry between 1989 and 1993, real wages suppressed in 1994 (the decrease in real wage per worker was 31.58%) and profit share reached

[6] Although Figure 3.1 presents non-operating profit as a share of net balance sheet profit for both public and private manufacturing firms due to data availability, the trend in the figure reflects mostly the evolution of financial profits of private manufacturing firms, since total profits of private manufacturing firms among 500 large manufacturing firms as a share of total profits of all 500 large manufacturing firms is about 90% between 1985 and 2000 in average terms (İSO, 2000).

86.38%. Profit share decreased slightly following the financial crisis from 1995 until the beginning of 2000s. Real wages on the contrary, increased by 7.30% annually in average terms between 1995 and 2000 before another collapse by 19.08% in 2001 crises.

Investment as a share of value added which was 17.40% during 1995-1998 period, fell 14.75% level during 1999-2001 period. Despite high rates of profit share changing between 78% and 86% between 1995 and 2001, investment could not recover in contrast to expectations of neo-classical theory. Stagnation in investment in spite of high profit share in private manufacturing industry gives rise to questions about the demand side effects of wage suppression policies which were used as the main tool for both growth and crisis adjustment in the recent history of Turkish economy. In spite of the fact that panel data for 2004 is not available at the time of this analysis, the aggregate data shows that a recovery of investment started finally in 2004 (Table 3.2).

Comparing the indicators of private manufacturing industry between import-substitution (1973-1979) and structural adjustment periods (1980-2001) in Table 3.3, enables us to see the effects of change in policy stances between these eras. Private manufacturing investment deteriorated with the implementation of structural adjustment programmes and decreased from 21.91% to 15.75% from 1973-1979 period to 1980-2001 period, despite the increase in profit share (from 66.82% to 79.22%). In the meantime, the average annual % change in real value added, which is an indicator of demand, decreased from 10.52% to 7.53% between these periods. The decrease in investment and demand and the increase in profit share hint not only the inability of increasing profit share in enhancing investment but also the importance of demand on determining investment.

Income distribution policies in favour of capital could not achieve a sustainable and stabilized growth and accumulation as seen in Figure 3.2. Contrary to volatile structure of both investment and growth in private manufacturing industry, profit share has followed a more stationary path with slight rises and falls. Although the relation between distribution and investment can not be clearly seen on Figure 3.2, it can be argued that those income policies of Turkish economy were unable to sustain long run stable growth and accumulation.

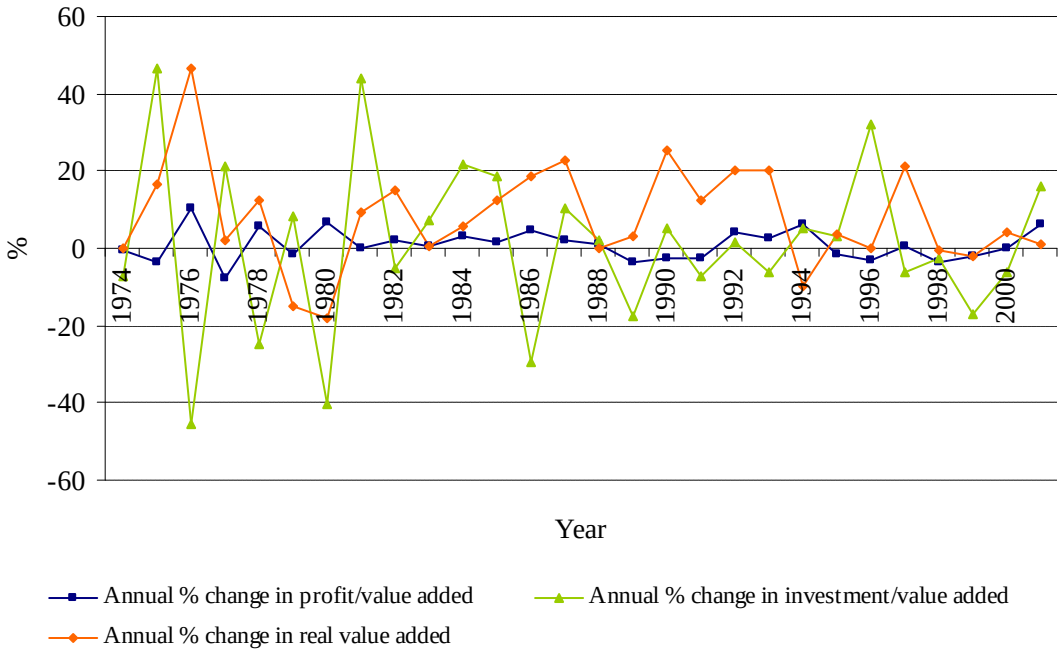


Figure 3.2: Developments in Profit Share, Investment and Real Value Added in Private Manufacturing Industry

Source: Turkish Institute of Statistics, Manufacturing Database:1973-2001

Stylized facts on Turkish economy and on private manufacturing industry through a narrower perspective provide us hints about the inability of pro-capital income policies to enhance and stabilize accumulation and growth. However, since it may be hard and sometimes misleading to make judgments about the quantitative relationship between distribution and investment by just looking at the stylized facts, the distributional dynamics of sub-sectors of private manufacturing industry will be analyzed in detail by the help of econometrical techniques in the following sections.

4. THE RELATION between DISTRIBUTION and INVESTMENT in TURKISH PRIVATE MANUFACTURING INDUSTRY

The stylized facts on Turkish economy and private manufacturing industry discussed in Section 3 provide clues about the unresponsiveness of investment to the high levels of profit share which may be due to the existence of excess capacity in the industry leading to reluctance to invest. The indicators of distribution and investment in Turkish private manufacturing industry hint at a stagnationist and wage-led regime. In order to test this argument for private manufacturing industry, we used econometrical techniques based on the data for sub-sectors of private manufacturing industry.

This section aims to present the data and model used in the econometrical analysis, the methodology and results of the analysis. In the first sub-section, data, model and the methodology of the analysis will be presented, and in the second sub-section estimation results will be discussed in detail.

4.1. Data, Model and Methodology

Turkish private manufacturing industry survey annual data, based on three-digit ISIC-Rev. 2 classification for 26 sub-sectors[7] in the period between 1973 and 2001 was used for the analysis in this study, which aims to shed light on the relation between distribution and investment in Turkish private manufacturing industry [8].

Although stylized facts on Turkish private manufacturing industry are briefly discussed in Section 3.2., we aim to present the general trends in investment, growth and distribution in 26 sub-sectors of private manufacturing industry before proceeding with the model that is estimated.

[7] Petroleum refineries and manufacture of miscellaneous products of petroleum and coal sub-sectors are excluded due to data constraints, and food manufacturing and other food manufacturing sub-sectors are aggregated.

[8] Source: Turkish Institute of Statistics, Survey of Employment, Payments, Production and Tendencies in Manufacturing Industry for the firms employing 10 or more employees.
See Appendix, Table A.1 for the list of the sub-sectors of Turkish manufacturing industry.

Table 4.1: Distribution, Investment and Growth in the Sub-Sectors of Private Manufacturing Industry:1973-2001

		Average Annual Investment/Value Added (%)			Average Annual Profit/Value Added (%)			Average Annual % Change in Real Value Added		
		1973-79	1980-2001	1973-2001	1973-79	1980-2001	1973-2001	1974-79	1980-2001	1974-2001
3	Private manufacturing industry	21.91	15.75	17.23	66.82	79.22	76.23	10.52	7.53	8.17
311	Food manufacturing and other food manufacturing	17.41	11.13	12.65	60.62	81.16	76.20	44.50	6.68	14.78
313	Beverage industries	17.91	18.58	18.42	72.86	84.30	81.54	15.26	7.77	9.38
314	Tobacco manufactures	1.57	7.06	5.74	80.47	88.69	86.71	-2.39	36.67	28.30
321	Manufacture of textiles	25.99	20.85	22.09	64.39	75.74	73.00	11.57	6.61	7.67
322	Manufacture of wearing apparel, except footwear	14.64	10.82	11.74	66.94	78.19	75.47	41.05	15.19	20.73
323	Manufacture of leather and prod. of leath., leather subs. and fur	12.29	9.91	10.48	53.54	75.77	70.41	25.02	9.61	12.91
324	Manufacture of footwear	19.22	6.08	9.25	56.01	75.20	70.57	24.52	11.29	14.12
331	Manufacture of wood and wood and cork prod., exc. furniture	14.35	22.40	20.46	70.10	77.71	75.87	2.69	9.62	8.14
332	Manufacture of furniture and fixt. except prim. of metal	17.70	10.08	11.92	62.52	76.79	73.35	24.41	16.81	18.44
341	Manufacture of paper and paper products	24.32	18.13	19.63	76.53	80.35	79.43	14.40	5.91	7.73
342	Printing, publishing and allied industries	14.36	19.73	18.43	62.39	80.91	76.44	-5.91	10.30	6.83
351	Manufacture of industrial chemicals	37.21	20.67	24.67	73.81	83.84	81.42	28.45	4.86	9.91
352	Manufacture of other chemical products	11.74	8.29	9.12	65.83	81.55	77.76	5.00	7.64	7.08
355	Manufacture of rubber products	9.43	13.59	12.59	60.94	76.59	72.81	11.27	3.33	5.03
356	Manufacture of plastic products not elsewhere classified	18.79	21.49	20.84	60.10	77.85	73.57	9.32	6.67	7.24
361	Manufacture of pottery, china and earthenware	19.40	17.13	17.67	60.73	79.30	74.82	19.29	7.75	10.22
362	Manufacture of glass and glass products	20.67	22.03	21.70	56.89	73.61	69.57	9.14	9.00	9.03
369	Manufacture of other non-metallic mineral product	41.55	16.63	22.65	63.23	81.40	77.01	11.11	8.60	9.14
371	Iron and steel basic industries	30.97	19.62	22.36	65.13	82.26	78.12	15.84	11.34	12.30
372	Non-ferrous metal basic industries	29.28	21.16	23.12	75.71	80.24	79.15	50.54	8.52	17.52
381	Manufacture of fabricated metal prod., exc. mach. and equip.	15.67	14.06	14.45	62.16	76.09	72.73	12.86	8.84	9.70
382	Manufacture of machinery except electrical	40.34	12.70	19.37	61.41	76.64	72.96	8.92	10.53	10.19
383	Manufacture of electr. machin. apparatus, applian. and supplies	14.52	12.05	12.65	64.39	77.33	74.20	18.56	11.36	12.90
384	Manufacture of transport equipment	13.65	19.77	18.29	72.99	75.96	75.24	11.78	13.48	13.11
385	Manufacture of professional and scientific, measuring and controlling equip. not elsewhere classified	12.35	12.59	12.53	57.63	78.73	73.64	4.23	25.33	20.80
390	Other manufacturing industries	13.15	18.19	16.98	58.48	77.51	72.92	6.13	14.64	12.82

Source: Turkish Institute of Statistics, Survey of Employment, Payments, Production and Tendencies in Manufacturing Industry, 1973-2001.

Table 4.1 presents investment as a share of value added, profit share and percentage change in real value added, all by annual average values for 26 sub-sectors of private manufacturing industry in 1973-79, 1980-2001 and 1973-2001 periods. Comparing the values of these macroeconomic indicators between the import-substituting era and structural adjustment era based on sub-sectors, we see that there has been a considerable decrease in the investment/value added ratio. There is a negative change in investment as a share of value added in 16 sub-sectors out of 26 sub-sectors in private manufacturing investment. The overall decline in investment/value added ratio in private manufacturing investment in the post 1980 era compared with 1970s is about 28% (from 21.91% to 15.75%).

The fall in investment is accompanied with the increase in profit share. There has been a positive change in profit share in all of 26 sub sectors during the structural adjustment phase of Turkish economy compared with import-substituting industrialization. The overall increase in profit share in private manufacturing industry is about 19% (from 66.82% to 79.22%).

These evidences pose doubts about the neoclassical theory arguing that pro-capital income policies increase investment because of the cost effects of wages in the production. The slowdown of accumulation in spite of increase in profit share rise questions about the demand aspects of the problem. When we compare the change in real value added, accelerator term which has the ability of reflecting demand, between 1974-1979 and 1980-2001 periods, we see that there has been a decrease in 19 out of 26 sub-sectors. The overall decrease in the average annual change of real value added is about 28% (from 10.52% to 7.53%). Thus, comparison of sub-sectors between post and pre-1980s signals existence of a wage-led accumulation regime where the increase in profitability goes along with low investment rates and a stagnationist growth regime where high profitability goes along with low growth rates in private manufacturing industry.

In order to test the regime of accumulation by comparing the relative effects of profitability and demand on investment, we estimated an investment function based on the theoretical framework outlined by Bhaduri and Marglin (1990). As it is discussed in Section 2.1.2, Bhaduri and Marglin (1990) define an investment function depends on profit expectations proxied by the rate of profit. The rate of profit is separated into its components; profit share and capacity utilization in order

to capture the possibility of unwillingness of investors to invest in additional capacity, in spite of high profitability in the case of excess capacity. Thus, investment is defined as a function of profit share and capacity utilization (Equation 2.4). Another aspect of this investment function is to separate the demand effect of wages on investment, indicated by capacity utilization, and the cost effect of wages on investment, indicated by profit share.

In the case of a stagnationist growth regime the decrease in consumption demand due to an increase in profit share (i.e. decrease in wage share) is not compensated by the increase in investment due to decrease in labour costs (i.e. increase in profit share). So, aggregate demand (Consumption + investment) decreases as a result of an increase in profit share. If the negative effect of decreasing aggregate demand (proxy for capacity utilization) on investment via accelerator principle is greater than the positive effect of increasing profit share on investment via decreasing labour costs, investment will decrease and the overall effect of profit share on investment will be negative. The type of accumulation regime is wage-led if the effect of capacity utilization on investment is greater than the effect of profitability on investment, where high profit share is associated with a low level of investment.

On the other hand, in an exhilarationist growth regime profit share is positively related to capacity utilization. Additionally, in the case of a profit-led accumulation regime higher profits go along with higher investment.

Thus, the investment function outlined by Bhaduri and Marglin (1990) provides us the ability to determine the type of accumulation by comparing the relative impacts of accelerator term and profit share on investment. Although a positive response of both profit share and accelerator term is expected, the relative impacts of these variables on investment determine the accumulation regime. If the demand effect of wages on investment, denoted by the effect of accelerator term on investment, is greater than the cost effect of wages on investment, denoted by the effect of profit share on investment, the regime of accumulation is wage-led. If the opposite case is valid, the regime of accumulation is profit-led.

In our case, using the panel data for 26 sub-sectors of private manufacturing industry based on 3-digit level, we estimate the following investment function:

$$\ln(I/VA)_{i,t} = f((P/VA)_{i,t-1}, d\ln VA_{i,t-1}) \quad (4.1)$$

where; i:1,...,26 (private manufacturing industry sub-sectors based on 3-digit classification)

t : 1975,...,2001

I : investment

VA: value added

P : profit

(All values are annual and deflated by sectoral WPI, 1987=100)

Sectoral investment normalized by sectoral value added in logarithmic terms is estimated as a function of sectoral profit share (P/VA) and an accelerator term: the logarithmic change in real value added. The reason of using growth in real value added instead of capacity utilization as an accelerator term is the absence of data for capacity utilization rates for 3-digit based industry level, which leads to poor performance of measuring the effect of demand on investment (Onaran and Yentürk, 2001). Additionally, Bhaskar and Glyn (1995) also argue that growth is a better indicator of expectations about demand and use growth values as the accelerator terms.

Lagged values of both profit share and growth in real value added are used in the equation, consistent with the Post-Keynesian empirical literature (Onaran and Yentürk, 2001; Bhaskar and Glyn, 1995; Bowles and Boyer, 1995; Stockhammer, 2000; Onaran and Stockhammer, 2006) assuming that profit expectations are determined by previous yearôs profit rate, which is separated into profit share and growth rate in our equation. Using lagged values also prevents the endogeneity problem.

Since the normality assumption is valid in most of the sectors when we use investment/value added in logarithmic form, the logarithmic form of investment/value added is used in the equation. According to the Augmented Dickey Fuller (ADF) test results[9], investment/value added (in logarithmic form) is stationary for 22 out of 26 sub-sectors whereas profit/value added is non-stationary for 18 out of 26 sub-sectors. The change in real value added is stationary in all sectors.

[9] See Appendix, Table A.2 for the results of ADF test results for each sub-sector and variable.

Although profit/value added is non-stationary for most of the sectors, since this is a ratio, and the power of the unit root tests is low, we choose to work with the level of the ratio. Moreover, when we employ profit/value added in difference form, the coefficients of profit share become negative which is counter-intuitive. Although in a stagnationist wage-led regime the overall effect of profit share on investment is negative, the coefficient of profit share in our equation, which is just the partial effect, does not have the ability of showing this overall effect, since the partial effect of profit share on investment, the interaction between aggregate demand and profit share and the effect of aggregate demand on investment jointly determine this overall impact of profit share. The coefficient of profit share just presents the partial cost effect of wages on investment, whereas change in real value added captures the demand effect of wages on investment. A higher response of investment to growth in real value added than to profit share is a sufficient condition for the existence of a wage-led accumulation regime.

Our base model specification is as follows:

$$\ln(I/VA)_{i,t} = \alpha_i + \beta_{1i} \times (P/VA)_{i,t-1} + \beta_{2i} \times d(\ln VA)_{i,t-1} \qquad \textit{(Model 1)}$$

where; i:1,é ,26 and t:1975,...,2001

I : investment

VA : value added

P : profit

(All values are annual and deflated by sectoral WPI, 1987=100)

Four alternative estimation methods[10] for panel data are used in order to estimate the coefficients of profit share and demand (i.e. growth in real value added). The estimation methods are seemingly unrelated regression (SUR) model, one way fixed effects linear model, one way random effects linear model and Arellano-Bond dynamic panel data method. SUR helps us to identify sector-specific impacts of profitability and demand on investment, whereas pooled panel data estimations (i.e. fixed, random effects, and dynamic panel data estimation) capture the overall view of the relation between distribution and investment in private manufacturing industry, accounting for the cross-section as well as across-time variations. Alternative

[10] Technical properties of estimation methods and tests for satisfaction of pre-conditions of these methods are given in Appendix.

methods also provide us the ability of checking the robustness of the results of estimations.

4.2. Estimation Results

According to the results of SUR estimation of Model 1, the coefficients of profit share are positive for 15 sub-sectors out of 26 sub-sectors, which are significant (at 10% level) for 10 sub-sectors. On the other hand, contrary to expectations the coefficients of profit share are negative for 11 sub-sectors, 9 of which are statistically significant.

The coefficients of the accelerator term (i.e. logarithmic change in real value added) are closer to the expectations, where they are positive for 17 sub-sectors, 15 of which are statistically significant. The number of significant and negative sub-sectors is only 4, and the coefficients of 5 sub-sectors are negative but insignificant.

Table 4.2 provides us a more detailed analysis of estimations of coefficients for Model 1. The coefficients, t-ratios and significance levels of these coefficients for constant term, profit share and the accelerator term are given in Table 4.2. Additionally, standardized coefficients[11] of explanatory variables are also given in order to compare the relative impacts of profit share and accelerator term on investment within and across sub-sectors.

Leaving aside the insignificant and negative coefficients, comparing the standardized coefficients of profit share and accelerator term, we see that the effect of profit share is greater than the accelerator term in 10 out of 26 sub-sectors, whereas the effect of the accelerator term is greater than profit share in 9 out of 26 sub-sectors. It may be misleading to compare the coefficients for remaining 7 sub-sectors, since the coefficients are both negative and/or insignificant. The sub-sectors where profit share is more effective than demand side of wages on investment are: food manufacturing and other food manufacturing; manufacture of textiles; manufacture of leather and products of leather, leather substitutes and fur; manufacture of wood and wood and cork products, except furniture; printing, publishing and allied industries; manufacture of rubber products; manufacture of plastic products not elsewhere

[11] Standardized coefficients are estimated by the formula ($\beta^*\hat{\sigma}_y/\hat{\sigma}_x$) where β denotes the estimated coefficient of variable x, $\hat{\sigma}_y$ denotes for the standard deviation of dependent variable y, and $\hat{\sigma}_x$ denotes the standard deviation of explanatory variable x.

classified; manufacture of glass and glass products; manufacture of transport equipment and other manufacturing industries.

The sub-sectors where the demand side of wages is more effective than profit share on investment are: manufacture of wearing apparel, except footwear; manufacture of footwear; manufacture of industrial chemicals; manufacture of pottery, china and earthenware; manufacture of other non-metallic mineral product; iron and steel basic industries; non-ferrous metal basic industries; manufacture of fabricated metal products, except machinery and equipment and manufacture of electrical machinery apparatus, appliances and supplies.

Standardized coefficients also enable us to compare the relative impacts of explanatory variables across sub-sectors. The impact of profit share on investment is the highest in sub sectors of manufacturing of wood and wood and cork products, except furniture; printing, publishing, and allied industries; manufacturing of glass and glass products. The impact of the accelerator term on investment is the highest in sub-sectors of manufacture of wearing appeal, except footwear; manufacture of rubber products and manufacture of electrical machinery apparatus, appliances and supplies.

The results show that the relative impacts of cost and demand sides of wages on investment differ from sub-sector to sub-sector. Although the effect of profit share on investment is positive and significant for 10 sub-sectors and more effective than the demand side of wages for these sub-sectors, it is insignificant and/or negative for remaining 16 sub-sectors. The impact of demand on investment is positive and significant for 9 sub-sectors out of these 16 sub-sectors. According to these results, it can be argued that pro-capital income policies do not enhance accumulation for most of the sub-sectors of private manufacturing industry.

Table 4.2: Estimation Results of Model 1 by Seemingly Unrelated Regression (SUR) Method

Sub-Sector	Constant	t-Stat.	Sig. Level	$(P/VA)_{t-1}$	t-Stat.	Sig. Level	$d(lnVA)_{t-1}$	t-Stat.	Sig. Level	D.W. Stat.	1st degree autoc. (Ŭ=.05)	R^2-Adj.	Standardized Coefficient $(P/VA)_{t-1}$	Standardized Coefficient $d(lnVA)_{t-1}$
311	-2.86	-14.02	1%	0.79	3.04	1%	0.65	12.33	1%	1.97	no	0.35	1.98	0.95
313	-1.36	-1.62	-	-0.55	-0.53	-	-1.66	-6.33	1%	1.31	?	0.13	-5.48	-5.96
314	-3.39	-1.96	10%	0.42	0.21	-	-0.29	-1.18	-	0.77	yes	-0.09	6.34	-0.53
321	-2.58	-8.65	1%	1.35	3.37	1%	-0.52	-3.66	1%	1.17	yes	0.02	7.52	-1.45
322	-2.23	-4.15	1%	-0.36	-0.51	-	0.96	7.36	1%	2.02	no	0.22	-2.68	1.61
323	-3.49	-11.74	1%	1.49	3.69	1%	0.51	4.46	1%	1.14	yes	0.14	6.73	0.86
324	-1.65	-4.50	1%	-0.98	-1.90	10%	0.46	3.05	1%	1.55	no	0.03	-4.86	0.99
331	-4.81	-10.84	1%	4.05	7.05	1%	-0.24	-1.59	-	1.47	?	0.14	32.62	-0.65
332	-1.15	-3.37	1%	-1.53	-3.33	1%	0.16	1.50	-	1.56	no	0.05	-8.03	0.27
341	-0.17	-0.24	-	-1.93	-2.24	5%	-0.02	-0.18	-	1.13	yes	-0.06	-19.71	-0.05
342	-3.99	-9.66	1%	2.75	5.25	1%	0.43	3.47	1%	1.82	no	0.24	16.80	0.94
351	-0.48	-0.68	-	-1.52	-1.74	10%	0.48	2.79	1%	0.95	yes	0.04	-14.41	1.03
352	-1.51	-3.78	1%	-1.19	-2.33	5%	-0.37	-2.60	1%	1.42	?	0.05	-4.94	-0.60
355	-3.51	-8.48	1%	1.83	3.27	1%	0.77	5.95	1%	1.77	no	0.29	10.88	1.53
356	-2.70	-12.49	1%	1.40	4.96	1%	0.47	3.87	1%	1.01	yes	0.14	4.80	0.84
361	-1.88	-9.10	1%	0.10	0.38	-	0.28	3.18	1%	0.97	yes	-0.03	0.35	0.44
362	-4.16	-7.81	1%	3.45	4.58	1%	-1.36	-5.13	1%	1.83	no	0.16	28.00	-5.57
369	-0.56	-1.33	-	-1.47	-2.72	1%	0.31	1.83	10%	0.74	yes	0.02	-8.65	0.82
371	-0.47	-1.13	-	-1.55	-2.95	1%	0.38	3.42	1%	2.44	no	0.04	-8.54	0.68
372	1.72	2.12	5%	-4.30	-4.22	1%	0.22	2.03	5%	1.77	no	0.10	-46.39	0.33
381	-2.19	-5.89	1%	0.16	0.31	-	0.43	2.39	5%	1.61	no	-0.04	0.82	1.18
382	1.36	3.71	1%	-4.42	-8.85	1%	-0.05	-0.30	-	1.32	?	0.39	-29.34	-0.16
383	-2.29	-8.17	1%	0.08	0.22	-	0.79	7.67	1%	2.17	no	0.05	0.38	1.51
384	-2.68	-5.91	1%	1.22	2.02	5%	0.34	3.30	1%	1.71	no	-0.01	8.96	0.44
385	-2.29	-7.85	1%	0.18	0.46	-	-0.04	-0.65	-	1.15	yes	-0.08	0.84	-0.06
390	-3.35	-7.61	1%	1.79	3.01	1%	0.15	0.86	-	1.53	?	0.01	10.29	0.38

Although SUR estimation enables us to analyze the sector specific impacts of profitability and demand on investment, it does not provide us the chance to see the generalized picture of private manufacturing industry. Next, Model 1 is estimated by fixed effects and random effects methods in order to analyze the relation between distribution and investment in a more general manner. Table 4.3 presents the results of fixed effects estimation, whereas Table 4.4 presents the results of random effects estimation for Model 1.

The test result for the joint significance of fixed effects for the one-way fixed effects estimation shows that, fixed effects estimation is more efficient than OLS. Additionally, the result of Breusch-Pagan LM test for random effects indicates that, variance of the sector-specific random term is different from zero, thus random effects estimation is more efficient than OLS. Although fixed effects estimation is found more efficient than random effects estimation according to Hausman test, results of both estimations are given and discussed, in order to check robustness of these estimation methods[12].

Table 4.3: Estimation Results of Model 1 by Fixed Effects Method

Model: $\ln(I/VA)_{i,t} = \alpha_i + \beta_1 \times (P/VA)_{i,t-1} + \beta_2 \times d(\ln VA)_{i,t-1}$

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Constant	-2.218455	0.182989	-12.12	0.0000
$(P/VA)_{t-1}$	0.262257	0.241442	1.086209	0.2778
$d(\ln VA)_{t-1}$	0.195250	0.079825	2.445962	0.0147
R-squared	0.290656	Mean dependent var.		-2.003913
Adjusted R-squared	0.262028	S.D. dependent var.		0.627540
S.E. of regression	0.539090	Sum squared resid.		194.4234
Log likelihood	-129.5256	F-statistic		274.1250
Durbin-Watson stat	1.328453	Prob. (F-statistic)		0.000000
Joint significance test of fixed effects		Chi^2		10.79
		Prob. (Chi^2)		0.0000

[12] Technical properties of fixed and random effects estimations are given in Appendix.

Table 4.4: Estimation Results of Model 1 by Random Effects Method

Model: $\ln(I/VA)_{i,t} = \alpha_1 + \beta_1 \times (P/VA)_{i,t-1} + \beta_2 \times d(\ln VA)_{i,t-1} + u_i$

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Constant	-2.196414	0.191778	-11.45288	0.0000
$(P/VA)_{t-1}$	0.233480	0.239217	0.976018	0.3294
$d(\ln VA)_{t-1}$	0.192234	0.079801	2.408919	0.0163
GLS Transformed Regression				
R-squared	0.262797	Mean dependent var.		-2.003913
Adjusted R-squared	0.260672	S.D. dependent var.		0.627540
S.E. of regression	0.539585	Sum squared resid.		202.0593
Durbin-Watson stat	1.278493			
Unweighted Statistics including Random Effects				
R-squared	0.287941	Mean dependent var.		-2.003913
Adjusted R-squared	0.285889	S.D. dependent var.		0.627540
S.E. of regression	0.530303	Sum squared resid.		195.1675
Durbin-Watson stat	1.323640			
Breusch-Pagan LM test for Random Effects		Chi^2		550.18
		Prob. (Chi^2)		0.0000
Hausman Test: Fixed vs. Random Effects		Chi^2		22.02
		Prob. (Chi^2)		0.0004

According to the results of estimations for Model 1 by both fixed and random effects methods, the coefficients of both profit share and growth are positive as expected. However, the coefficients of profit share are insignificant according to both fixed and random effects estimations, reflecting the unresponsiveness of investment to profit share. On the contrary, the coefficients of the accelerator term are significant at 5% significance level for the two estimation methods.

Results of pooled panel estimations hint the inability of pro-capital income policies in stimulating investment, whereas demand aspects of wages seem to effect investment positively through the accelerator principle.

However, the estimation results for Model 1 obtained by both SUR and pooled estimations (fixed and random effects models) may be misleading since all three estimations suffer from autocorrelation problem. Durbin-Watson test statistics for SUR estimation show that 9 sub-sectors out of 26 sub-sectors suffer from first degree autocorrelation problem, while the existence of autocorrelation cannot be determined for 5 sub-sectors. Pooled estimations with fixed and random effects models also have the problem of first-degree autocorrelation, since Durbin Watson test statistics are below the lower bound values at 5% significance level.

The model is modified by including the lagged value of the rate of accumulation (i.e. dependent variable), taken in logarithms, in order to solve the autocorrelation

problem. Besides having the ability of solving autocorrelation problem, the first lag of the rate of accumulation allows the role of costs in adjusting the rate of accumulation (i.e. partial adjustment) (Bhaskar and Glyn, 1995; Onaran and Yentürk, 2001).

The specification of the modified dynamic model is as follows:

$$\ln(I/VA)_{i,t} = \alpha_i + \beta_{1i} \times (P/VA)_{i,t-1} + \beta_{2i} \times d(\ln VA)_{i,t-1} + \beta_{3i} \times \ln(I/VA)_{i,t-1} \qquad (Model2)$$

where; i:1,é ,26 and t:1975,...,2001

I : investment

VA : value added

P : profit

(All values are annual and deflated by sectoral WPI, 1987=100)

Table 4.5 presents the estimation results for Model 2 by SUR method. Since the lagged value of dependent variable takes place among explanatory variables, the coefficients of explanatory variables presented in Table 4.5 show short-term values.

Breusch-Godfrey Lagrange Multiplier (LM) test is employed to test the existence of autocorrelation problem. According to the results, we see that autocorrelation problem is solved when the first lag of the change in investment/value added is included as an explanatory variable, except 2 sub-sectors at 1% significance level. Breusch-Godfrey LM test statistics and results of this test for each sub-sector are also included in Table 4.5.

Table 4.5: Estimation Results of Model 2 by SUR Method (Short-Term Coefficients)

Sub-Sector	Constant	t-Stat.	Sig. Level	$(P/VA)_{t-1}$	t-Stat.	Sig. Level	$d(lnVA)_{t-1}$	t-Stat.	Sig. Level	$ln(I/VA)_{t-1}$	t-Stat.	Sig. Level	R^2-Adjusted	Breusch-Godfrey LM stat.	Autocorr. (Ŭ=.01)
311	-2.50	-10.55	1%	0.40	1.30	-	0.62	9.94	1%	0.03	0.46	-	0.31	0.12	no
313	-0.03	-0.05	-	-0.98	-1.18	-	-1.51	-8.71	1%	0.51	10.94	1%	0.31	2.30	no
314	-2.49	-1.85	10%	1.65	1.05	-	0.30	1.51	-	0.67	7.30	1%	0.27	2.60	no
321	-2.27	-9.78	1%	1.92	5.89	1%	-0.86	-9.61	1%	0.44	11.49	1%	0.24	2.18	no
322	-2.71	-5.33	1%	0.26	0.38	-	0.95	7.75	1%	-0.01	-0.13	-	0.17	5.92	no
323	-1.78	-4.65	1%	0.90	2.16	5%	0.77	5.68	1%	0.55	7.20	1%	0.38	-0.01	no
324	-1.35	-3.30	1%	-0.65	-1.05	-	0.46	2.61	1%	0.22	2.13	5%	0.01	0.95	no
331	-4.56	-7.84	1%	4.14	5.78	1%	-0.20	-0.99	-	0.18	2.18	5%	0.10	1.26	no
332	-0.75	-1.89	10%	-1.48	-2.81	1%	0.23	1.94	10%	0.20	3.36	1%	0.02	1.93	no
341	-0.18	-0.21	-	-0.88	-0.78	-	-0.58	-3.24	1%	0.42	4.99	1%	0.11	3.43	no
342	-3.69	-8.57	1%	2.77	5.34	1%	0.35	3.44	1%	0.17	3.58	1%	0.23	0.14	no
351	-1.09	-1.81	10%	0.31	0.42	-	0.37	2.66	1%	0.54	8.21	1%	0.27	2.19	no
352	-1.68	-4.42	1%	-1.11	-2.22	5%	-0.30	-3.10	1%	-0.04	-0.53	-	0.00	12.34	yes
355	-3.10	-9.45	1%	1.56	3.81	1%	0.73	8.93	1%	0.10	2.63	1%	0.27	4.70	no
356	-1.64	-6.84	1%	1.01	3.52	1%	0.20	1.66	10%	0.47	7.10	1%	0.36	-0.10	no
361	-0.76	-2.48	5%	-0.06	-0.21	-	0.03	0.36	-	0.54	8.55	1%	0.20	4.70	no
362	-3.97	-6.24	1%	3.61	4.03	1%	-1.34	-3.84	1%	0.17	1.95	10%	0.12	0.04	no
369	-0.86	-3.12	1%	0.47	1.18	-	0.22	2.17	5%	0.72	12.66	1%	0.45	2.64	no
371	-0.08	-0.22	-	-2.51	-5.12	1%	0.32	3.65	1%	-0.24	-5.33	1%	0.06	7.69	yes
372	2.88	4.00	1%	-5.65	-6.22	1%	0.32	3.24	1%	0.06	0.99	-	0.07	0.37	no
381	-1.90	-7.41	1%	0.39	1.18	-	0.28	2.26	5%	0.22	6.76	1%	-0.03	1.58	no
382	1.42	3.76	1%	-4.15	-7.44	1%	-0.06	-0.38	-	0.14	2.06	5%	0.36	1.84	no
383	-2.31	-9.27	1%	-0.15	-0.48	-	0.72	9.86	1%	-0.10	-3.35	1%	0.03	-0.03	no
384	-2.45	-5.95	1%	1.04	1.91	10%	0.27	3.00	1%	0.05	0.99	-	-0.04	-0.19	no
385	-1.80	-6.22	1%	0.55	1.40	-	-0.14	-2.53	5%	0.34	7.48	1%	0.03	1.29	no
390	-2.37	-5.02	1%	0.94	1.44	-	0.31	1.73	10%	0.19	3.12	1%	0.02	0.54	no

The short-term coefficients of the lag value of profit share are positive for 16 sub-sectors, 8 of which are significant at 10%. The coefficients of remaining 10 sub-sectors are negative, but 5 of them are statistically insignificant. On the other hand, the short-term coefficients of the lag value of growth in real value added are positive and significant for 16 industries, whereas they are positive but insignificant for 2 industries. The number of significant and negative coefficients of growth in real value added is 8.

Despite the significant and negative short-term coefficients of both profit share (for 5 sub-sectors) and growth in real value added (for 6 sub-sectors), signs of the most coefficients are positive as expected. The fact that the number of positive and significant coefficients of growth in real value added is two times of that of profit share provides us evidences about the relative strength of demand aspects of wage share, compared with cost side of wages, in explaining investment.

The first lag of accumulation is highly significant and positive for most of the sub-sectors of private manufacturing industry, consistent with the partial adjustment model. The coefficients of first lag of accumulation are positive and significant for 19 sub-sectors, positive but insignificant for 3 sub-sectors, and negative for 4 sub-sectors, 2 of which are significant.

Although the number of positive and significant coefficients of profit share and growth in real value added provides hints about wage-led growth regimes in the short term, it does not provide us the ability of making comparisons between the relative strength of these variables within and across sub-sectors. In order to make comparisons of the impacts of demand and supply sides of wages on investment, short term standardized coefficients of profit share and growth in real value added are given in Table 4.6, next to the short term coefficients and significance levels.

Leaving aside the sub-sectors where both profit share and growth in real value added have negative and/or insignificant coefficients, the comparison of standardized coefficients within sectors shows that, the impact of growth in real valued added is greater than that of profit share on investment for 11 sub-sectors, whereas profit share is more effective for 8 sub-sectors.

Table 4.6: Comparison of Short-Term Standardized Coefficients of Profit Share and Growth in Real Value Added Estimated by Model 2

Sub-Sector	$(P/VA)_{t-1}$	Sig. Level	$d(lnVA)_{t-1}$	Sig. Level	Standardized short-term coefficients of $(P/VA)_{t-1}$	Standardized short-term coefficients of $d(lnVA)_{t-1}$
311	0.40	-	0.62	1%	1.01	0.90
313	-0.98	-	-1.51	1%	-9.79	-5.41
314	1.65	-	0.30	-	25.09	0.56
321	1.92	1%	-0.86	1%	10.68	-2.43
322	0.26	-	0.95	1%	1.94	1.59
323	0.90	5%	0.77	1%	4.05	1.30
324	-0.65	-	0.46	1%	-3.24	0.99
331	4.14	1%	-0.20	-	33.36	-0.53
332	-1.48	1%	0.23	10%	-7.74	0.39
341	-0.88	-	-0.58	1%	-8.98	-1.25
342	2.77	1%	0.35	1%	16.92	0.77
351	0.31	-	0.37	1%	2.97	0.79
352	-1.11	5%	-0.30	1%	-4.61	-0.49
355	1.56	1%	0.73	1%	9.25	1.45
356	1.01	1%	0.20	10%	3.47	0.36
361	-0.06	-	0.03	-	-0.22	0.05
362	3.61	1%	-1.34	1%	29.35	-5.53
369	0.47	-	0.22	5%	2.75	0.58
371	-2.51	1%	0.32	1%	-13.77	0.57
372	-5.65	1%	0.32	1%	-60.99	0.47
381	0.39	-	0.28	5%	2.07	0.76
382	-4.15	1%	-0.06	-	-27.53	-0.21
383	-0.15	-	0.72	1%	-0.73	1.38
384	1.04	10%	0.27	1%	7.63	0.34
385	0.55	-	-0.14	5%	2.64	-0.21
390	0.94	-	0.31	10%	5.42	0.76

The sub-sectors where profit share is more effective on investment than the growth in real value added, according to short-term standardized coefficients are: manufacture of textiles; manufacture of leather and products of leather, leather substitutes and fur; manufacture of wood and wood and cork products, except furniture; printing, publishing and allied industries; manufacture of rubber products; manufacture of plastic products not elsewhere classified; manufacture of glass and glass products and manufacture of transport equipment respectively.

The sub-sectors where the growth in real value added is more effective on investment than profit share, according to short-term standardized coefficients are: food manufacturing and other food manufacturing; manufacture of wearing appeal, except

footwear; manufacture of footwear; manufacture of furniture and fixtures, except primarily of metal; manufacture of industrial chemicals; manufacture of other non-metallic mineral product; iron and steel basic industries; non-ferrous metal basic industries; manufacture of fabricated metal products, except machinery and equipment; manufacture of electrical machinery apparatus, appliances and supplies and other manufacturing industries respectively.

Results of comparison of short-term standardized coefficients for Model 2 are almost robust with those of Model 1, reflecting that autocorrelation is not a serious problem in Model 1. The comparison results are the same for 16 sub-sectors out of 19 sub-sectors where comparison is made according to the results of Model 2.

Although comparison of short-term coefficients provide hints about the relative importance of demand side of wages compared with cost sides of wages proxied by profit share, the analysis should also be made according to the long-term coefficients obtained from Model 2.

Since the specification of Model 2 is given by;

$$\ln(I/VA)_{i,t} = \alpha_i + \beta_{1i} \times (P/VA)_{i,t-1} + \beta_{2i} \times d(\ln VA)_{i,t-1} + \beta_{3i} \times \ln(I/VA)_{i,t-1}$$

the long term coefficients of profit share are indicated by $\frac{\beta_{1i}}{1-\beta_{3i}}$, where the long term coefficients of growth in real value added are indicated by $\frac{\beta_{2i}}{1-\beta_{3i}}$.

Table 4.7 presents the long-term coefficients of profit share and growth in real value added, the probability values of these coefficients indicating the results of Wald Coefficient Tests and the standardized long-term coefficients of profit share and growth in real value added, for each sub-sector in private manufacturing industry.

The signs and the state of significance of long-term coefficients are the same as those of short-term coefficients, despite a few changes in the significance levels of coefficients. Additionally, the results of the comparison of long-term standardized coefficients are the same with those of the comparison of short-term standardized coefficients.

Table 4.7: Comparison of Long-Term Coefficients and Long-Term Standardized Coefficients of Profit Share and Growth in Real Value Added Estimated by Model 2

Sub-Sector	$(P/VA)_{t-1}$	Prob.	Sig. Level	$d(lnVA)_{t-1}$	Prob.	Sig. Level	Standardized long-term coefficients of $(P/VA)_{t-1}$	Standardized long-term coefficients of $d(lnVA)_{t-1}$
311	0.41	0.205	-	0.64	0.000	1%	1.04	0.92
313	-1.99	0.241	-	-3.08	0.000	1%	-19.98	-11.03
314	5.02	0.340	-	0.92	0.189	-	76.14	1.70
321	3.39	0.000	1%	-1.53	0.000	1%	18.92	-4.30
322	0.26	0.703	-	0.94	0.000	1%	1.92	1.58
323	2.01	0.028	5%	1.71	0.001	1%	9.06	2.90
324	-0.83	0.268	-	0.59	0.017	5%	-4.13	1.26
331	5.02	0.000	1%	-0.24	0.311	-	40.49	-0.64
332	-1.85	0.005	1%	0.29	0.061	10%	-9.70	0.49
341	-1.52	0.434	-	-1.00	0.008	1%	-15.51	-2.17
342	3.35	0.000	1%	0.42	0.001	1%	20.47	0.94
351	0.67	0.681	-	0.80	0.015	5%	6.42	1.71
352	-1.07	0.021	5%	-0.29	0.002	1%	-4.44	-0.47
355	1.72	0.000	1%	0.81	0.000	1%	10.23	1.61
356	1.91	0.002	1%	0.37	0.095	10%	6.52	0.67
361	-0.14	0.838	-	0.06	0.719	-	-0.47	0.10
362	4.34	0.000	1%	-1.61	0.000	1%	35.24	-6.64
369	1.67	0.295	-	0.78	0.045	5%	9.84	2.10
371	-2.03	0.000	1%	0.26	0.000	1%	-11.15	0.46
372	-6.03	0.000	1%	0.34	0.001	1%	-65.06	0.50
381	0.50	0.242	-	0.35	0.021	5%	2.64	0.97
382	-4.80	0.000	1%	-0.07	0.708	-	-31.85	-0.24
383	-0.14	0.631	-	0.66	0.000	1%	-0.66	1.25
384	1.09	0.059	10%	0.28	0.004	1%	7.99	0.35
385	0.84	0.177	-	-0.21	0.012	5%	4.01	-0.32
390	1.16	0.161	-	0.38	0.083	10%	6.68	0.94

Thus, according to the results of dynamic model estimation by SUR, the accelerator term proxied by growth in real value added seems more effective than profit share in stimulating investment for more than half of the sub-sectors in private manufacturing industry. Additionally, analyses with both short-term and long-term coefficients provide the same results.

In order to check robustness of the results obtained by the estimation of Model 2 by SUR, Model 2 is also estimated by Arellano-Bond dynamic panel data method with coefficient standard errors that are robust to within cross-section residual correlation and heteroscedasticity. We also acquire a chance to evaluate the distributional dynamics and their impacts on accumulation for private manufacturing industry through a more general perspective. Table 4.8 presents the GMM (Generalized

Method of Moments) estimation results of Model 2 by Arellano-Bond dynamic panel data method with robust standard errors.

Table 4.8: Results of Model 2 by Arellano-Bond Dynamic Panel Data Estimation with Robust Standard Errors Method

Dependent variable	$\ln(I/VA)_t$		
Variable	**Coefficient**	**Robust Std. Error**	**Probability**
$(P/VA)_{t-1}$	0.3575	0.5500	0.516
$d(\ln VA)_{t-1}$	0.2763	0.1009	0.006
$\ln(I/VA)_{t-1}$	0.3231	0.0594	0.000
Constant	-0.0022	0.0048	0.646
Diagnostics	Number of observations: 665		
	Number of lags of dependent variable:1		
	Chi^2_{SARGAN}(probability):388.56 (0.3165)		
	Chi^2_{Wald}(3) (probability):45.57 (0.0000)		
	m_1 (probability):-4.34 (0.0000)		
	m_2 (probability): 0.17 (0.8669)		

The consistency of the GMM estimators crucially depends on the absence of serial correlation, and there should be evidence of significant negative AR(1) and no significance AR(2) in the difference equation, to satisfy the condition that the original dynamic levels equation is not serially correlated (Arellano and Bond, 1991). Arellano-Bond test results for first-order and second order serial correlation, denoted by m_1 and m_2 respectively, show that autocorrelation problem is solved with this dynamic estimation. Additionally, the result of Wald test (Chi^2 value and its probability are given in the table above) shows that explanatory variables are jointly significant on determining investment/value added ratio in its logarithmic form. Additionally, GMM estimation for the dynamic model necessitates the validity of the instrument variables. Sarganôs (1958) test is used to test the validity of instrument variables. The null hypothesis being tested with the Sargan test is that, the instrumental variables are uncorrelated with a set of residuals, and hence instruments are suitable. If the null hypothesis is not rejected by the statistic, the instruments are valid. The validity of the instrument set is strongly supported by the Sargan test for instrument validity in Model 2, since the null hypothesis is not rejected.

According to the results of Arellano-Bond dynamic panel data estimation of Model 2 with robust standard errors, the coefficient of the lag value of profit share is insignificant although its sign is positive as expected, the coefficient of the lag value of logarithmic change in real value added is positive and significant at 1%

significance, and the coefficient of the lagged investment/value added in logarithmic form is again positive and significant at 1% significance level.

The results are robust to both Arellano-Bond dynamic panel data and dynamic SUR estimation methods, providing evidences about the relative importance of demand on investment, compared with that of profitability on investment. The results of SUR estimation show that although the relative impacts of demand and profitability change from sector to sector, demand is more effective on investment than profitability for more than half of the sub-sectors. Dynamic panel data estimation shows that demand has a positive and significant effect on investment, whereas the effect of profitability on investment is insignificant although it is positive. The lag of accumulation is highly significant and positive for the two estimation methods, consistent with the partial adjustment model. This outcome explains the stagnant accumulation rates during the structural adjustment era, where high profitability goes along with low level of investment, since demand aspects of such growth policies based on wage suppression are denied and not taken into account.

Export-led growth policies during the implementation of structural adjustment programmes give rise to the question whether the negative impact of the fall in domestic consumption out of wages on investment is compensated by the impact of international demand on investment. In order to test the impacts of boom in export on investment, change in sectoral export is also included in our model. The coefficient of sectoral export, after controlling the change in value added, indicates the effects of exposure to external competition and exertion to the global markets. Additionally, the change in real GDP is incorporated into our model with the aim of reflecting demand expectations for the aggregate economy.

The first lag of the change in real GDP and the first lag of change in real sectoral exports are included in Model 3, whereas the current values of these variables are included in Model 4. The specifications of Model 3 and Model 4 are as follows:

Model 3:

$$\ln(I/VA)_{i,t} = \alpha_i + \beta_{1i} \times P/VA_{i,t-1} + \beta_{2i} \times d(\ln VA)_{i,t-1} + \beta_{3i} \times \ln(I/VA)_{i,t-1} + \beta_{4i} \times d\ln GDP_{t-1} + \beta_{5i} \times d\ln X_{i,t-1}$$

Model 4:

$$\ln(I/VA)_{i,t} = \alpha_i + \beta_{1i} \times P/VA_{i,t-1} + \beta_{2i} \times d(\ln VA)_{i,t-1} + \beta_{3i} \times \ln(I/VA)_{i,t-1} + \beta_{4i} \times d\ln GDP_t + \beta_{5i} \times d\ln X_{i,t}$$

where;

GDP : real GDP (1987 prices)

X : real sectoral export (deflated by sectoral WPI, 1987=100)

Model 3 and Model 4 are estimated by SUR and Arellano-Bond dynamic panel data with robust standard errors methods. According to the results of the estimation of Model 3 by SUR[13], the short-term coefficients of the first lag of the change in real GDP are positive for 21 sub-sectors, 6 of which are significant at 10% significance level, and negative for 5 sub-sectors, all of which are insignificant. The short-term coefficients of the first lag of the change in sectoral export are positive for 11 sub-sectors, 6 of which are significant and negative for the remaining 15 sub-sectors, 10 of which are significant at 10% significance level.

Including the variables for export and GDP alters the results slightly for the first lag of profit share, the first lag of growth in real value added and the first lag of accumulation. Numbers of positive and significant coefficients are 10, 12 and 17 for the first lag of profit share, the first lag of growth in real valued added and the first lag of accumulation respectively for Model 3, where these values were 8, 16 and 19 for Model 2. The changes in the number of positive significant coefficients from Model 2 to Model 3 may be due to usage of extra degrees of freedom, which is a problem for SUR estimation because of the limited time interval used in this analysis.

According to the results of Model 4 estimated by SUR[14], the short-term coefficients of the current value of change in real GDP are positive for 20 industries, 8 of which are significant and negative for 6 industries, 2 of which are significant at 10% significance level. The coefficients of the current value of sectoral real exports are positive for 15 industries, 9 of which are significant and negative for 11 industries, 8 of which are significant at 10% significance level. It is noticeable to observe that,

[13] See Appendix Table A.5 for estimation results of Model 3 by SUR.

[14] See Appendix Table A.6 for estimation results of Model 4 by SUR.

the number of significant positive coefficients increases from Model 3 to Model 4, while the number of significant negative coefficients decreases, indicating the relative fitness of using the current value of the change in sectoral real export instead of the first lag of it. The results for the change in GDP do not change much according to the lag structure of the variable.

Table 4.9 presents the results of the Arellano-Bond dynamic panel data estimations with GMM (Generalized Method of Moments) of Model 3 and Model 4 in comparison with the results of Model 2.

The results of Sargan tests show that the instrument sets are valid for all three estimations. Wald tests show that explanatory variables are jointly significant on determining investment/value added ratio in its logarithmic form, for all three estimations. Additionally, Arellano-Bond test statistics for first and second-order correlations indicate that, none of the dynamic equations are serially correlated.

Both the coefficients of first lag of the change in real GDP (Model 3) and the current value of the change in real GDP (Model 4) are positive as they are expected and significant at 1% and 5% significance levels respectively, reflecting the role of demand expectations on investment. The positive and significant coefficients of GDP for both equations, after controlling for sectoral value added, reflect the effect of overall optimism about the investment environment as a result of an increase in GDP.

However, contrary to expectations, the coefficient of the lagged logarithmic change in sectoral exports is negative and significant at 5% significance level, whereas the coefficient of the current value of the logarithmic change in sectoral exports is positive but insignificant. The significant negative coefficient of the lagged variable of sectoral exports indicates that, firms become pessimistic about future sales under the intense pressure of global competition.

The coefficients of demand and the lagged accumulation continue to be positive and significant, and the coefficients of profitability continue to be positive and insignificant after controlling for demand expectations for the aggregate economy and differences in sectoral exports, despite slight changes in the coefficients.

Table 4.9: Results of Model 2, Model 3 and Model 4 by Arellano-Bond Dynamic Panel Data Estimation with Robust Standard Errors

Dependent variable:	$\ln(I/VA)_t$		
Variables	**Model 2**	**Model 3**	**Model 4**
$(P/VA)_{t-1}$	0.3575 (0.55)	0.4480 (0.54)	0.0826 (0.57)
$d(\ln VA)_{t-1}$	0.2763 (0.10)*	0.2229 (0.11)**	0.2916 (0.10)*
$\ln(I/VA)_{t-1}$	0.3231 (0.06)*	0.2742 (0.05)*	0.3001 (0.05)*
$d(\ln GDP)_{t-1}$	-	0.0111 (0.00)*	-
$d(\ln X)_{t-1}$	-	-0.0526 (0.03)**	-
$d(\ln GDP)_t$	-	-	0.0145 (0.01)**
$d(\ln X)_t$	-	-	0.0131 (0.04)
constant	-0.0022 (0.00)	-0.0030 (0.00)	0.0015 (0.00)
N (number of observations)	665	662	663
Chi^2_{SARGAN} (p value)	388.56 (0.3165)	392.01 (0.2743)	382.91 (0.3917)
Chi^2_{Wald} (p value)	45.57 (0.00)	93.10 (0.00)	52.39 (0.00)
m_1 (p value)	-4.34 (0.00)	-4.49 (0.00)	-4.45 (0.00)
m_2 (p value)	0.17 (0.87)	-0.08 (0.94)	0.13 (0.90)
Number of lags of dependent variable	1	1	1

Notes:

(1) Robust standard errors are in parenthesis below the coefficients, *, **, *** stand for 1%, 5%, and 10% significance levels respectively, m_1 and m_2 are the Arellano-Bond tests for first-order and second-order serial correlation. Chi^2_{Wald} is the Wald test for the joint significance of the explanatory variables. Chi^2_{SARGAN} is the statistics of Sargan test for instrument validity.

In summary, the results of SUR estimations enable us to see the relative impacts of demand and profitability on investment for each sub-sector whereas the results of pooled panel data estimations enable us to see the overall effects of demand and profitability on investment. Results of SUR estimations show that investment for sub-sectors respond to demand and profitability in different ways, where the relative impact of demand on investment is greater than the impact of profitability on investment for slightly more than half of the sub-sectors in private manufacturing industry. According to the results of pooled estimations of our models, the impact of demand on investment is found positive and significant, whereas the impact of profitability on investment is found positive but insignificant, for private manufacturing industry. Additionally, the rise in exports turns out to be insignificant

in determining investment, and even it is found that, the lagged variable of sectoral exports negatively affects investment. This outcome shows the limits of exertion to the global markets, since export depends on suppression of wages rather than increasing productivity via new investments.

The impact of demand expectations for the aggregate economy, proxied by GDP growth, on investment is significant and positive, as expected. This finding supports the important role of demand expectations on investment.

The results are consistent with the theoretical framework, discussed in Section 2, and the stylized facts on Turkish economy, discussed in Section 3. Accumulation policies based on solely promoting profitability via decreasing wages are not right solutions to the stagnation in investment. On the contrary, the role of effective demand on investment through consumption should also be taken into consideration while developing policies.

5. CONCLUSION

This thesis analyzes the relation between functional income distribution and investment in Turkish private manufacturing industry, based on the theoretical framework outlined by Bhaduri and Marglin (1990), for the period between 1973 and 2001. The main motivation behind such an analysis is to clarify the role of demand about the slowdown in accumulation in Turkish private manufacturing industry, despite high increase in profit shares during the structural adjustment period.

The theoretical background of the analysis is the model outlined by Bhaduri and Marglin (1990), where investment is defined as a function of profit expectations, proxied by rate of profit, which is separated into its components -profit share and capacity utilization (i.e. the accelerator term)- in order to take into account the possibility of unwillingness of investors to invest in spite of high profitability. We estimated the ratio of investment to value added, as a function of profit share and an accelerator term, namely the growth rate of real value added, in order to analyze the demand aspects of the problem of stagnant accumulation rates in Turkish private manufacturing industry. We used econometrical techniques, for the purpose of analyzing the relative impacts of profitability and demand on investment, using panel data for 26 sub-sectors of the private manufacturing industry in 1973-2001 period. We also investigated the effects of demand expectations for the aggregate economy on investment, by incorporating the growth of GDP into our model, and the effects of increase in exports and exposure to global markets on investment, by incorporating the effects of growth in sectoral real exports.

We used SUR estimation method to identify the differences in the impacts of demand and profitability on investment across sub-sectors. By doing so, not only the sectoral differences are identified, but also the effects of common macroeconomic shocks (i.e. financial crises) to sub-sectors of the private manufacturing industry are taken into consideration. In order to have an overall view of the private manufacturing industry, we also employed panel regression methods (i.e. fixed, random effects methods and dynamic panel regression).

Comparing the standardized coefficients, obtained by the SUR regression of our base model, we observe that the magnitude and the significance of the impacts of profitability and demand on investment differ across sub-sectors, and the effect of profitability on investment is greater than demand for less than half of the sub-sectors. In contrast to the expectations of the neo-classical theory, the results of the panel regressions (i.e. fixed and random effects methods) robustly show that, investment is not always responsive to profit share, whereas demand has a more robust positive and significant effect on investment.

However, since our base models suffered from autocorrelation problems, we incorporated the lag of the ratio of investment to value added as an explanatory variable, which also reflects the cost of adjustment We estimated the dynamic model by using SUR as well as Arellano-Bond dynamic panel data method with robust standard errors. According to the results of dynamic model estimation by SUR, the accelerator term, proxied by growth in real value added seems more effective than profit share in stimulating investment for more than half of the sub-sectors in private manufacturing industry, based on the comparisons of both short-term and long-term coefficients. The results of the pooled dynamic regression also indicate that profit share does not have a significant effect on investment, whereas demand has a consistent positive effect. The coefficient of the first lag of accumulation is positive and highly significant, consistent with the partial adjustment model.

We also included the growth in GDP and sectoral exports, with both lagged and current values, in our dynamic models. The results show that, after controlling for the growth in real value added, the effect of demand expectations for aggregate economy on investment is positive and significant, for both SUR and the dynamic panel estimations, for both current and lagged values. On the contrary, the current value of the growth in sectoral real exports is found insignificant, although it is positive. The lagged value of the growth in sectoral real exports is however found to have a negative and significant effect, reflecting that firms become pessimistic about future sales under the intense pressure of global competition, and prefer wage competition to productivity increases via new investments. This outcome shows that, increase in international competition do not enhance investment, since the increase in exports depends on wage suppression policies and increasing use of existing capacity, rather than productivity increases via new investments.

Our results show the inability of pro-capital income policies via wage suppression, in enhancing investment in Turkish private manufacturing industry. The existence of excess capacity is closely related to the reluctance of firms in spite of high profitability. On the contrary, the effect of demand on investment is found very important and significant. In contrast to the neo-classical expectations, policies based on solely promoting profitability could not achieve high accumulation rates, since demand aspect of such policies has been denied. We conclude that, the demand aspect of the problem should be well considered, and the sector-specific factors determining the relation between distribution and investment should also be taken into consideration while developing policy alternatives.

Finally, the challenges and the limits of this thesis should also be stated. We aimed to compare the relative impacts of demand and profitability on investment. Thus, other factors instead of distribution and demand, which may affect investment, are not taken into consideration, within the limits of this thesis. Although, we aimed to analyze the effects of the rise in financialisation and rentier incomes on investment, as well as on the distributional factors effecting investment at the beginning of the study, we could not incorporate these effects due to the limitations regarding data. Unfortunately, the proxies that we used for rentier incomes, such as real interest rates and public interest expenditures were found all significant on determining investment. Analyzing the effects of financialisation on accumulation with appropriate variables necessitate more comprehensive further research.

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APPENDIX

Table A.1: The List of Sub-Sectors in Turkish Private Manufacturing Industry

Sub-Sector Code	Explanation
311-312 (311)*	Food manufacturing and other food manufacturing
313	Beverage industries
314	Tobacco manufactures
321	Manufacture of textiles
322	Manufacture of wearing apparel, except footwear
323	Manufacture of leather and products of leather, leather substitutes and fur
324	Manufacture of footwear
331	Manufacture of wood and wood and cork products, except furniture
332	Manufacture of furniture and fixtures, except primarily of metal
341	Manufacture of paper and paper products
342	Printing, publishing and allied industries
351	Manufacture of industrial chemicals
352	Manufacture of other chemical products
353**	Petroleum refineries
354**	Manufacture of miscellaneous products of petroleum and coal
355	Manufacture of rubber products
356	Manufacture of plastic products not elsewhere classified
361	Manufacture of pottery, china and earthenware
362	Manufacture of glass and glass products
369	Manufacture of other non-metallic mineral product
371	Iron and steel basic industries
372	Non-ferrous metal basic industries
381	Manufacture of fabricated metal products, except machinery and equipment
382	Manufacture of machinery except electrical
383	Manufacture of electrical machinery apparatus, appliances and supplies
384	Manufacture of transport equipment
385	Manufacture of professional and scientific, measuring and controlling equipment not elsewhere classified
390	Other manufacturing industries

* Aggregated.

** Excluded due to data constraints.

Table A.2: Augmented Dickey-Fuller Unit Root Test Results

Sub-Sector	ln(I/VA)	L.D.**	10% Critical Value	P/VA	L.D.**	10% Critical Value	dln(VA)	L.D.**	10% Critical Value
311	-4.73	2	-2.63	-2.17*	1	-2.63	-3.74	1	-2.63
313	-2.84	1	-2.63	-1.15*	1	-2.63	-3.73	1	-2.63
314	-0.51*	1	-1.62	-2.23*	1	-2.63	-3.48	1	-2.63
321	-3.71	2	-2.63	-3.12*	1	-3.23	-2.29	1	-1.62
322	-3.47	2	-2.63	-2.44*	1	-2.63	-2.92	2	-2.63
323	-4.29	4	-2.63	-2.02*	1	-3.23	-6.55	1	-2.63
324	-2.81	1	-2.63	-3.73	2	-2.63	-3.96	1	-3.24
331	-2.71*	1	-3.23	-1.44*	1	-2.63	-3.75	2	-3.24
332	-2.18*	1	-2.63	-1.54*	2	-2.63	-7.55	1	-2.63
341	-4.09	1	-2.63	-3.35	3	-2.63	-4.71	1	-2.63
342	-3.92	2	-3.23	-3.44	1	-3.23	-6.41	1	-2.63
351	-2.42*	1	-2.63	-5.11	1	-2.63	-4.33	1	-2.63
352	-4.84	3	-2.63	-2.19*	1	-2.63	-2.67	1	-1.62
355	-2.63*	1	-2.50	-1.67*	1	-2.63	-3.80	2	-3.23
356	-3.30	3	-3.23	-4.18	1	-3.23	-4.25	1	-2.63
361	-3.42	4	-2.63	-1.81*	1	-2.63	-3.88	1	-2.63
362	-3.36	2	-2.63	-2.41*	1	-2.63	-5.05	2	-3.23
369	-3.19	2	-2.63	-2.51*	2	-3.23	-5.03	2	-3.23
371	-2.64	1	-2.63	-1.21*	1	-2.63	-4.20	1	-2.63
372	-2.63	1	-2.11	-3.64	2	-2.63	-4.58	1	-2.63
381	-2.98	1	-2.63	-3.36	1	-3.23	-3.51	1	-2.63
382	-3.10	4	-2.63	-3.53	2	-3.23	-4.14	1	-2.63
383	-3.58	1	-2.63	-1.66*	1	-2.63	-4.60	1	-2.63
384	-2.80	1	-2.63	-2.11*	1	-2.63	-3.75	1	-2.63
385	-2.95	1	-2.63	-2.27*	2	-2.63	-4.11	1	-2.63
390	-3.70	1	-2.63	-2.99*	1	-3.23	-3.32	1	-2.63

* Non-stationary at 10% significance level.
** Denotes for lagged difference.

Technical Properties of Panel Data Models

Fixed Effects Model (Least Square Dummy Variable Model)

The general specification of a fixed effects panel data model can be given by:

$$y_{i,t} = \alpha_i + \beta' x_{i,t} + e_{i,t} \qquad \text{(A.1)}$$

where, i denotes for individual cross-section, t denotes for time period, *e* denotes for error term, ***b*** denotes for the slope coefficient, and ***Ď*** denotes for the cross-sectional dummy variable.

It is assumed that the error terms ($e_{i,t}$) are independently and identically distributed over cross-sections and time, with variance $\mathring{u}_e$, and 0 mean Additionally, $x_{i,t}$ is assumed to be strictly exogenous, thus it is not allowed to depend upon current, future and past values of the error term. However, fixed effects method does not impose any restrictions upon the relationship between the fixed effects term, i.e. ***Ď***, and $x_{i,t}$. (Verbeek, 2000:310-320).

The matrix notation of the model can be given by:

$$\begin{bmatrix} y_1 \\ y_2 \\ \text{M} \\ y_n \end{bmatrix} = \begin{bmatrix} i & 0 & \Lambda & 0 \\ 0 & i & & 0 \\ \text{M} & & \text{O} & \text{M} \\ 0 & 0 & \Lambda & i \end{bmatrix} \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \text{M} \\ \alpha_n \end{bmatrix} + \begin{bmatrix} x_1 \\ x_2 \\ \text{M} \\ x_n \end{bmatrix} \beta + \begin{bmatrix} e_1 \\ e_2 \\ \text{M} \\ e_n \end{bmatrix} \qquad \text{(A.2)}$$

Fixed effects model assumes that the slope coefficient ***b*** is homogeneous across cross-sections, and the cross-section specific fixed effect is captured by cross-sectional dummy variable ***Ď***, which is constant over time (Verbeek, 2000:310-320).

Joint significance test of fixed effects for the fixed effects estimation of our model is employed in order to compare the relative efficiencies of OLS (Ordinary least squares estimation) and fixed effects estimations. The null hypothesis (H_0) and the alternative hypothesis (H_1) are as follows:

$$\begin{aligned} H_0 &: \alpha_1 = \alpha_2 = ... = \alpha_{26} \\ H_1 &: \alpha_1 \neq \alpha_2 \neq ... \neq \alpha_{26} \end{aligned} \qquad \text{(A.3)}$$

The null hypothesis proposes that the fixed effects are not statistically different across 26 sub-sectors of private manufacturing industry, and OLS is the efficient estimation method. The result of the test (given in Table 4.3) shows that the null hypothesis is rejected and fixed effects estimation is more efficient than OLS.

Random Effects Model

The general specification of a random effects panel data model can be given by:

$$y_{i,t} = u + \beta' x_{i,t} + \alpha_i + v_{i,t} \tag{A.4}$$

where, i denotes for individual cross-section, *t* denotes for time period, β denotes for the slope coefficient, $\breve{U}$ denotes for random factors, $\gamma_{i,t}$ denotes for the error term, and μ denotes for the constant term. Additionally, $\alpha_{i,t} + \upsilon_{i,t}$ is treated as an error term consisting of two components: a cross-section specific component that does not vary over time, and a remainder component, that is assumed to be uncorrelated over time. The cross-section component, i.e. the random factor, captures the systematic differences across cross-sections, and if these unobserved cross-section specific effects are correlated with the explanatory variables, then the estimates will be biased and inconsistent (Verbeek, 2000:310-320).

The assumptions for random effects model are:

$E[\gamma_{i,t}] = E[\breve{U}] = 0$

$E[\gamma_{i,t}^2] = \sigma_\gamma^2$

$E[\breve{U}_{,t}^2] = \sigma_\alpha^2$

$E[\gamma_{i,t}\ \breve{U}] = 0$, for all i and j

$E[\gamma_{i,t}\ \gamma_{j,s}] = 0$, for all i and j (iÍ j and tÍ s)

$E[\breve{U}\ \breve{U}] = 0$, for all i and j (iÍ j and tÍ s)

The random effects model can be written in matrix form as:

$$Y = \beta X + \eta \tag{A.5}$$

where ę ~ N(0,ę). Given the assumptions above, the $(nT \times nT)$ variance-covariance matrix ę has the following structure:

$$\Omega = (I_n \otimes \Sigma_T) = \begin{bmatrix} \Sigma_T & 0 & \Lambda & 0 \\ 0 & \Sigma_T & \Lambda & 0 \\ \text{M} & \text{M} & \text{O} & \text{M} \\ 0 & 0 & \text{K} & \Sigma_T \end{bmatrix} \tag{A.6}$$

where

$$\Sigma_T = \begin{bmatrix} \sigma_\gamma^2 + \sigma_\alpha^2 & \sigma_\alpha^2 & \text{K} & \sigma_\alpha^2 \\ \sigma_\alpha^2 & \sigma_\gamma^2 + \sigma_\alpha^2 & \text{K} & \sigma_\alpha^2 \\ \text{M} & \text{M} & \text{O} & \text{M} \\ \sigma_\alpha^2 & \sigma_\alpha^2 & \Lambda & \sigma_\gamma^2 + \sigma_\alpha^2 \end{bmatrix}_{T \times T} \tag{A.7}$$

Although OLS will produce consistent estimates, because q is not diagonal, the OLS estimates will be inefficient. Therefore, GLS (Generalized Least Squares) is the efficient estimator ((Verbeek, 2000:310-320).

Breusch-Pagan Lagrange Multiplier test for random effects is used for the comparison of the efficiencies of OLS and random effects (Greene, 2003:648-690).

The null hypothesis and the alternative hypothesis for this test are as follows:

$$H_0 : \sigma_{\alpha_1}^2 = \sigma_{\alpha_2}^2 = ... = \sigma_{\alpha_n}^2 = 0$$
$$H_1 : \sigma_{\alpha_1}^2 \neq \sigma_{\alpha_2}^2 \neq ... \neq \sigma_{\alpha_n}^2 \neq 0 \qquad \text{(A.8)}$$

where n denotes the number of cross-sections.

The null hypothesis proposes that, variances of the random effects terms are not different from zero. The test result (given in Table 4.4) of Breusch-Pagan LM test for random effects, for our model (Model 1) shows that, variances of the random effects for sub-sectors are different from zero, and hence random effects method is more efficient than OLS estimation.

According to Verbeek (2000:310-320), Hausman test can be used to compare the efficiencies of fixed and random effects methods. The motivation behind the Hausman test is that under the null hypothesis of no correlation between the cross-section specific term and the explanatory variable ($i.e., H_0 : corr(X_{i,t}, \alpha_i) = 0$), both the fixed and random effects estimators are consistent but only the random effects estimator is efficient. Under the alternative, while the fixed effects estimator is consistent, the random effects estimator is not.

The test statistic of Hausman test for our model (Model 1), given in Table 4.4, shows that the null hypothesis is rejected, and fixed effects is more efficient. However, we also included the results of random effects estimation, in order to check the robustness of the results.

Seemingly Unrelated Regression Model (SUR)

Zellnerôs (1962) seemingly unrelated regression (SUR) method does not assume parameter homogeneity, in contrast to the fixed and random effect methods, and captures the efficiency due to the correlation of the disturbances across cross-sections.

The general specification of a SUR model can be written as (Greene, 2003:648-690):

$$y_{i,t} = \beta_i x_{i,t} + e_{i,t} \qquad \text{(A.9)}$$

where i=1,2,...,n and indicates cross-sections

$E[e_{i,t}] = 0$

$E[e_{i,t}\, e_{j,s}õ] = ů_{i,j}$, if t=s and 0 otherwise.

The disturbance formulation is therefore:

$E[e_i e_j] = ů_{i,j} I_T$ (A.10)

or

$$E[ee'] = V = \begin{bmatrix} \sigma_{11}I & \sigma_{12}I & \Lambda & \sigma_{1n}I \\ \sigma_{21}I & \sigma_{22}I & \Lambda & \sigma_{2n}I \\ & \text{M} & & \\ \sigma_{n1}I & \sigma_{n2}I & \Lambda & \sigma_{nn}I \end{bmatrix} \tag{A.11}$$

According to Greene (2003:648-690), both Breusch and Paganôs Lagrange Multiplier test and Likelihood Ratio statistic can be used to test the hypothesis that the correlation matrix of the residuals is a diagonal matrix.

We used Wald tests to decide whether our variables are homogeneous across sub-sectors of private manufacturing industry, or not. The results are given in Table A.3, and show that all variables are heterogeneous across sub-sectors. We also tested the null hypothesis that the correlation matrix of the residuals is a diagonal matrix, using Breusch and Paganôs Lagrange Multiplier test. The result of this test is given in Table A.4, and shows that the null hypothesis is rejected, indicating that disturbance terms across equations for sub-sectors are correlated. Although the test results show that, SUR is more efficient than pooled estimations, we also used pooled estimations to check robustness of our results, and to capture a general view for private manufacturing industry.

Table A.3: Wald Tests for Parameter Homogeneity

H_0: The coefficients of explanatory variables are homogeneous across sub-sectors
H_1: The coefficients of explanatory variables are heterogeneous across sub-sectors

	Model 1	**Model 2**	**Model 3**	**Model 4**
	Chi-Square statistics (probabilities in the brackets)			
$(P/VA)_{t-1}$	1049.42 (0.0000)	658.66 (0.0000)	763.30 (0.0000)	498.31 (0.0000)
$d(lnVA)_{t-1}$	426.66 (0.0000)	717.23 (0.0000)	974.77 (0.0000)	410.41 (0.0000)
$ln(I/VA)_{t-1}$		1490.34 (0.0000)	700.34 (0.0000)	500.98 (0.0000)
$d(lnGDP)_{t-1}$			186.04 (0.0000)	
$d(lnX)_{t-1}$			587.51 (0.0000)	
$d(lnGDP)_t$				215.43 (0.0000)
$d(lnX)_t$				233.15 (0.0000)

Table A.4: Breusch-Pagan test of independence

	Model 1	**Model 2**	**Model 3**	**Model 4**
Chi-square	460.05	386.52	322.23	324.59
Probability	0.0000	0.0249	0.0459	0.0378

Table A.5: Estimation Results of Model 3 by SUR Method
(Dependent variable: ln(I/VA))

Sub-Sector	Constant	t-Stat.	Sig. Level	$(P/VA)_{t-1}$	t-Stat.	Sig. Level	$d(lnVA)_{t-1}$	t-Stat.	Sig. Level	$ln(I/VA)_{t-1}$	t-Stat.	Sig. Level	$d(lnGDP)_{t-1}$	t-Stat.	Sig. Level	$d(lnX)_{t-1}$	t-Stat.	Sig. Level	R^2-Adjusted
311	-2.86	-12.89	1%	0.42	1.60	-	0.61	11.76	1%	-0.10	-2.10	5%	0.01	1.76	10%	0.26	6.15	1%	0.39
313	-0.58	-1.00	-	-0.58	-0.82	-	-1.66	-13.35	1%	0.42	12.52	1%	0.02	1.10	-	-0.37	-7.29	1%	0.34
314	-1.43	-0.90	-	-0.01	-0.01	-	0.28	1.24	-	0.47	4.05	1%	0.01	0.32	-	-0.24	-2.07	5%	0.03
321	-2.15	-7.36	1%	1.72	4.48	1%	-0.90	-5.13	1%	0.48	8.57	1%	0.02	1.35	-	0.09	0.66	-	0.22
322	-2.54	-7.71	1%	0.20	0.47	-	0.82	10.89	1%	0.08	1.87	10%	0.01	0.61	-	0.43	4.65	1%	0.14
323	-2.26	-5.31	1%	1.55	3.55	1%	0.93	6.44	1%	0.52	5.39	1%	0.00	0.05	-	-0.40	-4.33	1%	0.31
324	-1.71	-4.54	1%	-0.18	-0.33	-	0.55	3.10	1%	0.18	1.89	10%	0.00	-0.08	-	-0.39	-3.99	1%	-0.01
331	-5.39	-6.24	1%	4.72	4.73	1%	-0.04	-0.14	-	0.02	0.20	-	0.02	0.57	-	0.25	2.75	1%	0.12
332	-0.90	-3.43	1%	-1.69	-5.40	1%	0.25	4.15	1%	0.01	0.23	-	-0.02	-1.09	-	-0.26	-10.30	1%	0.13
341	-0.38	-0.46	-	-0.34	-0.33	-	-0.59	-3.26	1%	0.53	5.63	1%	-0.02	-0.80	-	0.11	2.17	5%	0.06
342	-3.19	-6.96	1%	2.33	4.39	1%	0.51	4.66	1%	0.30	5.23	1%	0.02	0.93	-	-0.14	-2.81	1%	0.17
351	-0.94	-1.88	10%	-0.21	-0.36	-	0.21	1.76	10%	0.48	9.47	1%	0.04	1.67	10%	0.39	4.09	1%	0.24
352	-1.97	-4.42	1%	-1.20	-2.24	5%	-0.57	-3.83	1%	-0.12	-1.31	-	0.04	2.69	1%	0.07	1.31	-	0.06
355	-3.72	-6.65	1%	2.40	3.53	1%	0.77	6.60	1%	0.07	1.35	-	-0.01	-0.37	-	-0.17	-2.52	5%	0.23
356	-2.06	-10.46	1%	1.52	6.81	1%	-0.28	-2.45	5%	0.49	9.63	1%	0.04	2.63	1%	-0.16	-5.42	1%	0.44
361	-0.98	-2.75	1%	0.05	0.15	-	-0.10	-1.11	-	0.49	6.43	1%	0.02	0.93	-	-0.02	-0.34	-	0.12
362	-4.28	-7.51	1%	3.51	4.52	1%	-1.98	-6.72	1%	0.04	0.69	-	0.05	1.93	5%	-0.09	-0.45	-	0.15
369	-1.58	-7.08	1%	1.11	3.77	1%	0.15	1.98	5%	0.69	15.35	1%	0.04	3.33	1%	-0.06	-1.35	-	0.57
371	0.14	0.36	-	-2.74	-5.66	1%	0.48	5.82	1%	-0.22	-4.92	1%	-0.01	-0.39	-	0.01	0.10	-	-0.04
372	3.09	3.73	1%	-6.04	-5.63	1%	0.19	1.63	10%	0.06	0.62	-	0.00	0.20	-	0.53	3.35	1%	0.16
381	-2.13	-6.53	1%	0.71	1.89	10%	-0.19	-1.50	-	0.24	7.20	1%	0.02	1.19	-	-0.03	-0.67	-	-0.11
382	1.22	2.85	1%	-3.94	-6.56	1%	-0.26	-1.43	-	0.14	2.37	5%	0.02	0.81	-	0.03	0.52	-	0.32
383	-2.39	-8.71	1%	-0.04	-0.11	-	0.73	7.86	1%	-0.11	-2.64	1%	0.00	0.18	-	-0.11	-2.88	1%	-0.05
384	-2.22	-4.07	1%	1.00	1.44	-	0.17	1.22	-	0.17	2.38	5%	0.01	0.67	-	-0.07	-0.80	-	-0.11
385	-1.69	-7.12	1%	0.53	1.69	10%	-0.26	-6.29	1%	0.41	8.99	1%	0.02	0.92	-	-0.10	-8.00	1%	0.06
390	-2.58	-5.61	1%	0.92	1.57	-	0.24	1.21	-	0.14	2.38	5%	0.03	1.17	-	0.01	0.19	-	-0.03

Table A.6: Estimation Results of Model 4 by SUR Method
(Dependent variable: ln(I/VA))

Sub-Sector	Constant	t-Stat.	Sig. Level	$(P/VA)_{t-1}$	t-Stat.	Sig. Level	$d(lnVA)_{t-1}$	t-Stat.	Sig. Level	$ln(I/VA)_{t-1}$	t-Stat.	Sig. Level	d(lnGDP)	t-Stat.	Sig. Level	d(lnX)	t-Stat.	Sig. Level	R2-Adjusted
311	-2.40	-10.87	1%	0.61	2.19	0.05	0.71	13.83	1%	0.19	3.31	1%	0.02	2.40	5%	0.25	5.70	1%	0.41
313	0.11	0.14	-	-1.03	-1.10	-	-1.74	-8.53	1%	0.56	9.50	1%	0.00	0.21	-	0.00	0.01	-	0.23
314	1.25	0.72	-	-2.55	-1.27	-	0.75	2.92	1%	0.74	6.58	1%	0.05	1.53	-	0.24	2.26	5%	0.24
321	-2.78	-7.63	1%	2.32	4.61	1%	-0.72	-3.94	1%	0.35	5.32	1%	0.02	1.66	0.1	-0.06	-0.34	-	0.21
322	-2.87	-4.79	1%	-0.02	-0.02	-	0.76	5.08	1%	-0.16	-1.79	10%	0.03	1.31	-	-0.40	-2.02	5%	0.19
323	-2.00	-5.19	1%	0.76	1.84	10%	0.56	4.02	1%	0.45	5.44	1%	0.04	2.62	1%	-0.29	-3.40	1%	0.49
324	-1.37	-3.11	1%	-0.83	-1.28	-	0.38	2.12	5%	0.19	1.72	10%	0.02	0.97	-	0.03	0.29	-	-0.09
331	-3.66	-6.02	1%	2.97	3.97	1%	0.10	0.49	-	0.17	2.04	5%	-0.02	-0.81	-	0.26	2.94	1%	0.19
332	-0.99	-2.29	5%	-0.97	-1.62	-	-0.03	-0.24	-	0.25	3.13	1%	0.01	0.67	-	-0.20	-3.83	1%	0.06
341	-0.12	-0.15	-	-1.30	-1.20	-	-0.21	-1.07	-	0.40	4.42	1%	0.05	3.45	1%	0.06	1.29	-	0.33
342	-3.07	-6.19	1%	2.01	3.42	1%	0.41	3.17	1%	0.11	1.57	-	-0.05	-2.04	5%	0.11	1.79	10%	0.25
351	-0.54	-1.02	-	-0.48	-0.74	-	0.61	4.87	1%	0.55	8.95	1%	0.02	1.07	-	0.46	4.76	1%	0.30
352	-2.19	-6.07	1%	-0.94	-1.99	5%	-0.58	-5.19	1%	-0.20	-2.68	1%	0.02	1.71	10%	-0.33	-7.14	1%	0.33
355	-2.83	-5.36	1%	1.31	2.08	5%	0.55	4.40	1%	0.15	2.02	5%	0.01	0.62	-	-0.12	-1.75	10%	0.21
356	-1.77	-6.68	1%	1.06	3.68	1%	0.07	0.43	-	0.39	4.98	1%	0.00	-0.30	-	-0.03	-0.73	-	0.29
361	-1.03	-2.62	1%	-0.01	-0.02	-	0.22	1.93	10%	0.50	5.67	1%	0.03	2.19	5%	0.09	1.52	-	0.22
362	-4.33	-6.52	1%	3.90	4.24	1%	-1.51	-4.03	1%	0.13	1.54	-	0.04	1.48	-	-0.13	-0.49	-	0.10
369	-0.67	-2.38	5%	0.19	0.46	-	0.32	3.64	1%	0.69	12.02	1%	0.00	-0.35	-	-0.15	-3.30	1%	0.42
371	-0.57	-1.33	-	-2.04	-3.80	1%	0.30	3.09	1%	-0.27	-5.51	1%	0.01	0.52	-	0.17	2.58	1%	0.01
372	2.05	2.88	1%	-4.14	-4.53	1%	0.38	3.23	1%	0.19	2.52	5%	-0.05	-2.32	5%	0.26	1.80	10%	0.14
381	-1.87	-5.16	1%	0.09	0.19	-	0.35	2.31	10%	0.18	4.23	1%	0.02	1.41	-	0.00	0.05	-	-0.07
382	1.23	3.10	1%	-4.14	-7.12	1%	-0.05	-0.29	-	0.06	0.88	-	0.02	1.10	-	-0.12	-1.96	10%	0.36
383	-2.61	-7.28	1%	0.30	0.65	-	0.64	5.61	1%	-0.09	-1.81	10%	0.00	0.31	-	-0.08	-1.69	10%	-0.05
384	-2.84	-4.50	1%	1.29	1.56	-	0.22	1.50	-	-0.08	-0.71	-	-0.02	-1.35	-	0.21	1.77	10%	0.05
385	-1.87	-5.29	1%	0.16	0.35	-	0.02	0.26	-	0.28	3.99	1%	0.04	2.24	5%	0.04	2.07	5%	0.07
390	-2.38	-4.76	1%	0.94	1.36	-	0.16	0.72	-	0.27	3.42	1%	0.05	2.24	5%	0.06	1.27	-	0.10

CURRICULUM VITAE

Özer Erdoĵan was born in 1980 in Bünyan. He graduated from Melikgazi High School in 1998. In the same year, he started his undergraduate study at Management Engineering Department in Ķstanbul Technical University. After he graduated in 2003, he attended the Master of Arts program in Economics at Ķstanbul Technical University. He is still working as an assistant specialist at Budgeting and Planning Department in Türkiye Ķş Bankasē A.ķ.