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Evîn ve Gelecek için...

Contents

1	General introduction	1
1.1	Distribution and growth	2
1.2	Capitalist globalization and labor income share	4
1.3	Transformation of East and Southeast Asia and export-led growth	7
1.4	The plan of the dissertation	10
2	Theories of income distribution and growth	12
2.1	Classicals	13
2.1.1	Adam Smith	15
2.1.2	David Ricardo	16
2.2	Marx	18
2.3	Neoclassicals	19
2.4	Keynes	21
2.5	Neo-Keynesian (Cambridge) models of income distribution and growth	23
2.5.1	Kaldor	24
2.5.2	Pasinetti	28
2.5.3	Robinson	29
2.6	Kalecki	30
2.6.1	Kalecki's theory of profits and output	31
2.6.2	Kalecki's theory of prices and income distribution	33
2.7	Neo and post-Kaleckian theories	35

2.7.1	Neo-Kaleckian model	38
2.7.2	Post-Kaleckian model	41
2.8	Remarks	47
3	Review of empirical literature on post-Keynesian models of income distribution and growth	49
3.1	Empirical work based on single equation estimations	51
3.1.1	Post-Kaleckian models without technical progress	52
3.1.2	Post-Kaleckian models with technical progress	62
3.2	Empirical work based on system approach (VAR models)	64
3.3	Summary of findings on demand regimes in the literature	65
4	Theoretical, empirical, and econometric methodology	70
4.1	Theoretical framework	71
4.1.1	Model equations	72
4.1.2	Derivation of multipliers	73
4.2	Variables and data	78
4.2.1	Unit labor costs and labor income share	78
4.2.2	Adjusting labor income share	80
4.2.3	Price indicators	84
4.2.4	Foreign demand	85
4.2.5	GDP and its components	86
4.3	Econometric methodology	86
4.3.1	Engle-Granger cointegration test	90
4.3.2	Bounds test	90
4.4	Relevance of post-Keynesian models to developing countries	94
4.4.1	Capacity (or capital) constraints	96
4.4.2	Agricultural constraints	97
4.4.3	Open economy issues	98
4.4.4	Remarks	100

5	Analysis of the demand regime in South Korea	101
5.1	Structural transformation and macroeconomic performance of South Korea	102
5.2	Labor income share in South Korea	108
5.3	Econometric analysis of the demand regime in South Korea	111
5.3.1	Consumption equation	112
5.3.2	Investment equation	113
5.3.3	Exports equation	114
5.3.4	Imports equation	117
5.3.5	Domestic prices equation	118
5.3.6	Export prices equation	119
5.4	Evaluation of the econometric results and their comparison with the literature	120
6	Analysis of the demand regime in Thailand	123
6.1	Structural transformation and macroeconomic performance of Thailand	124
6.2	Labor income share in Thailand	132
6.3	Econometric analysis of the demand regime in Thailand	135
6.3.1	Consumption equation	136
6.3.2	Investment equation	138
6.3.3	Exports equation	141
6.3.4	Imports equation	142
6.3.5	Domestic prices equation	143
6.3.6	Export prices equation	147
6.3.7	Sub-period analysis of the demand regime in Thailand . .	150
6.4	Evaluation of the findings and their comparison with literature . .	151
7	Analysis of the demand regime in China	158
7.1	Political and structural transformation, and macroeconomic performance of China	159

7.1.1	Maoist period: 1949-1976	160
7.1.2	Post-Maoist period: 1978-present	161
7.1.3	Structural transformation and macroeconomic performance of China	166
7.2	Labor income share in China	173
7.2.1	Gross Domestic Product in China	174
7.2.2	Mixed income and self-account workers in China	176
7.2.3	Alternative measures of labor income share in China	178
7.3	Econometric analysis of the demand regime in China	183
7.3.1	Consumption equation	183
7.3.2	Investment equation	185
7.3.3	Exports equation	189
7.3.4	Imports equation	191
7.3.5	Domestic prices equation	192
7.3.6	Export prices equation	194
7.4	Evaluation of the findings and their comparison with literature . . .	196
8	General conclusion and policy implications	199
8.1	Shortcomings of the model	199
8.2	General evaluation of the results	203
8.3	Policy implications	206
A	Data Sources	208
A.1	GDP and its components	208
A.1.1	Consumption	208
A.1.2	Investment	209
A.1.3	Exports	210
A.1.4	Imports	210
A.1.5	GDP at market prices	211
A.1.6	GDP at factor cost	211
A.2	Labor income share	211

B	Unit root, Bounds, and EG cointegration tests	213
B.1	South Korea	214
B.1.1	Unit root tests	214
B.1.2	Bounds tests	215
B.1.3	Engle-Granger cointegration tests	220
B.2	Thailand	221
B.2.1	Unit root tests	221
B.2.2	Bounds tests	223
B.2.3	Engle-Granger cointegration tests	250
B.2.4	Estimations of the model equations for the subsample 1980- 2011	252
B.3	China	259
B.3.1	Unit root tests	259
B.3.2	Bounds tests	260
B.3.3	Engle-Granger cointegration tests	269

List of Tables

2.1	Growth regimes in Bhaduri and Marglin (1990)	43
3.1	Single equations in recent empirical studies on post-Kaleckian models without technical progress	59
3.2	Summary of results on demand regimes in the empirical literature, Panel 1/3	66
3.3	Summary of results on demand regimes in the empirical literature, Panel 2/3	67
3.4	Summary of results on demand regimes in the empirical literature, Panel 3/3	68
4.1	Comparison of Stockhammer, Onaran, and Ederer (2009) and our model in terms of equations	73
4.2	Derivation of h_2 and h_1	77
4.3	Adjustments of labor income share	82
4.4	Null hypotheses of the tests for the diagnostic checks	90
5.1	Consumption equation estimations for Korea (1970-2011)	112
5.2	Investment equation estimations for Korea (1970-2011)	114
5.3	Exports equation estimations for Korea (1970-2011)	116
5.4	Imports equation estimations for Korea (1970-2011)	117
5.5	Domestic prices equation estimations for Korea (1970-2011)	118
5.6	Export prices equation estimations for Korea (1970-2011)	119

5.7	Total effect of a 1% increase in the labor income share on the demand in South Korea (1970-2011)	121
6.1	Average per annum growth of GDP and its sectoral components in Thailand (1968-2012)	131
6.2	Consumption equation estimations for Thailand (1970-2011) . . .	137
6.3	Investment equation estimations for Thailand (1970-2011) Panel 1/2	139
6.4	Investment equation estimations for Thailand (1970-2011) Panel 2/2	140
6.5	Exports equation estimations for Thailand (1970-2011)	142
6.6	Imports equation estimations for Thailand (1970-2011)	143
6.7	Domestic prices equation estimations for Thailand (1970-2011) Panel 1/2	145
6.8	Domestic prices equation estimations for Thailand (1970-2011) Panel 2/2	146
6.9	Export prices equation estimations via ECM for Thailand (1970-2011)	148
6.10	Export prices equation estimations in first differences of the variables for Thailand (1970-2011)	149
6.11	Effect of a 1% increase in the labor share on the consumption in Thailand	152
6.12	Total effect of a 1% increase in the labor income share on the demand in Thailand	154
6.13	Total effect of a 1% increase in the labor income share on the demand in Thailand for the subsample 1980-2011)	157
7.1	Consumption equation estimations for China (1978-2011)	184
7.2	Investment equation estimations of ALS_1 for China (1978-2011) .	186
7.3	Investment equation estimations of ALS_2 for China (1978-2011) .	187
7.4	Investment equation estimations of ALS_3 for China (1978-2011) .	188

7.5	Exports equation estimations for China (1978-2011)	190
7.6	Imports equation estimations for China (1978-2011)	192
7.7	Domestic prices equation estimations for China (1978-2011) . . .	193
7.8	Export prices equation estimations for China (1978-2011)	195
7.9	Effect of a 1% increase in the labor share on the consumption in China	197
7.10	Total effect of a 1% increase in the labor income share on the demand in China (1978-2011)	198
8.1	Synthesis of econometric findings on demand regimes of South Korea, Thailand, and China	204
A.1	Data sources of GDP and its components	209
A.2	Labor income share in GDP at factor cost in South Korea, Thai- land, and China (in %)	212
B.1	Critical value bonds of F and t statistics for unrestricted intercept and no trend for $k=2$ for Pesaran's Bounds test	213
B.2	ADF test of the variables of Korea for the period (1970-2011) . .	214
B.3	Bounds tests for consumption equation of Korea (1970-2011) . . .	216
B.4	Bounds tests for investment equation of Korea (1970-2011)	217
B.5	Bounds tests for exports equation (as a function of M_{w_1}) of Korea (1970-2011)	218
B.6	Bounds tests for exports equation (as a function of M_{w_2}) of Korea (1970-2011)	219
B.7	Engle-Granger cointegration test for the imports equation for Ko- rea (1970-2011)	220
B.8	ADF test of the variables of Thailand for the period (1970-2011) .	221
B.9	ADF test of the variables of Thailand for the period (1980-2011) .	222
B.10	Bounds tests for consumption equation of Thailand (1970-2011) Panel 1/2	224

B.11 Bounds tests for consumption equation of Thailand (1970-2011)	
Panel 2/2	225
B.12 Bounds tests for investment equation of Thailand (1970-2011) for	
ALS_1	226
B.13 Bounds tests for investment equation of Thailand (1970-2011) for	
ALS_2	227
B.14 Bounds tests for investment equation of Thailand (1970-2011) for	
ALS_3	228
B.15 Bounds tests for investment equation of Thailand (1970-2011) for	
ALS_4	229
B.16 Bounds tests for exports equation of Thailand (1970-2011)	230
B.17 Bounds tests for imports equation of Thailand (1970-2011)	231
B.18 Bounds tests for domestic price equation of Thailand (1970-2011)	
for ALS_1	232
B.19 Bounds tests for domestic price equation of Thailand (1970-2011)	
for ALS_2	233
B.20 Bounds tests for domestic price equation of Thailand (1970-2011)	
for ALS_3	234
B.21 Bounds tests for domestic price equation of Thailand (1970-2011)	
for ALS_4	235
B.22 Bounds tests for export price equation of Thailand (1970-2011) . .	236
B.23 Bounds tests for consumption equation of Thailand (1980-2011)	
Panel 1/2	237
B.24 Bounds tests for consumption equation of Thailand (1980-2011)	
Panel 2/2	238
B.25 Bounds tests for investment equation of Thailand (1980-2011) for	
ALS_1	239
B.26 Bounds tests for investment equation of Thailand (1980-2011) for	
ALS_2	240

B.27 Bounds tests for investment equation of Thailand (1980-2011) for ALS_3	241
B.28 Bounds tests for investment equation of Thailand (1980-2011) for ALS_4	242
B.29 Bounds tests for exports equation of Thailand (1980-2011)	243
B.30 Bounds tests for imports equation of Thailand (1980-2011)	244
B.31 Bounds tests for domestic prices equation of Thailand (1980-2011) for ALS_1	245
B.32 Bounds tests for domestic prices equation of Thailand (1980-2011) for ALS_2	246
B.33 Bounds tests for domestic prices equation of Thailand (1980-2011) for ALS_3	247
B.34 Bounds tests for domestic prices equation of Thailand (1980-2011) for ALS_4	248
B.35 Bounds tests for export prices equation of Thailand (1980-2011) .	249
B.36 Engle-Granger cointegration tests for the consumption and invest- ment equations for Thailand (1970-2011)	250
B.37 Engle-Granger cointegration tests of all the model equations for Thailand (1980-2011)	251
B.38 Consumption Equation Estimations for Thailand (1980-2011) . . .	253
B.39 Investment equation estimations for Thailand (1980-2011)	254
B.40 Exports equation estimations for Thailand (1980-2011)	255
B.41 Imports equation equation estimations via ECM for Thailand (1980- 2011)	255
B.42 Imports equation in first differences of the variables for Thailand (1980-2011)	256
B.43 Domestic prices equation estimations for Thailand (1980-2011) . .	257
B.44 Export prices equation estimations for Thailand (1980-2011) . . .	258
B.45 ADF test of the variables of China for the period (1978-2011) . . .	259
B.46 Bounds tests for consumption equation of China (1978-2011) . . .	260

B.47 Bounds tests for investment equation of China (1978-2011) for	
ALS_1	261
B.48 Bounds tests for investment equation of China (1978-2011) for	
ALS_2	262
B.49 Bounds tests for investment equation of China (1978-2011) for	
ALS_3	263
B.50 Bounds tests for exports equation (as a function of M_{w_1}) of China	
(1978-2011)	264
B.51 Bounds tests for exports equation (as a function of M_{w_2}) of China	
(1978-2011)	265
B.52 Bounds tests for imports equation of China (1978-2011)	266
B.53 Bounds tests for domestic price equation of China (1978-2011)	267
B.54 Bounds tests for export prices equation of China (1978-2011)	268
B.55 Engle-Granger cointegration test for the consumption equation for	
China (1978-2011)	269

List of Figures

1.1	Labor income share (% of GDP at market prices) (left-hand column) and annual average GDP growth rate (right-hand column) in EU 15 (1960-2011)	5
1.2	Labor income share (% of GDP at market prices) in selected developed countries (1960-2011)	6
5.1	South Korean GDP by sector composition (% of GDP) (1965-2011)	104
5.2	Distribution of the workforce across economic sectors in South Korea (% of total employment)(1980-2011)	105
5.3	Composition of Korean exports with respect to stages of production (% of total exports) (1967-2013)	106
5.4	Composition of Korean imports with respect to stages of production (% of total exports)(1967-2013)	107
5.5	Evolution of GDP components by expenditure in South Korea (in %) (1960-2011)	108
5.6	Labor income share in Korea (% of GDP at factor cost) (1970-2011)	110
5.7	Labor income share (% of GDP at market prices) in Korea (1970-2011)	111
6.1	Distribution of the workforce across economic sectors in Thailand (% of total employment) (1980-2011)	127
6.2	Thai GDP by sector composition (% of GDP) (1960-2011)	128

6.3	Composition of Thai exports with respect to stages of production (% of total exports)(1967-2013)	129
6.4	Composition of Thai imports with respect to stages of production (% of total imports)(1967-2013)	130
6.5	Evolution of GDP components by expenditure in Thailand (% of GDP) (1965-2011)	132
6.6	Labor income, compensation of employees, and OSPUE in Thai- land (% of GDP at factor cost) (1970-2011)	134
6.7	Labor income, compensation of employees, and OSPUE in Thai- land (% of GDP at market prices) (1970-2011)	135
7.1	Chinese GDP by sector composition (% of GDP) (1960-2011) . .	167
7.2	Distribution of the workforce across economic sectors in China (% of total employment) (1980-2011)	168
7.3	Composition of Chinese exports with respect to stages of produc- tion (% of total exports) (1967-2013) Panel 1/2	169
7.4	Composition of Chinese exports with respect to stages of produc- tion (% of total exports) (1967-2013) Panel 2/2	170
7.5	Composition of Chinese imports with respect to stages of produc- tion (% of total imports) (1967-2013)	171
7.6	Evolution of GDP components by expenditure in China (% of GDP) (1978-2011)	172
7.7	Evolution of the number of the self-employed (in millions of work- ers) in China between 2004 and 2012	180
7.8	Labor income share (% of GDP at factor cost) in China (1978-2012)	181
7.9	Labor income share (% of GDP at market prices) in China (1978- 2012)	182
7.10	Labor income share in China from different sources	183

Abbreviations

ADF Augmented Dickey Fuller (test)

AIC Akaike Information Criterion

ARCH Autoregressive Conditional Heteroscedasticity

ARDL Autoregressive Distributed Lags

ASEAN Association of Southeast Asian Nations

CPC Communist Party of China

CSY China Statistical Yearbook

CUSUM Cumulative Sum Control Chart (test)

DH Doornik-Hansen (normality test)

ECM Error Correction Model

FoF Flow of Funds

GRET GNU Regression Econometric and Time Series Library

GRP Gross Regional Product

HQ Hannan-Quinn (Information Criterion)

JB Jarque-Bera (normality test)

NAIC Newly Agro-Industrializing Country

NBS National Bureau of Statistics (of China)

NESDB National Economic and Social Development Board (of Thailand)

NIPA National Income and Product Accounts (of Thailand)

OSPUE Operating Surplus of Unincorporated Enterprises

PLI Price Level Index

PW Prais-Winsten (Method)

PWT Penn World Tables

RESET (Ramsey) Regression Equation Specification Error Test

SBC Share-based Cooperatives

SIC Schwarz Information Criterion

SOE State Owned Enterprise

TVE Town and Village Enterprises

VAR Vectorial Autoregression

VIF Variance Inflation Factor

Chapter 1

General introduction

The aim of this thesis to examine the short-run impact of a variation in income distribution between wages and profits on demand growth in South Korea, Thailand, and China. For this purpose, we adopt the post-Keynesian, or more precisely, the post-Kaleckian approach. This framework does not suggest a complete explanation of the growth path of these countries; but analyzes the short-run effect of distribution on the latter. The research question is “What is the effect of an increase in labor share on demand and its components in South Korea, Thailand, and China?”

In this introductory chapter, we present the motivation behind our research question and the plan of this dissertation. We focus on income distribution, demand growth¹, and the relationship between them in the first section. We also

¹The term *growth* refers to both growth of demand and that of capital in the literature. Here, we refer to demand growth, while we opt for *capital accumulation* for the latter. When used alone, *growth* refers to demand growth.

briefly introduce the theoretical approach that we adopt. In the second section we discuss the evolution of labor income share² in the world and the general reasons behind its decline in relation to global capitalism. In the third section we provide a general view of the transformation and growth of the East Asian economies during the aftermath of World War II. In the last section we exhibit the plan of our dissertation.

1.1 Distribution and growth

Since the last economic and financial crisis of 2007-2008, the questions around income distribution and inequality have been raised more loudly than ever.³ The studies focusing on personal income and wealth distributions, such as the best-seller *Capital* of Piketty (2014), find place in mass media. The hailed capitalist globalization would bring development and equal chances to peoples from different regions of the world, however, its consequences are quite the contrary. The share of labor in total production is in decline all over the world along with relatively lower growth rates and higher unemployment rates since 1980s. Internationalization of production due to the profit-seeking nature of the capital, hand in hand with the policies adapted by conservative, liberal, or social democrat gov-

²The terms *labor share*, *labor income share*, and *adjusted wage share* are used interchangeably in the text. *Wage share*, usually stands for the share of compensation of employees in GDP. This term, alone, poses some problems for the developing countries. See Section 4.2 for the definitions of variables used in the dissertation.

³Foster and Yates (2014) provide a quick example: A simple search of the phrase “income inequality” in the New York Times archive among the articles between 2007 and 2014 results in 4260 entries while it is 2660 for the period 1977-2007.

ernments in developed and developing countries led to this situation. Among the policies adopted in this vein, the most prominent ones are privatization of public/state companies, curtailment of government spendings, and capital accounts liberalization. These coherent policies, often referred as “neoliberal”, translate into disappearance of the welfare state, weakening of labor unions, and financialization of global and national economic activities. In contrast with the major claims, capitalist globalization does not lead to an internationally balanced economies with full employment (Hart-Landsberg 2015).

Wages, in general, are considered a cost factor in production by neoclassical economists. However, post-Keynesian framework provides a different explanation to its relation to output. While lower unit labor costs, hence wages, policies are praised for attaining higher export shares in the world market; wages as a determinant of domestic demand is pushed to the background. Post-Keynesian, in particular, post-Kaleckian models of income distribution and growth address these issues by taking both domestic and international markets into account. In this framework it is possible that an increase in labor’s share in total income brings on a growth in output. This the case of “wage-led” growth. Increased share of labor might also lead to a decline in output, which is the case of “profit-led” growth.

It should be underlined that the aim of the model employed in this dissertation is not to provide a comprehensive explanation to the economic growth of the countries under examination. Income distribution is not the unique factor that determines growth. Monetary and fiscal policies, exogenous shocks such as oil price shocks, shifts in real exchange rates etc. also have influences on aggregate demand

(Lavoie and Stockhammer 2013b, p.23). The model we employ rather analyzes the impact of variations in (exogenous) income distribution on demand (growth) in the short-term. The theoretical model enables characterization of the demand regimes as wage-led or profit-led by putting forward the theoretical conditions, e.g. the relations between model parameters, marginal effects etc. In compliance with the latter, the econometric model and its equations enable estimation of those.⁴

1.2 Capitalist globalization and labor income share

The invariability of relative shares of workers and capitalists in the national income was taken for granted in the neoclassical analysis. However, the long-run decline in labor income share invalidates this assumption. It is not only particular to the developed countries but it is also valid for the developing world. The decreases are more apparent in continental European economies (and Japan) than in the Anglo-Saxon economies. The labor share in developing countries is subject to more fluctuations, however, since 1990 the decline is more apparent (Stockhammer 2013a, p.40-43). Figure 1.1 depicts the historical decline in both labor share and GDP growth rates in Europe. Figure 1.2 shows the evolution of labor share in selected Anglo-Saxon countries and Japan.⁵

While the decline in the labor income share is not denied by economists, there

⁴The assumptions and the limitations of the model are discussed in Chapter 4.

⁵We depict and discuss the evolution of labor share in South Korea, Thailand, and China in Sections 5.2, 6.2, and 7.2, respectively.

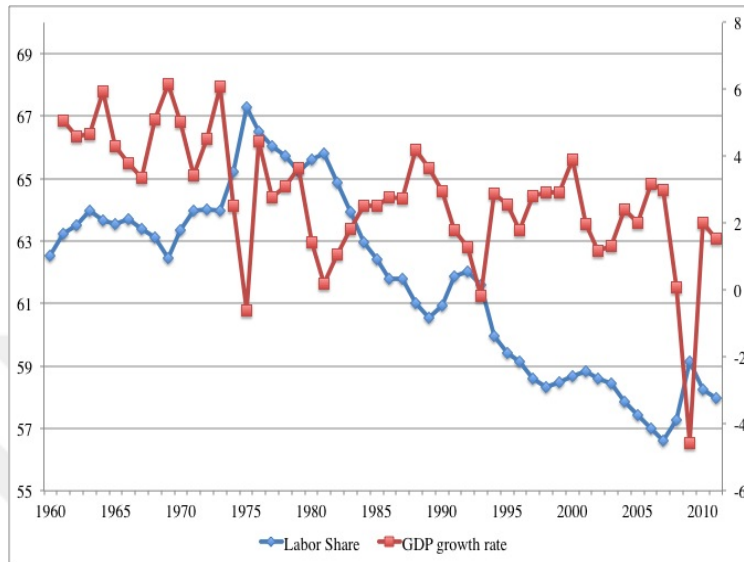


Figure 1.1: Labor income share (% of GDP at market prices) (left-hand column) and annual average GDP growth rate (right-hand column) in EU 15 (1960-2011)

Source: AMECO. West Germany is included until 1990.

is no general consensus on the underlying reasons. Stockhammer (2013a); Stockhammer (2013b) analyzes the determinants of labor income share and provides an extensive review of the studies in this field. Technological change, globalization, financialization, and retrenchment of the welfare state are the most commonly brought forward explanations of the decline in labor income share. However, interrelated with the last three factors, the impact of bargaining power and market power of firms are set aside. It is claimed to owe to technological development since the shares of profits and wages in total income are determined by the latter according to the neoclassical view. IMF, admitting the role of globalization, states that “rapid technological change has had a bigger impact” on the decreasing share of labor income (cited by Stockhammer (2013a, p.52) from IMF (2007)).

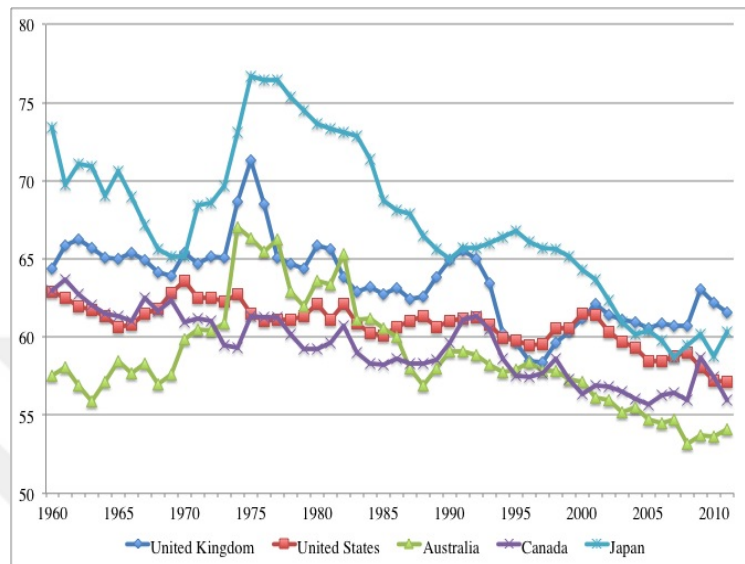


Figure 1.2: Labor income share (% of GDP at market prices) in selected developed countries (1960-2011)

Source: AMECO

The econometric study by Stockhammer (2013a) uses two different samples, one consisting of developing and developed countries and the other only of the latter. He underlines that the main factor behind the decline in labor income share is financialization. The negative impact of globalization and welfare state retrenchment are also remarkable. Technological change has positive effects in developing countries, however, for developed countries it has negative effects, but less in magnitude. It is concluded that technological change is not the main cause of the decline in income distribution in developed economies. The other important conclusion is that globalization was not in favor of workers in developing economies.

1.3 Transformation of East and Southeast Asia and export-led growth

East Asian export oriented industrialization and transformation have been praised for the high growth rates attained in these countries. Some countries like South Korea have been shown as model for the rest of the developing world. However, the Asian crisis of 1997-98 led to a partial ruin of the image of the East Asian economies. In the chapters devoted to the analyses of demand regimes in South Korea, Thailand, and China we depict the structural and economic transformation of these countries in detail. Here we briefly present the pace of export-led growth, the general transformation of the region, and some views on the East and South Asian “miracles”.

In the late 1970s, export-led growth policies replaced import-substitution, which was the dominant development policy after World War II. Export-led growth strategy targeted increasing productive capacity by focusing on world markets. Germany and Japan were the pioneer countries of this strategy in 1950s and 1960s. In 1970s and 1980s the four East Asian “Tigers” (South Korea, Taiwan, Hong Kong, and Singapore) adopted this policy. In the 1980s and 1990s South East Asian countries Thailand, Malaysia, and Indonesia, and from Latin America Mexico joined the competition. 2000s saw the emergence of China becoming one of the leading exporters of the world (Palley 2011).

One of the explanations of the East Asian, including that of Thailand, growth is the significant developments in labor productivity growth. It is claimed to be the

main reason behind East Asian per capita growth. It was the result of rapid industrialization, which was preceded by important increases in agricultural productivity. While productivity growth is negatively associated with employment growth in several late-industrializing countries, this was not the case for East Asian countries (Storm and Naastepad 2005).

The share of Developing Asia's world GDP was less than 10% in 1980 but reached at 28% in 2010. Trade dependency of the countries also deepened in the course of time: The export to GDP ratio increased from 15% to 45% between 1982 and 2006. The region's world share of exports rose from 8% to 26% between 1980 and 2009. The share of manufacture within total exports steadily increased, in accordance with the interests of the transnational companies. World demand, rather than regional needs, has become the engine of the economy (Hart-Landsberg 2013, p.31-36).⁶ Despite the high growth rates, two-thirds of the world's poor live in the region. More than 1.8 billion Asians subsist on less than \$2 a day and 903 million survive on less than \$1.25 a day. (ADB 2010, p.38)

East Asia's exports, except those of China, have changed direction from the US and the EU to East Asia, and mostly to China. The latter, in contrast, started to export to the West. China's final goods exports to the East Asia decreased from 50% to 27% between 1992-93 and 2004-5, while its exports to OECD countries, excluding Japan and South Korea, increased from 29% to 50% (Hart-Landsberg

⁶Developing Asia is composed of the 44 developing member countries of the Asian Development Bank, including South Korea, Thailand and China, and Brunei Darussalam by 2010. The statistics are retrieved by Hart-Landsberg (2013) from ADB (2010). East Asia refers to the Peoples Republic of China; Hong Kong, China; Republic of Korea; Mongolia; and Taipei, China.

2013, p.34).

East Asian rapid growth and its underlying reasons have been an important area of discussion in recent decades. Burkett and Hart-Landsberg (2003) classify the mainstream views on the East Asian development as neoliberalism, left-wing neoliberalism, and developmental-statism. They claim that these views are based on the assumption of developmental catch-up and technological determinism, and they are uncritical towards capitalist relations and imperialism. Up until the 1997-98 crisis, neoliberals, especially the World Bank, asserted that East Asian growth and industrialization is a proof of the success of the free market policies and their efficacy. These policies were non-restrictiveness toward foreign capital and openness to international trade. Burkett and Hart-Landsberg state that neoliberalism played down the role of state policies in industrialization, notably in Japan, South Korea, and Taiwan. The free market policies applied in the ASEAN-3 countries (Thailand, Indonesia, and Malaysia) were closer to the neoliberal ideal. The Asian crisis of 1997-98 owed to these neoliberal policies, however “crony capitalism” was claimed to be the underlying reason by the neoliberals. This concept refers to corrupt state interference in market processes, especially government controls over allocation of credits and investment priorities. However, defenders of “left-wing neoliberalism”, especially the economist Joseph Stiglitz, did not accept this explanation. They rather suggest that the crisis was the product of a speculative bubble compounded by contagion effects. They kept their position that the Asian economies were still solid due to high savings and absence of budget deficits. Their critics were rather directed to contractionary monetary and

fiscal policies. Burkett and Hart-Landsberg criticize those mainstream views stating that the export performance of East Asian countries and their overproduction crises should be considered as symptoms of high rates of exploitation of labor, which decreases the purchasing power of their working classes. After restructuring of the economies for export-led growth, which often requires dependence on transnational corporate production and marketing networks, an increase in rate of wages higher than that of labor productivity causes problems of competition. Emergence of China as an export-base has even worsened this race.

1.4 The plan of the dissertation

The plan of the dissertation is the following. Chapter 2 offers a literature survey on the theories on income distribution, growth, and the relationship between the two. Starting from Adam Smith, prominent economists' views on the issue and the evolution of the questions related to income distribution-growth relationship are discussed.

Chapter 3 presents the empirical literature on the post-Keynesian models of income distribution and growth. This section provides a broad review of the econometric studies using different methodologies for estimations of demand/accumulation regimes of numerous countries. Methodologies and findings of these studies are summarized in that section.

Chapter 4 we present the theoretical model that we use for the analysis of demand regimes in South Korea, Thailand, and China. Model variables, empir-

ical aspects of the variables, and econometric methodology are presented in that chapter. We also offer a discussion on the relevance of the model to developing countries.

In Chapters 5, 7, and 6 we analyze the demand regimes of the three countries. In these chapters, we firstly discuss the structural transformation and macroeconomic performance of the countries. We continue with calculation and evolution of labor income share in these countries. We proceed with the application of the theoretical model and results of the estimations. Finally, we evaluate econometric findings and if applicable, compare them with previous ones in the literature.

Finally, in Chapter 8, we address shortcomings of the model, summarize the findings of the dissertation, and discuss implied policy conclusions.

Chapter 2

Theories of income distribution and growth

“Wages,..., are not a share of the worker on the commodities produced by himself. Wages are that part of already existing commodities with which the capitalist buys a certain amount of productive labour-power”

Karl Marx

This chapter presents a survey on theories of income distribution-growth relationship by tracing the origins of the problematic. The reason behind such an attempt is the necessity of positioning post-Keynesian approach(es) to income

distribution and economic growth within a historical context of theories of value, income, and distribution. As mentioned above, we focus on the *growth* of demand, rather than that of capital, which is in general referred as *capital accumulation*.

The aim of this chapter is not to exhibit an exhaustive review on theories of income distribution growth relationship but to present the historical milestones that brought for the theoretical and the empirical model used in this dissertation. We firstly present the ideas and main concerns of two classical political economists, Adam Smith and David Ricardo, on distribution and growth. We proceed with Karl Marx's critique on Ricardo and touch upon his theories of value, distribution, and growth. In the following section we briefly introduce the conception of the neoclassical school of the relationship between distribution and growth. Then we present Keynes's approach to the problematic and focus on the contributions of his followers in Cambridge (UK). We continue with Michal Kalecki's theories on prices and income distribution. In the penultimate section we present neo-Kaleckian and post-Kaleckian models. We end the chapter with a general assessment of the evolution of the problematic and conclude.

2.1 Classicals

In this section we evaluate the views of Adam Smith (1723-90) and David Ricardo (1772-1823) on the income distribution and growth. Since the main paradigm of the long tradition of the political economy is not the relation between income distribution and economic growth, but *value* and distribution, we try to abstract

from their propositions on the latter.

Marx (1859) in *A Contribution to the Critique of Political Economy* states that William Petty (1623-1687) in Britain and Boisguilbert (1646-1714) in France are the pioneers of the classical political economy. He mentions that the quest in this field ends with David Ricardo in Britain and Sismondi (1773-1842) in France; that is to say, there exists a long tradition starting from the 17th century and continuing until the middle of the 19th century. Pivetti (2008) defines “classical theory of distribution” as the

main elements which can be regarded as characterizing the approach to the problem of the division of the national product among classes followed by the English classical economists from Adam Smith to David Ricardo, later by Karl Marx, and, more recently, by Piero Sraffa

Keynes defines the classical school beginning with David Ricardo and ending with Arthur Cecil Pigou (1877-1959) (Blaug 2008).

It should be mentioned that classical economists considered distribution inseparable from *value*. Despite having different definitions of the latter, it was the indispensable concept of their analyses. Economic growth, especially its relation to distribution of income was not explicitly treated by them; however, we find some clues on their approaches to this question.

2.1.1 Adam Smith

Adam Smith developed a theory of price in which he tried to explain its relation to labor, however, the link between shares of income and growth is not clearly stated. Skinner (2008) states that Smith starts with the analysis of division of labor, before addressing value, price, and allocation; and later to discussion of distribution. However, several authors claim that the latter is not extensively analyzed and the relation between wages, profits, and rents is not evidently treated (Dobb (1975, p.50); Aspromourgos (1996) reporting from O'Donnell (1990)). Nevertheless, he establishes the relationship between the interest of the landlords, workers and capitalists with the interests of the society. Smith states, in *The Wealth of the Nations*, the following on the interests of the landlords:

The interest of the first of those three great orders, ..., is strictly and inseparably connected with the general interest of the society. What-ever either promotes or obstructs the one, necessarily promotes or obstructs the other (Smith 2010, p.265).

Adam Smith was the first important economist who made a clear distinction between industrial capitalists profits, wages, rents, and merchants profits. He underlined the importance of the class conflict between capitalists and workers. Smith was aware of the fact that ownership of property was the source of income and determinant of the social class. He was sure that labor is the only creator of value or wealth. However, the division of the produce between wages and profits was the outcome of the struggle between laborers and capitalists, though not

expressed with those words. He laid out a labor theory of value that would be improved later by David Ricardo and Karl Marx (Hunt and Lautzenheiser 2011, p.43-49).

As for the workers Smith states that their interests are “strictly connected with the interest of the society as” the landlords (Smith 2010, p.266). Smith recognizes that wages increase when demand for labor raises and they stabilize around its subsistence level when “real wealth of the society becomes stationary” and they become even less when the “society declines”. However, we observe no direct attempt for the analysis of the relation between labor income (share) and growth.

2.1.2 David Ricardo

For David Ricardo, distribution of (national) income was the main question of the political economy, as stated by his often quoted assertion: “To determine the laws which regulate this distribution, is the principal problem in Political Economy” (Ricardo 1821, p.5). However, the relation between distribution and growth is not examined in an explicit manner. Anikin (1975) states that the theory of distribution, as well as that of value of Ricardo was concentrating on the shares and proportions instead of its “actual nature” and development of society. Ricardo developed Smith’s approach to wages, profit, and rent (p.246).

Ricardo rejected the statement by Smith and his disciples that an increase in money wages would bring about a rise in value and price of a commodity (ibid., p.241-242). He improved Smith’s theory of value and stated on value that

[t]he value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labour which is necessary for its production and not on the greater or less compensation which is paid for that labour(Ricardo 1821, p.11).

His theory was later developed by Marx, who conceptualized the value of *labor power*.

Ricardo's analysis of income distribution was in line with the interests of the rising bourgeoisie and against that of the landlords in the UK. He suggested that the agricultural prices would increase due to population growth and use of marginal lands, if there was no intervention to economic development. Consequently, all the profit would be acquired by the landowners while the profit rate would decrease. Ricardo states that "the interest of the landlord is always opposed to the interest of every other class in the community"(Anikin 1975, p.236-237). According to Ricardo, distribution of income was like sharing a cake of fixed size. Workers were awarded by some more than a modest part of the whole while the rest was shared among capitalists and landowners, whose share is steadily rising (ibid., p.247).

The points mentioned above offer not much explanation to the relation between income distribution between capitalists and workers and economic growth. However, we might state that a redistribution of income towards rents would be detrimental to economic growth according to Ricardo. Since Ricardo saw no possibility of crisis of overproduction, the essential point for him was maintaining the share of profits against that of rents.

2.2 Marx

Karl Marx (1818-83) developed the value theorems proposed by Smith and Ricardo and surmounted the dilemma of the latter by founding his own labor theory of value. In his works, the income distribution-demand growth relation does not appear as an important problematic, but he analyzes the link between distribution and (capital) accumulation. Although profit rate has tendency to fall while capital accumulates, the latter, *ceteris paribus*, rises if value of the labor power decreases. In other words, a higher rate of exploitation and lower wages lead to a rise in capital accumulation rate.¹ However, this does not directly draw conclusions about the relationship between aggregate demand and income distribution, but his theory and some of his works enable examination of this problematic.

Marx (1976), in contrast with Smith and Ricardo, does not view rents, interests, and profits as independent constituents. He states that they are “only *different names for different parts of the surplus value* of the commodity, or the *surplus value* of the commodity, or the *unpaid labour realised in it*, and they are *equally derived from this source, and from this source alone*” (Book II, p. 45, italics in original).

Both Marx and Ricardo agree that profits and wages move in opposite directions; in other words, an increasing (decreasing) share of profits in total income comes along with a decreasing (increasing) wage share.² Nonetheless, Marx an-

¹Still this does not reverse the tendency of falling profit rate.

²Marx (1976, p. 39, Book I) underlines that “the interests of capital and the interests of wage-labour are diametrically opposed to each other”

ticipated the latter to decrease, while Ricardo expected the contrary (Davidson 1960, p.15)

Davidson (ibid.) mentions that both the Ricardian and Marxian theories of income distribution neglect the role of aggregate demand. However, Marx (1976), in his reply to John Weston³, argues in *Value, Price and Profit* that an increase of the overall wages does not change the aggregate demand but the composition of the goods consumed would be altered. The basic aim of his discussion was to disprove the arguments of Weston who states that the rise of wages would not prove the prosperity of the working class, however, while doing so, he also examines the impact of the wage share on the aggregate demand.

2.3 Neoclassicals

The classical approach to prices, distribution, and growth was displaced by the neoclassical paradigm in the 1870s. William Stanley Jevons (1835-1882), Carl Menger (1840-1921), and Leon Walras (1834-1910) formed the basis of the neoclassical theories of income distribution and growth.⁴ While social classes are fundamental to the classical theory, neoclassical theory was constructed on pre-societal individuals, subjective values, and supply and demand. The distribution of income is situated within the general equilibrium price theory of the neoclas-

³John Weston was an English workers' representative and a member of the First International (1865) (Marx 1976, p.5, Book II).

⁴However, Davidson (1960) states that "the major analytical precursors of the neoclassical marginal productivity doctrine can be found in rudimentary form in the writings of von Thunen (1783-1850)" (p.20)

sical approach. The “first principles”, i.e. given production and utility functions, given initial endowments and the assumption of strictly profit maximizing companies and utility maximizing individuals, are the bedrock of this theory. The aggregate version of this theory was proposed by authors like John Bates Clark (1847-1938) and Knut Wicksell (1851-1926) in the late nineteenth century. Hence a marginal productivity theory of distribution was born out of this tradition (Hein 2014, p.50).

Since the center of attention of the neoclassical theory was the allocation of resources, mainly that of labor and capital, theories on economic growth were developed lately. The first growth models, which are now called “old neoclassical growth models” were proposed by Robert M. Solow in 1950s. Solow model, which assumes full employment with exogenous technology, was replaced by second generation “new growth models” in the 1980s by the works of Paul M. Romer and Robert E. Lucas. They were aiming to integrate productivity growth within the neoclassical approach (ibid., p.50-51). In the latter type of models, distribution of income in favor of capital or high income households leads to a higher long-run equilibrium growth rates (ibid., p.84).

The neoclassical general equilibrium theory, which analyses simultaneous determination of prices and quantities for given initial endowments, is at the same time a theory of income distribution (ibid., p.53-54). Labor and capital are “rewarded” with respect to their “contributions” to production and hence income distribution is reduced to a technical sphere.

The neoclassical theory is subject to two main critiques. The first critique

concerns Say's law, i.e. that the aggregate supply necessarily creates an equivalent aggregate demand. The second addresses the notion of *capital* and is known as "capital controversy" or "Cambridge-Cambridge controversy" in 1950s and 1960s. The discussions direct several critiques to the neoclassical theory. Among those, concerning the income distribution, it is mentioned that shares of labor and capital in production can not be determined by coefficients of an aggregate production function (Hein 2014, p.91-107).⁵

2.4 Keynes

Keynes, in his *General Theory* (henceforth GT), states that the economic system fails to achieve full employment and an equitable distribution of wealth and income (Keynes 1973, Chap. 24). However, he does not explicitly focus on the relation between income distribution and growth in his works.

In the GT, the problematic is treated through the general propensity to consume, which would decrease in case of a reduction in the labor income and notices that "[t]he effect of the transfer from entrepreneurs to rentiers is more open to doubt."⁶ (ibid., Chap. 19)". On the contrary, in the same work, we also find signs that the neoclassical marginalist approach is accepted by Keynes at the microeconomic level. However, at the macroeconomic level, due to lack of effective

⁵The collective work edited by Arestis, Palma, and Sawyer (2005) provides several essays on the history of the discussion of the capital controversy.

⁶Keynes states that "[t]he transfer from wage-earners to other factors is likely to diminish the propensity to consume" But if rentiers represent on the whole the richer section of the community and those whose standard of life is least flexible, then the effect of this also will be unfavorable.

demand, this relation can not be based on the scarcity and marginal productivity of the labor (Hein 2014, p.23-24). Keynes mentions that

...up to the point where full employment prevails, the growth of capital depends not at all on a low propensity to consume but is, on the contrary, held back by it; and only in conditions of full employment is a low propensity to consume conducive to the growth of capital (Keynes 1973, Chap. 24)

The earlier work of Keynes, *A Treatise on Money*, provides important insights into the subject. Investment spending, which is not dependent on savings, influences price and distribution of income (Hein 2014, p.24). He states the following on the relation between investment, profits, and consumption:

Thus profits, as a source of capital increment for entrepreneurs, are a widow's cruse which remains undepleted however much of them may be devoted to riotous living. When on the other hand, entrepreneurs are making losses, and seek to recoup these losses by curtailing their normal expenditure on consumption, *i.e* by saving more, the cruse becomes a Danaid jar which can never be filled up; for the effect of this reduced expenditure is to inflict on the producers of consumption-goods a loss of an equal amount. (Keynes (1971), cited in Hein (2014))

Keynes was in favor of “moderate”, rather than “great” income differentials, which were neither desirable nor necessary. He defended direct taxation of in-

come and inheritance to achieve full employment (Minsky 2008, p.149, quotation marks in original). According to Keynes, there were two reasons for a lower profit share. Firstly, high profit share would decrease the propensity to consume and would be deterrent to investment. Secondly, in order to attain full investment full employment and disciplining of the wants were necessary (ibid., p.153-154).

2.5 Neo-Keynesian (Cambridge) models of income distribution and growth

The history of the emergence of post-Keynesian economic thought as a distinct school of economics goes back to 1930s, when Keynes was discussing his views on the Great Depression with the Cambridge economists like Joan Robinson (1903-83) and Richard Kahn (1905-89). It can be stated that post-Keynesian economics started at the second half of 1950s with Nicholas Kaldor (1908-86) and Robinson, who proposed a theory of income distribution as an alternative to the neoclassical one. Or the 1960s was the start of post-Keynesianism during when the discussions on capital theory between the two Cambridges took place (Lavoie 2014). Alternatively, King (2003) claims that post-Keynesianism emerged as a separate school at this period as a reaction against the “Bastard Keynesians” like J.R. Hicks (1904-89), Paul Krugman, James Meade (1907-95), and Paul Samuelson (1915-2009).

In this section we present the main contributions of three main followers of Keynes, namely Kaldor, Robinson, and Pasinetti, respectively. Also known as Cambridge models, they proposed the most prominent post-Keynesian mod-

els of growth and distribution (Lavoie 2014, p.347). However, another line of post-Keynesian models based on the fundamentals of Kalecki, called Kaleckian, emerged in 1980s.⁷ There are two main differences between those two family of models. The former, based on Keynes, that we call neo-Keynesian approach, assumes competition among firms, whereas the Kaleckian framework is oligopolistic. The other important distinction is about the treatment of capacity utilization. While the neo-Keynesian model implicitly assumes that the latter is fixed at its normal level in the long term, the Kaleckian models treat it as an endogenous variable, even in the long term (ibid., p.348).

2.5.1 Kaldor

Nicholas Kaldor based his analysis of theory of growth, in relation to income distribution, on Keynes's *Treatise on Money* (Hein 2014, p.25). The approach of Kaldor (1955/56) was also under the influence of both Michal Kalecki and Joan Robinson. The famous phrase "Capitalists earn what they spend, and workers spend what they earn" attributed to Kalecki, which summarizes the latter's approach to the problem, was originally used by Kaldor (Hein 2014; Lavoie 2014). His theory of income distribution in his seminal paper "Alternative Theories of Distribution" (1955/56) can be summarized as follows: The share of profits is a function of the investment to output ratio for given saving propensities out of wages and profits at full employment.⁸

⁷Those Kaleckian models are exhibited in Section 2.7.

⁸Kaldor's contributions to this problematic go beyond this work. However, we restrict our attention to the aforementioned article that presents the core elements of his theory. For further

Kaldor (1955/56) analyzed the adjustment of savings to investment in an economy that grows at its *natural* rate.⁹ Assuming no government and taxes in a closed economy the total income is the sum of profits (R) and wages (W). Both wage and profit earners can save out of their income with the saving propensities s_W and s_R , respectively. This enables the wage earners to accumulate financial wealth and receive income out of profits. Hence, the overall saving rate s of the economy is dependent on the weighted sum of the s_W and s_R . This implies that a redistribution of income between wage and profit earners changes the total savings, which must adjust to exogenous investment (I). However, the stability condition $s_R > s_W$, must be satisfied for this adjustment. Then he shows that profit share h in total income (Y) is equal to the following:

$$h = \frac{1}{s_R - s_W} \cdot \frac{I}{Y} - \frac{s_W}{s_R - s_W} \quad (2.1)$$

Here, the impact of the exogenous investment to income ratio is dependent on the magnitudes and the difference between s_R and s_W . If the latter is smaller, the “coefficient of sensitivity of income distribution”, in Kaldor’s words, is higher. However, there are bounds within which the investment share brings about an adjustment of income distribution through the equilibrium of saving and investment. Kaldor (ibid.) presents four conditions, which we do not treat here, to be filled for

contributions of Kaldor, see Hein (2014, Chapter 4.2), King (2009).

⁹*Natural rate of growth* is introduced by Harrod (1939) and defined as “the maximum rate of growth allowed by the increase of population, accumulation of capital, technological improvement and the work/leisure preference schedule, supposing that there is always full employment in some sense”. It can be defined as the sum of the rate of growth of labor productivity and that of the labor force (Hein 2014, p.34).

this change to take place. In the equation 2.1, functional income distribution is dependent on the investment to income ratio. The latter is equal to the multiplication of the natural rate of growth g_n and the capital to output ratio v :

$$\frac{I}{Y} = \frac{I}{K} \cdot \frac{K}{Y} = g_n \cdot v \text{ (Hein 2014, p.123-126)} \quad (2.2)$$

This equation provides us with a theory of income distribution without a production function, which is entirely different from that of the neoclassicals. Kaldor (1955/56) also demonstrated that the *warranted* rate of growth g_W ¹⁰, proposed by Harrod (1939) adjusts to be equal to g_n , which is the actual rate of growth due to the full employment assumption. The adjustment of g_W to g_n follows through the variations of the profit share. Combining the equations 2.1 and 2.2, and equating g_n and g_W , we obtain the following equation:

$$g_n = g_W = \frac{s}{v} = \frac{s_w + (s_P - s_W)h}{v} \text{ (Hein 2014, p.126)} \quad (2.3)$$

This equation implies that g_W and g_n are not independent and if profit margins are flexible, g_W adjusts to g_n through a resultant change in h (Kaldor 1955/56, p. 97).

Dividing the terms in both sides of the equation 2.1 by the capital to output ratio, another equation that connects growth of the capital, accumulation rate g ¹¹ and profit rate r ¹² is obtained:

¹⁰ g_W is equal to s/v .

¹¹ $g = \frac{I}{K}$

¹² $r = \frac{R}{pK}$, where p is the price level

$$r = \frac{R}{pK} = \frac{1}{s_R - s_W} \cdot g - \frac{s_W \cdot \frac{Y}{K}}{s_R - s_W} \quad (2.4)$$

According to Kaldor (1955/56), the profit rate has no feedback on the capital-output ratio and on the technique choice of the firms. Although Kaldor admits that the value of capital would change along with the rate of profit, choice of technique and capital-output ratio; he assumes that the factor price effects on the capital-output ratio to be small and non-systematic. Then, for a given capital-output ratio and given saving propensities, the equilibrium profit rate is a positive function of the accumulation rate. If we assume that workers can not save, i.e. $s_W = 0$, we obtain the following equilibrium growth rate of capital:

$$r^* = \frac{1}{s_R} \cdot \frac{I}{K} = \frac{g}{s_R} \quad (2.5)$$

This equation is called the “Cambridge Equation”. With the same assumptions, we obtain the equilibrium share of profits:

$$h^* = \frac{1}{s_P} \frac{I}{Y} \quad (2.6)$$

Hein (2014) underlines that the Cambridge Equation brings forth a macroeconomic theory of distribution that does not depend on the nature of the technology, marginal productivities, perfect competition etc. While in the classical and Marxian macroeconomic theories of distribution it is the functional income distribution that determines the capital accumulation, Kaldor’s Keynesian theory provides us a reversed theory. The rate of profit and profit share are determined by the accumu-

lation and consequently the wage share becomes a residual variable (p. 129-130).

2.5.2 Pasinetti

Luigi Pasinetti develops the approach of Kaldor (1955/56) in which the class structure of workers and capitalists is not explicitly examined (Palley 2003). While the Keynesian distribution theory of Kaldor (1955/56) is based on income categories (Hein 2014, p.130), Pasinetti (1962) proposes a model by explicitly treating the class structure (Palley 2003).

Pasinetti (1962), in his analysis, makes four basic assumptions on the workers and capitalists:

- Workers' propensity to save is lower than that of capitalists.
- Capitalists only earn profit.
- Workers receive wage income for their labor and profits for their savings.
- The rate of interest and rate of profit are equal.

Based on those assumptions, Pasinetti shows that workers' saving behavior does not influence the steady-state income distribution. In the steady state, the share of the capital stock of capitalists is constant and their savings adjust to keep this share. Thus, the profit share must be at such that it can sustain the necessary savings to maintain the share of capitalists' ownership. (Palley 2003, pp. 183-184).

2.5.3 Robinson

The main contributions of Joan Robinson to the post-Keynesian theories of income distribution and growth are presented in her *The Accumulation of Capital* written in 1956 and *Essays in the Theory of Economic Growth*. Her work is based on Keynes and especially his *General Theory*. She undertook the task of generalizing the work of the latter from short to long term. She was also influenced by Harrod and Kalecki (Hein 2014, p. 155-56).

Robinson criticized the equilibrium models and distinguished between logical and historical time. She stated that “[o]bserved history cannot be interpreted in terms of a movement along an equilibrium path nor adduced as evidence to support any proposition drawn from it” (Robinson (1962) cited in Hein (2014, p. 156-157)). However, she used the notion of equilibrium in her analyses to show the possible growth paths of an economy.

Robinson believed that adjustment of saving to investment can come about in terms of changes in output/income and also through the changes of the income distribution via variation of prices. In her *Essays*, the adjustment occurs through the distribution of income as it is the case for Kaldor’s Keynesian model. However, in her non-equilibrium framework, this does not lead to full employment growth path. The real wage and wage share become the residuals in her model while the equilibrium rates of profit, accumulation and saving, with given technical conditions and full/normal utilization of the capital stock, are simultaneously determined (ibid., p. 158-160).

2.6 Kalecki

Michal Kalecki (1899-1970), along with Keynes, is considered to be one of the founding fathers/mothers of the post-Keynesian school. Being influenced by Marx¹³, his ideas not only played an important role in the formation of the current post-Keynesian school but also the French Regulation School (Lavoie 2006, p.3,18).

Kalecki's theory of effective demand and that of income distribution and growth can not be treated in isolation. Compared to Keynes's effective demand theory, his analysis explicitly takes into account the distributional aspects at the outset. However, his approach was different from those of Kaldor and Robinson, in the sense that the industrial sector of economy does not operate at full capacity, not only in short-run but also in medium to long-run. Moreover, he assumed that the firms do not have a competitive but an oligopolistic or monopolistic character, which affects price determination. In the primary sector, since the supply is inelastic in short-run, the demand brings about a change in prices. In the industrial sector, the prices are determined by costs, not by demand; however, the latter changes the rate of capacity utilization and production. Firms set their prices by applying a certain mark-up over their unit costs. Mark-up pricing also constitutes the basis of his income distribution theory. The mark-up covers unit labor and material costs, as well as fixed costs and different types of profits (retained profits, dividends, interests, rent). He assumes that the variable costs are constant if firms operate with excess capacity (Hein 2014, p. 181-182)

¹³Hein (2014) states that Kalecki was highly under the influence of Marx's schemes of reproduction in his *Capital* and Rosa Luxemburg's *Accumulation of Capital*.

Drawing from the extensive work of Lopez and Assous (2010) on the contributions and life of Michal Kalecki and also from that of Hein (2014), we firstly present his theory of profits and output. Then, we proceed with a summary of his analysis of pricing and income distribution.

2.6.1 Kalecki's theory of profits and output

Kalecki's formulation of the relation between profits and output took several stages (Lopez and Assous 2010, p.23).¹⁴ In this section, by summarizing the exhibition in the work of the latter, we present Kalecki's analysis of this relation for a given income distribution. We firstly examine a closed economy with no government spending, then extend the analysis to open economy.¹⁵

We assume that the rate of capacity utilization of the economy is given in the short-run. Short run labor productivity is constant. There are three departments that are vertically integrated. The first department produces capital goods, the second consumption goods for capitalists, and the third wage goods for workers. The capitalists demand consumer and investment goods, while workers only consume the former with no savings. Then we can write:

$$R = I + C_k \quad (2.7)$$

where R is gross profits, I is investment, and C_k is consumption of capital-

¹⁴Lopez and Assous (2010) exhibit those steps in the third chapter of their work.

¹⁵These exhibitions correspond to chapter 2 of Lopez and Assous (ibid.) and chapter 5.3 of Hein (2014), respectively.

ists. This equation summarizes the famous phrase of Kaldor, attributed to Kalecki: “Capitalists earn what they spend, and workers spend what they earn”. Kalecki states that “It is...investment and consumption [of capitalists] decisions that determine profits, and not vice versa.” In a given period, capitalists can determine their expenditures but not their profits. The latter influences investment and consumption not contemporaneously but in succeeding periods (Lopez and Assous 2010, p.28).

An increase in production of capital and consumption goods for capitalists bring about new employment and hence more consumption by workers. In other words, capitalists’ expenditure not only determines profits, but also total income. Here additional investment increases the capacity of production (in long-run), however, in short-run it is only considered as effective demand.¹⁶

Let us suppose that, for a given level of investment and capitalist consumption, share of wages in total income increases (for some reason). In such a case, total output, employment, and wages rise as well. Since there is no additional investment, utilization rate of the already installed capacity also increases. Hence the rate of capacity utilization becomes a function of income distribution.

As for the open economy, the equation 2.7 is formulated as the following:

$$R = I + C_k + X - M \quad (2.8)$$

where X stands for exports and M for imports. We can claim that a trade

¹⁶Lopez and Assous (2010) and Hein (2014) exhibit derivation of two Kaleckian multipliers that reflect the impact of autonomous investment on profits and output, respectively.

surplus raises the level of profits for a given income distribution. However, an increase in wages or wage share might decrease the competitiveness and exports, and consequently the profits. We focus on the open the analysis of an open economy in Subsection 2.7.2.

2.6.2 Kalecki's theory of prices and income distribution

In Kalecki's framework, income distribution and determination of income are strongly related. While profit share depends on the degree of monopoly, the level of profits are determined by capitalists' expenditures (Lopez and Assous 2010, p.69). Lopez (2002) cite the following phrase from Kalecki, which summarizes his approach: "According to the first theory the absolute level of profits is determined by capitalist consumption and investment. According to the second theory the relative share of profits in national income is determined by the degree of monopoly."

We maintain the assumptions above for the analysis of the relation between prices and income distribution, unless otherwise stated. Since all the sectors are vertically integrated, total costs are equal to total wages. Then the income distribution in an industry is dependent on the relation between prices and unit costs (wages). A higher price to unit cost ratio corresponds to a higher share of profits in total value of production. The ability of the capitalists to impose higher prices over unit costs is determined by their monopolistic power. Kalecki uses the term "degree of monopoly" for the price unit cost ratio, which is influenced by several factors including the monopolistic power (Lopez and Assous 2010, p.69-70). We

discuss this points later in this subsection.

We now assume that industries are not vertically integrated; then, raw or intermediate material costs should also be included in the analysis. Denoting the price unit cost ratio by k , MP as the total cost of materials, P as prices, and W as wages, we can write the following equation:

$$P = (k - 1)(W + MP) \quad (2.9)$$

Assuming that total value added is equal to sum of profits wages, we can formulate the labor income share (or wage share) as the following:

$$LS = \frac{1}{1 + (k - 1)(j + 1)} \quad (2.10)$$

where j is the ratio of costs of materials to total wages (MP/W). An increase in the “degree of monopoly” k or j causes a decline in the share of wages in total income. As Kalecki (2003) summarizes, “...the degree of monopoly, the ratio of prices of raw materials to unit wage costs and industrial composition are the determinants of the relative share of wages in the gross income of the private sector.” (p. 30). The industrial composition or structure influences the income distribution. If the weight of sectors in which labor receives a high share raises, the overall wage share increases as well.

According to Kalecki, the degree of monopoly, which determines mark-up hence income distribution, depends on several factors. Those are degree of market concentration, relevance of price competition, bargaining power of trade unions,

and overhead costs. While the first has a positive impact on the degree of monopoly, the second and the third have negative effects. As for the overhead costs, Kalecki states that “[t]he degree of monopoly *may*, but need not necessarily, increase as a result of a rise in overheads in relation to prime costs” (cited by Hein (2014, p.188-191) from Kalecki (1971, p. 51))

Kalecki provided a comprehensive and complete theory of prices, income distribution and income determination. The 1980s saw the appearance of the stalwart of a new stream of post-Keynesian modeling based on Kalecki. Kaleckian models of growth and distribution took the place of the neo-Keynesian models, which are presented in Section 2.5. In the next section we exhibit the income distribution and growth models that are based on his foundations.

2.7 Neo and post-Kaleckian theories

In this section, we present and compare two different streams Kaleckian models of distribution and growth. The first family of models, called “Kaleckian” (Lavoie 2014) or “neo-Kaleckian” (Hein 2014), we adopt the latter term. They were developed by Rowthorn (1981) and Dutt 1984, 1987.¹⁷ In those models, a lower mark-up leads to a lower profit share and hence a higher rate of capacity utilization, a higher level of profits and a higher rate of capital accumulation. These models are thus called “wage-led”, “underconsumptionist” or “stagnationist”, in which an increased share of wages results in a raised level of aggregate demand,

¹⁷Lavoie (2014) states that the early formulations of the model were also presented by Taylor (1983, 1985), Amadeo (1986a) and Amadeo (1986b) (p.359)

capital accumulation and growth (Hein 2014, p.241, 257). However, this is only valid when saving out of wages is nil. If we relax this assumption, a “profit-led” regime also becomes possible.

The second kind of Kaleckian models are called “post-Kaleckian” (Hein (ibid.), Lavoie (2014)). Bhaduri and Marglin (1990) and Kurz (1990), by modifying the investment function of the neo-Kaleckian models, obtained two different growth regimes, “wage-led” and “profit-led”. It is the magnitudes of model parameters that determine the growth regime of a given economy. (Hein 2014, p.241-242).

The two different sort of Kaleckian models distribution and growth have the main characteristics of Kalecki’s approach to the problem, as presented in Section 2.6. The labor supply is not limited, and unemployment is permanent in relation to this assumption. Firms are in oligopolistic competition and they apply mark-up pricing on unit costs. In accordance with the latter aspect, both in the short and long term, they maintain excess capacity. Investment determines saving through income, capacity utilization, and growth, not through distribution, as it is the case in the neo-Keynesian models. However, investment function differs between the neo-Kaleckian Rowthorn/Dutt models and the post-Kaleckian Bhaduri/Marglin-Kurz models. In the latter, investment is a function of unit profits or share of profits, while they are not present in the former models. (ibid., p.242-243).

Before we exhibit the two variants of the Kaleckian models, we introduce their basic aspects and equations, as in Hein (ibid., Chap. 6.2). It is assumed that, using labor and capital, a homogeneous good that can be used for both consumption and investment economy is produced. For sake of simplicity there are no over-

head costs, depreciation of capital, or raw materials. Since there is no technical progress¹⁸, the labor-output ratio ($a = N/Y$) and capital-potential output ratio ($v = K/Y^p$) are constant. Then we can write the following equation:

$$r = \frac{R}{p.K} = \frac{R}{p.Y} \frac{Y}{Y^p} \frac{Y^p}{K} = \frac{pY - wL}{pY} \frac{u}{v} = (1 - w^r a) \frac{u}{v} = h \frac{u}{v} \quad (2.11)$$

where r is the profit rate, p the general price level, R the total profits, K the capital stock, w^r the real wage rate, h the profit share, and u the capacity utilization rate. This equation shows that an increase in the wage rates does not imply a decrease in rate of profit since it might lead to an increase in the capacity utilization rate and hence the profit rate. It is the mark-up on unit (labor) costs that determines the income distribution and hence the profit share. We have the following price-mark-up relation :

$$p = (1 + m) \frac{W}{Y} = (1 + m) wa \quad (2.12)$$

where m is the mark-up rate and W is the sum of wages. Then we can express the real wages as below:

$$w^r = \frac{w}{p} = \frac{1}{(1 + m)a} \quad (2.13)$$

The last shows that an increase in the mark-up results in a lower real wage rate.

¹⁸Technical progress is also integrated into the Kaleckian models. Here we do not present such models but in the next chapter on the empirical literature, we present the results found in the econometric studies treating demand and productivity regimes. See subsection 3.1.2.

We relate the profit share ($h = \frac{R}{pY}$) and mark-up as in the following equation:

$$h = \frac{R}{pY} = \frac{pY - W}{pY} = 1 - \frac{W}{(1 + m)W} = 1 - \frac{1}{1 + m} = \frac{m}{1 + m} \quad (2.14)$$

This last equation demonstrates that the mark-up is the only factor that determines the income distribution. As for the savings, which is uniquely made by capitalists, we have the following equation:

$$\sigma = \frac{S}{pK} = \frac{s_R R}{pK} = s_R r = s_R h \frac{z}{v} \quad (2.15)$$

where σ is the saving rate and s_R the propensity to save out of profits. In order to close the model, an accumulation function (g) and the good market equilibrium condition ($g = \sigma$) are required. In the next subsection we present the neo-Kaleckian and the post-Kaleckian model based on this setting, respectively.

2.7.1 Neo-Kaleckian model

In this section we present a neo-Kaleckian model of distribution and growth, as proposed by Rowthorn (1981) and Dutt (1984, 1987). In these models, investment is a function of rate of capacity utilization and realized profit rate. The former has a positive impact on the latter and it reflects the evolution of the quantity of goods demanded, as well. The profit rate is both an indicator of future profitability and a source for internal funding and also a facility for obtaining external finance (Hein

2014, p.248). We exhibit this model assuming that workers do not save their wages in the first version and then relax this assumption in a second one.

Hein (2014) states that inclusion of the capacity utilization rate implicitly implies that an increase in the latter results in a raise of the realized profit rate. The reason behind is that the profit share would fall if the profit rate did not change along with an increased capacity utilization rate. Hein remarks that the investment function can be simplified and elimination of the profit rate does not change the qualitative conclusions of the model (p. 248). The investment function with capacity utilization rate can be written as in the following equation:

$$g = \frac{I}{K} = \alpha + \beta u \quad (2.16)$$

where g is the accumulation rate, and α represents the animal spirits of the investors.

The first version of the neo-Kaleckian model (with or without profit rate in the investment function) shows that an increase in the savings rate of capitalists (s_R) results in a decline in equilibrium capacity utilization, accumulation and profit rates. In other words we confront a *paradox of saving*. An increase in the profit share leads to the same results regarding the growth rates of the endogenous variables. This phenomenon is called *paradox of costs* by Rowthorn (1981) (Hein 2014, p.250-257). The model always generates an underconsumptionist economy, in which an increasing wage share always increases capacity utilization and consequently accumulation and profit rates.

The second version of the neo-Kaleckian model allows for savings out of workers' wages.¹⁹ We assume that the propensities to save concern the income types (wages and profits) but not the classes (workers and capitalists). In other words, the propensities to save out of wages and that of workers are not identical. This assumption is required to prevent complications related to workers' ability to hold financial assets and receive income in form of profits. We also assume that the propensity to save out of profits (s_R) is strictly higher than that of wages (s_W). Inclusion of the savings out of wages gives us the following saving function:

$$\begin{aligned}\sigma &= \frac{S_R + S_W}{pK} = \frac{s_R R + s_W W}{pK} = \frac{s_R R + s_W (Y - R)}{pK} = [s_W(1 - h) + s_R h] \frac{u}{v} \\ &= [s_W + (s_R - s_W)h] \frac{u}{v} \quad (2.17)\end{aligned}$$

The paradox of saving is still valid after inclusion of the savings out of wages in the model. An increase in both s_R and s_W results in a decrease in the endogenous capacity utilization, accumulation, and profit rates. However, the specification of the investment (accumulation) function in the second type of neo-Kaleckian model leads to different qualitative results regarding the impact of profit share on those variables. If we employ the investment function in the equation 2.16, we observe that while the capacity utilization and accumulation rates remain wage-led, the profit rate does not have a predetermined sign. The latter might be wage or profit-led depending on the magnitudes of the parameters. In other words,

¹⁹This version is based on the Chapter 7.2 in Hein (2014).

the paradox of costs is not completely valid for the model (Hein 2014, p.272-27).

In a subversion of the second type of model, in which investment is also a function of profit rate along with capacity utilization rate, as $g = \frac{I}{K} = \alpha + \beta u + \chi r$, the wage-led character of the model is even more undermined. In such models, as in those of Rowthorn (1981) and Dutt (1984, 1987), the impact of the profit share on the growth rates of the variables under examination completely depends on the magnitudes of parameters. The lower the difference between s_R and s_W and the higher the value of the parameter χ , the more it is likely that the demand and the accumulation regimes become profit-demand. There are three potential regimes in this model: Wage-led regime (with wage-led demand and accumulation), intermediate regime (with wage-led demand and profit-led accumulation), and profit-led regime (with profit-led demand and accumulation) (Hein 2014, p.277-281).

2.7.2 Post-Kaleckian model

Bhaduri and Marglin (1990), Kurz (1990, 1994) and Marglin and Bhaduri (1990, 1991) employ both profit share and capacity utilization in the investment function. This is equivalent to decomposing the profit rate into capacity utilization, profit share, and capital-potential output ratio as in the equation 2.11, holding the latter constant, and reintegrating it into this function (Hein 2014, p.258-259). This modified investment function alters the implications of the Kaleckian model, with the assumption of no saving out of wages. While the paradox of saving still holds in this model, paradox of costs is no longer valid (ibid., p.260).

Here we proceed with the model by Bhaduri and Marglin (1990) to present

the potential regimes of a typical post-Kaleckian model. The same three types of models in the neo-Kaleckian model with savings out of wages are regenerated in this model. We firstly focus on the original article by those authors in this section. Then we discuss the implications of the same model with savings out of wages. Finally, we discuss the open economy macroeconomics within the Bhaduri-Marglin model.

Bhaduri and Marglin (1990) construct their analysis on a reformulation of Hick's IS Curve by assuming exogenous variations in the real wage rate. This model is based on the short-run tension between the capacity utilization u and the profit share h by assuming a constant full capacity. They define two regimes under which the variation of the (real) wage rate w might have different impacts on the output level Y . In the *stagnationist* (*exhilarationist*) regime, the relation between u and h is negative (positive) and the increase in w leads to growth (degrowth) of Y .

Under those two regimes, capital and labor can be in conflict, i.e. an inversely proportional relationship between the total wages W and the profit bill R , or they can cooperate, i.e. a directly proportional relationship between the two. While an elastic IS curve²⁰ enables the cooperation, conflict arises when the curve is inelastic (flat). In the stagnationist regime, if the IS curve is elastic, an increase in the wage rate w leads to a higher capacity utilization rate u while promoting the employment N . The profit bill R and the profit rate R/K rises despite the

²⁰The horizontal axis is h and the vertical axis is u in the graph of the IS curve by Bhaduri and Marglin (1990).

Table 2.1: Growth regimes in Bhaduri and Marglin (ibid.)

	Wage rate w	Wage share $LS = W/Y$	Profit share $h = 1 - (W/Y)$	Employment N	Capacity utilization u
Stagnationist-Cooperative	+	+	-	+	+
Stagnationist-Conflictual	+	+	-	+	+
Exhilarationist-Cooperative	+	+	-	-	-
Exhilarationist-Conflictual	+	+	-	-	-

	Wage rate w	Wage bill $W(wN)$	Total profit $R = Y - W$	Profit rate R/K	Output Y
Stagnationist-Cooperative	+	+	+	+	+
Stagnationist-Conflictual	+	+	-	-	+
Exhilarationist-Cooperative	+	-	-	-	-
Exhilarationist-Conflictual	+	+	-	-	-

increased wages, which correspond to lower profit margins (and h) since the capitalists compensate it by higher sales. This case is called *stagnationist cooperative*. If the IS curve is inelastic under the stagnationist regime, this compensation is no more possible, in this case the regime is *stagnationist conflictive*. However, N , W , and Y increase.

In the exhilarationist regime, in which the relation between u and h is negative, if the IS curve is elastic; a decrease in the wage rate has the opposite effects. In other words, despite a lower w paid to already employed workers, the increment of the N counterbalances the fall of the total wage bill. Cooperation between the workers and capitalists is possible, assuming that there is no intra-class conflict, as long as the IS Curve is elastic. For the cases in which the IS curve is inelastic, cooperation is not possible. The summary of the characterization of the growth regimes and the impact of a variation of the wage rate w on employment N , capacity utilization u , wage bill W , wage (labor income) share LS , profit share h , output Y , total profits R and profit rate R/K are presented in Table 2.1.

In this framework, the stagnationist-cooperative regime corresponds to the wage-led regime with the wage-led demand and accumulation demand in the neo-Kaleckian model with savings out of wages. The stagnationist-conflictual regime corresponds to the intermediate regime with wage-led demand and profit-led accumulation, and the exhilarationist regime (both cooperative and conflictual) corresponds to the profit-led regime with profit-led demand and accumulation.

The potential regimes of the model obtained by relaxing the assumption of no saving out of wages are the same as the original model (Hein 2014) ²¹. Then we can say that the neo-Kaleckian model with inclusion of saving out of wages and the two versions of the post-Kaleckian model all generate same potential demand and accumulation regimes.

Open economy in the post-Kaleckian model

In this part, we discuss the distribution growth relation within the post-Kaleckian model in an open economy.²² Maintaining the already made assumptions and modifying the ones for the international economy, we add net exports into the model. The economy imports raw materials and semi-finished goods for production of goods for internal consumption and investment and also for exports.

We write the price equation anew, by integrating the price of imported goods in foreign currency p_f :

²¹See Chapter 7.2.2 in Hein (2014) for an exhibition of the model.

²²This section draws from Chapter 7.3 in Hein (ibid.)

$$p = (1 + m)(wa + p_f e \mu) \quad (2.18)$$

where e is the nominal exchange rate, and μ is the unit raw material and semi-finished product inputs. The relationship between unit labor costs (z) and unit material costs can be written as:

$$z = \frac{p_f e \mu}{wa} \quad (2.19)$$

Combining the equations 2.18 and 2.19 we obtain the following equation:

$$p = (1 + m)wa(1 + \frac{p_f e \mu}{wa}) = (1 + m)wa(1 + z) \quad (2.20)$$

The profit share, in the open economy no more uniquely depends on the mark-up rate but also on z :

$$h = \frac{R}{R + W} = \frac{(1 + z)m}{1 + (1 + z)m} = \frac{1}{\frac{1}{(1+z)m} + 1} \quad (2.21)$$

Net exports are not directly a function of profit (wage) share but international competitiveness. Bhaduri and Marglin (1990) suggest real exchange rate (e_r), which is defined as above, as a measure of competitiveness:

$$e_r = \frac{ep_f}{p} \quad (2.22)$$

If we combine the equations 2.18 and 2.22, we obtain:

$$e_r = \frac{ep_f}{(1+m)(wa + p_fe\mu)} \quad (2.23)$$

Then holding a and p_f constant, the international competitiveness depends on mark-up, nominal exchange rate, and nominal wage rate. An increase in the mark up has a negative effect on competitiveness since $\frac{\partial e_r}{\partial m} = \frac{-ep_f(wa + p_fe\mu)}{p^2} < 0$. An increase in the mark-up raises the profit share but deteriorates competitiveness. As for the effect of the wage rate we have $\frac{\partial e_r}{\partial w} = \frac{-ep_f(1+m)a}{p^2} < 0$. Then an increasing (decreasing) wage rate not only has a negative (positive) effect on competitiveness but it also decreases (increases) z , which in turn causes a decline (raise) in the profit share. Lastly, depreciation of the nominal exchange rate, i.e. an increase in e improves competitiveness since $\frac{\partial e_r}{\partial e} = \frac{p - (1+m)\mu ep_f}{\frac{p^2}{p_f}} > 0$.

We can conclude that a change in distribution might improve or deteriorate the international competitiveness depending on the variable that triggers the redistribution. If the cause of change is the mark-up, an increasing profit share has a negative impact on the competitiveness. If the nominal wages decrease, the profit share increases, and the competitiveness improves. Finally, if the source of change is the nominal exchange rate, its depreciation leads to an increase in the profit share and international competitiveness.

In the open economy, the good markets equilibrium condition is modified by integrating the net export rate ($b = \frac{NX}{pK}$) as below:

$$\sigma = g + b \quad (2.24)$$

Here b is a function of international competitiveness (e_r), local demand presented by u and foreign demand (u_f). The local demand rises imports, it has a negative effect on the net exports, while the foreign demand has an inverse impact.

The paradox of saving is still valid in the open economy post-Kaleckian model, however increasing saving rates out of wages or profits improve b . As in the closed economy, we obtain the same three potential regimes of demand and accumulation. However, in an open economy, it is less likely to have a wage-led regime with wage-led demand and accumulation due to negative impact of wages on net exports.

In the next chapter, we present a post-Kaleckian empirical open economy model and the exports and imports functions are explicitly treated in this model.

2.8 Remarks

The question of income distribution-demand growth relationship is a relatively recent theme in the history of economic thought. The relation between capital accumulation and income distribution was analyzed by Marx, however, as stated above, the relationship between distribution and demand is not analytically treated by him. The quest of the classical economists for conceptualizing *value* and distribution of national product gave birth to Marx' labor theory of value, which treats distribution and value in conjunction. However, the question of value was replaced by the notion of *utility* by the neoclassicals and distribution was isolated

from its social context and reduced to a technical sphere.

The hegemony of the neoclassical paradigm was challenged by Keynes and his followers, however, the labor theory of value had already been abandoned. However, recalling of the distribution question by Kalecki and post-Keynesians does not come along with an attempt to discuss the notion of value as classical economists and Marx had done. Post-Keynesians' approach to the distribution problem is rather a reaction to neoclassical economists, who conceive wages only as a factor of production. It is also instrumentalist in the sense that income distribution is treated within its relation to economic growth, rather than providing a theoretical framework for explaining the existence of different income types, namely rents, profits, dividends and wages. We observe a paradigm shift in which the post-Keynesians concentrate on income distribution, in terms of shares or levels, through its interaction with economic growth. The question of distribution is back to the scene of economic thought through its function in economic growth, putting aside the questions around *value*.

Chapter 3

Review of empirical literature on post-Keynesian models of income distribution and growth

The aim of this chapter is to present the empirical literature on the post-Keynesian, more precisely the post-Kaleckian, models of income distribution and growth. We focus on the empirical works based on the open economy models with savings out of wages, which were presented in the previous chapter. Moreover, we present empirical studies on models in which productivity regime is examined along with demand regime.

The vast part of the empirical literature that we present is on the demand regime but not the accumulation regime of the economies. Another important point is that, up until now, we ignored technical progress, monetary issues like

interest and credit, and finance in the framework of the post-Kaleckian models. These elements have already been explicitly integrated into the models and there exists an empirical literature based on them.¹ However, here we proceed with the empirical studies on the Bhaduri and Marglin (1990) type of post-Kaleckian model, but we also review the literature examining the productivity regimes that integrate technical progress. The majority of the studies in this field are on developed countries while the literature on the developing are relatively new. We also present this literature in order to be able to compare their results with ours on South Korea, Thailand, and China.

The approaches to testing the post-Kaleckian models, in terms of econometric methodology and equations, especially the models of open economy, are quite diverse. Two different econometric methodologies are used in the literature. The majority of the empirical work is based on single equation estimation of consumption (or savings), investment, exports and imports (or net exports) functions. However, theoretical framework and empirical equations are not identical. Consumption functions are almost estimated in the same manner and investment equations slightly differ. However, the main difference stems from the treatment of the international trade and the auxiliary price equations required for integration of unit labor costs, and exports and import prices into the models. The other type of models take into account the interactions among the variables through use of Vector Autoregressive Models (VAR). These studies provide a system approach

¹Hein (2014) provides an extensive review on the Kaleckian models and the related empirical work that address those issues.

to estimation of some Kaleckian hypotheses.

In this chapter we firstly examine the empirical studies that employ the single equation methodology for estimation of parameters of models of demand regimes. In this section, we start with a review of the early empirical studies and proceed with the recent ones in another subsection. We present a specimen empirical model that is commonly used in the literature and compare the similar studies in terms of equations used in estimations. In the following section we briefly present post-Kaleckian models with technical progress. We proceed with empirical studies employing VAR models. In the last section we summarize the findings in the empirical literature on demand regimes of several countries.

3.1 Empirical work based on single equation estimations

In this section we provide a review of the empirical work on demand regimes examined through separate equations. In the first subsection, we exhibit the early literature and then proceed with a presentation of an empirical model commonly used for characterization of demand regimes. In the second subsection we touch upon the empirical literature on models with productivity regimes but we do not treat them in detail.

3.1.1 Post-Kaleckian models without technical progress

The earliest studies on characterization of demand regimes of economies through separate equations go back to the articles by Bowles and Boyer (1995) and Gordon (1995) published in a collective work. A second vague of empirical studies, which employ an aggregate demand equilibrium model applying elaborate econometric techniques start after a decade by Hein and Vogel (2008), Stockhammer and Ederer (2008), Stockhammer, Onaran, and Ederer (2009), among the others. The empirical work by Onaran and Galanis (2012) integrates international interactions into this latter type of models. In this subsection we firstly present the early empirical studies and then proceed with the recent literature.

Early empirical studies

Bowles and Boyer (1995) conceptualize employment and productivity regimes and quest for the feasibility of a wage-led employment regime. They state that a necessary condition for the latter is a wage-led aggregate demand regime (p. 146) and in line with this purpose they test the impact of profit share on savings, investment and net exports, which are normalized by total output. If labor productivity is exogenous, wage-led aggregate demand regime implies a wage-led employment regime. However, if labor productivity is endogenous, a wage-led aggregate demand regime becomes the necessary but not sufficient condition for a wage-led employment regime. In both cases, a wage-led aggregate demand regime is the preliminary condition for a wage-led employment regime. Since labor produc-

tivity is assumed to be exogenous in the empirical analysis, a wage-led demand regime is sufficient to prove that employment is wage-led. The saving equation is used to obtain estimations of propensities of savings out of profits and wages and the differential between the two is employed as a proxy to measure the impact of a redistribution in favor of wages on consumption. The latter and the estimates of the coefficient corresponding to the profit share in separate equations summed to find the total effect of profit share on aggregate demand. The analyzed countries France, Germany, Japan, U.K., and U.S. are found to be domestically wage-led. However, only the U.K. and the U.S. remain wage-led when the effect of the profit share on net exports are taken into account.

Gordon (1995), in his analysis of the U.S. economy, employs separate equations for saving, investment and net exports, which are normalized by an exogenous potential output. Those aggregates are modeled as a function of capacity utilization, profit rate, interest rate and some exogenous variables. The profit rate is also endogenized and it depends on capacity utilization and some exogenous variables, including ones that capture “observed capitalist power” (p.347). He concludes that the U.S. economy is profit-led.

These two early studies are valuable, however, in terms of econometrics they fail to investigate the time series properties of the variables used in their models. The international trade and determinants of exports and imports are not treated in depth.

Recent empirical studies

More recent empirical studies on demand regimes propose a general Keynesian model based on equilibrium of aggregate demand. Two type of equations are used to determine the character of demand regime of a given economy in these empirical models. The first set of equations concern the macroeconomic aggregates consumption, investment, and exports and imports (or net exports). The second group consists of auxiliary price equations, whose specifications depend on the determinants of exports and imports. Here we present the model by Stockhammer, Onaran, and Ederer (2009) as a representative one. We summarize the other empirical studies using a similar model in the end of this part.

In the model proposed by Stockhammer, Onaran, and Ederer (ibid.), macroeconomic aggregates are functions of aggregate output and labor income share LS . While the exogenous variation starts off with LS in the model by the former, in the model by Bhaduri and Marglin (1990), it is the wage rate w that triggers the variations. However, the stagnationist and exhilarationist regimes of the latter correspond to the wage-led and the profit-led regimes of the former, respectively. It is important to note that LS is the share of total wages in the GDP at factor cost (Y_{fac}). However, the aim of the model is to find the effect of a change in the LS on the GDP at market prices (Y). Some control variables (denoted by z) are assumed to be exogenous. The government expenditures G are dependent only on income and some exogenous variables. However, in the empirical work they takes only the private sector into account. The aggregate demand can be expressed as:

$$AD = C(Y, LS) + I(Y, LS, z_I) + NX(Y, P, P_x, P_m, z_{NX}) + G(Y, z_G) \quad (3.1)$$

where P stands for domestic price level, P_x for export prices and P_m for import prices. P is a function of via unit labor costs ULC , hence an indirect function of LS . The exogenous variables for the investment and (net) exports functions are real interest rate and global demand, respectively. P_m is exogenous to the model. Since G is excluded from the analysis and does not depend on the distribution of income, differentiation of the equation 3.1 with respect to LS and the goods market equilibrium condition ($Y^* = AD$) gives:

$$\frac{dY^*}{dLS} = \frac{h_2}{1 - h_1} \quad (3.2)$$

where $h_1 = \partial C/\partial Y + \partial I/\partial Y + \partial NX/\partial Y$ and $h_2 = \partial C/\partial LS + \partial I/\partial LS + \partial NX/\partial LS$.

For stability of the model, the multiplier $1/(1 - h_1)$ should be positive. Then sign of h_2 , which is called *private excess demand*, determines the sign of the total derivative. h_2 gives the change in demand due to a variation of income distribution at a fixed level of income. Its sign can not be determined without an empirical investigation since the partial derivatives have different signs.

The change in the aggregate demand starts off by a variation in the income distribution. The multiplier mechanism will have an effect on consumption, investment, and imports. In order to find the percentage change in the GDP due to a 1 percent increase in the labor share, the equation 3.2 is divided by Y . Then we

obtain the following equation:

$$\frac{dY^*/Y}{dLS} = \frac{h_2}{1 - h_1} \quad (3.3)$$

which gives $h_2 = \frac{\partial C/Y}{\partial LS} + \frac{\partial I/Y}{\partial LS} + \frac{\partial NX/Y}{\partial LS}$.

$\frac{\partial C/Y}{\partial LS}$ is positive due to the Kaleckian assumption that the consumption propensity of the labor is higher than that of the capital. Since decreasing profits would lead to declining investment, $\frac{\partial I/Y}{\partial LS}$ is expected to be negative. With a similar argumentation $\frac{\partial NX/Y}{\partial LS}$ is negative since increasing labor income share will increase the unit labor costs, hence the domestic and export prices. Imports will also be positively affected since the increasing domestic prices due to higher unit labor costs will lead to substitution of the domestic goods by imported ones.

Since increasing aggregate demand has a positive impact on the macroeconomic aggregates consumption, investment, and imports; $\partial C/\partial Y$, $\partial I/\partial Y$ and $\partial M/\partial Y$ are positive. $\partial X/\partial Y$ is nil since exports depend on the foreign demand. Consequently, $\partial NX/\partial Y$ is negative since it is equal to $\partial X/\partial Y - \partial M/\partial Y$ and it becomes $-\partial M/\partial Y$. Since the government sector is excluded from the model the term $\partial G/\partial Y$ disappears. Eventually, h_1 becomes $\partial C/\partial Y + \partial I/\partial Y - \partial M/\partial Y$. The latter should be positive for the stability of the model. If $\frac{dY^*/Y}{dLS}$ turns out to be positive then the demand regime is wage-led; otherwise it is profit-led.

For the econometric estimation of the model Stockhammer, Onaran, and Ederer (2009) propose a consumption function of the form $C = f(W, R)$, where W is the (adjusted) labor income and R is the (adjusted) capital income. This equation enables the estimation of the consumption propensities out of wages and

profits.² It is expected that the wage earners have a higher propensity to consume than the profit earners. The investment is modeled as $I = f(Y, R)$ in order to concurrently take into account the scale of the economy and the profitability.³

Exports and imports are estimated both as separate equations and also treated together as a single net exports equation. The exports function proposed is of the form $X = f(Y_{for}, E, P_x/P_m)$, where Y_{for} stands for the main foreign trade partners' weighted GDP, E for the exchange rate and P_x/P_m for the ratio of export prices to import prices. The imports are modeled as $M = f(Y, E, P/P_m)$. As an alternative to separate exports and imports equations, they propose a net exports function of the form $NX/Y = f(Y, Y_{for}, E, RULC)$, where $RULC$ is the real unit labor costs. $RULC$ and the labor income share LS are closely related but they are not exactly the same. While the former is the ratio of the labor compensation to GDP in market prices, the latter is the share of the labor compensation in GDP at factor cost.

As for the price equations, the domestic prices are modeled as $P = f(P_m, ULC)$. The ULC has a direct effect on the domestic prices along with the exogenous P_m . The export prices equation is of the form $P_x = f(P_m, P)$.

As mentioned above, the sign of h_2 determines the character of demand regime. If we consider only the domestic economy, composed of consumption and investment, if consumption is more sensitive to an increase in the labor share than in-

²The term *profit* refers to all types of non-labor income, i.e. profits, rents, interests, and dividends.

³In the estimations they also use real interest rate in the investment function but it does not turn out to be significant.

vestment, i.e. $\frac{\partial C/Y}{\partial LS} - \frac{\partial I/Y}{\partial LS} > 0$, then it is wage-led. However, this does not imply that the demand regime of the overall economy is the same. In this case the magnitude of the effect of income distribution on exports, i.e. $\frac{\partial NX/Y}{\partial LS} (< 0)$, determines the character of the overall demand regime. If domestic economy is already profit-led, entire economy is necessarily so.

There is a large empirical literature employing this workhorse model and its variants. We also employ a model developed in the same line, which is presented in Section 4.1 for the analyses of demand regimes in South Korea, Thailand, and China. In Table 3.1 we tabulate the empirical work using this model and present the form of the equations used in the estimations.

We see in Table 3.1 that the same form of consumption function is used in almost all the empirical works. The only exception is the study by Stockhammer and Ederer (2008), in which they employ wage share and aggregate demand to estimate their effects on consumption.

Investment, in general, is estimated as a function of aggregate demand, interest rate, and total profits or profit share. Interest rate does not always turn out to be significant and it is omitted from the estimations in those cases. The significance of profits is of main importance for testing of the model since it is decisive in characterizing the demand regime of domestic and total economies. Hein and Vogel (2008) do not confirm the positive impact of profit share on investment for Austria, Germany, the U.K. and the U.S.. Onaran and Galanis (2012), in their study on the G20 countries, find that the U.S. is the only country in which the

Table 3.1: Single equations in recent empirical studies on post-Kaleckian models without technical progress

	Consumption	Investment	Exports	Imports	Net Exports	Domestic Prices	Export Price
ES2007	$C = f(W, R)$	$I = f(Y, R, i)$	$X = f(Y_{for}, ULC, P_m)$ $X = f(Y_{for}, P_x/P_m)$	$M = f(Y, P_m, ULC)$ $M = f(Y, P/P_m)$	-	-	$P_x = f(ULC)$
E2008	$C = f(W, R)$	$I = f(Y, R, i)$	$X = f(Y_{for}, P_x/P_x^{comp})$	$M = f(Y, P_x/P_m)$	-	$P = f(P_m, ULC)$	$P_x = (P, P_m)$
HV2008	$C = f(W, R)$	$I = f(Y, h, i)$	-	-	$NX = f(Y, Y_{for}, h)$	-	-
SE2008	$C = f(W, R)$ $C = f(LS, Y)$	$I = f(Y, R, i)$	$X = f(Y_{for}, P_x/P_x^{comp})$	$M = f(Y, P_x/P_m)$	-	$P = f(P_m, ULC, Y)$	$P_x = (P, P_m)$
HV2009	$C = f(W, R)$	$I = f(Y, R)$ $I/Y = f(Y, h)$	-	-	$NX/Y = f(Y, Y_{for}, h)$	-	-
SOE2009	$C = f(W, R)$	$I = f(Y, R, i)$	$X = f(Y_{for}, P_x/P_m, E)$	$M = f(Y, P/P_m, E)$	$NX/Y = f(Y, Y_{for}, E, RULC)$	$P = f(P_m, ULC)$	$P_x = (P, P_m)$
SHG2011	$C = f(W, R)$	$I = f(Y, h, i)$	$X = f(Y_{for}, P_x/P_m)$	$M = f(Y, P_x/P_m)$	-	$P = f(P_m, ULC)$	$P_x = f(P_m, l)$
OG2012	$C = f(W, R)^{\ddagger}$	$I = f(Y, R)^{\ddagger}$	$X = f(Y_{for}, P_x/P_m, E)$ $X = f(Y_{for}, RULC)$	$M = f(Y, P/P_m, E)$	-	$P = f(P_m, ULC)$	$P_x = f(P_m, l)$
M2015	$C = f(W, R)$	$I = f(Y, R)$	-	-	$NX = f(Y, Y_{for}, LS, E)$	-	-

$\ddagger$: Onaran and Galanis (2012) distinguish urban and rural GDP, profits and wages for some developing and conduct their regressions accordingly.

Y_{for} denotes foreign demand in a general sense. E stands for nominal exchange rate, i for real exchange rate, $RULC$ for real unit labor costs, h for profit share

ES2007: Ederer and Stockhammer (2007), E2008: Ederer (2008), HV2008: Hein and Vogel (2008), SE2008: Stockhammer and Ederer (2008), HV2009: Hein and Vogel (2009), SOE2009: Stockhammer, Onaran and Ederer (2009), SHG2011: Stockhammer, Hein and Grafl (2011), OG2012: Onaran and Galanis (2012), M2015: Molero-Simarro (2015)

profit share has no significant effect on private investment.⁴ What is more, the profit share is not significant in most of the developing countries they analyze. We discuss these findings while evaluating and comparing our results on South Korea, Thailand, and China with those found in the literature.

As for the international trade, there are two methods used for the estimation of trade equations in the empirical studies. When exports and imports are estimated separately, in general, auxiliary price equations are used with them. When they are estimated together as net exports (or net exports as a share of output), no price equations are required, since they are directly regressed on profit/wage share or real unit labor costs. If the latter methodology used, the other explanatory variables are local or foreign demand.

In the exports function, foreign demand is always present; however, the type of relative prices differ among the studies. It is usually the terms of trade, i.e. the ratio of export to import prices, but Ederer (2008) employs export prices to competitors' export prices ratio.⁵ As it is the case for the exports, in the imports function a relative price and a demand component are used. The relative price component, in general, is either the terms of trade or ratio of domestic to import prices.⁶ Exchange rate is also used as a regressor in some exports and imports functions. There seems to be a consensus on domestic prices equation, which

⁴However, Onaran, Stockhammer, and Grafl (2011) show in another empirical study that when financialization is accounted for, the profits have a positive impact on private investment. They use non-rentier profit share (without interest and dividend payments) in this work as a determinant of private investment.

⁵The latter is the approach that we prefer and adopt in our model that we present in Chapter 4.

⁶We opt for the latter in our model.

is a function of unit labor costs and import prices. Exceptionally, Stockhammer and Ederer (2008) use output as a determinant in this function, and Ederer and Stockhammer (2011) drop off import prices. In export prices function, import prices are used as a regressor in all the empirical studies and it is accompanied by either domestic prices or unit labor costs.

Naastepad and Storm (2006/2007) also employ the single equation approach with a different model and an alternative characterization of demand regimes. They use a savings function instead of consumption in order to estimate saving propensities out of wages and profits. The demand regime is defined according to the sign of the derivative of aggregate demand growth with respect to real wage growth.

Among those studies summarized above, the work by Stockhammer, Hein, and Grafl (2011) integrates the impact of globalization into the model by Stockhammer, Onaran, and Ederer (2009). In their empirical study on Germany, they consider the import content of the exports is integrated in calculating the impact of income distribution on net exports. When exports decline, e.g. due to an increase of the export prices, imports of some goods, mostly semi-finished products, are expected to decline accordingly. Integrating this dimension into the income distribution-growth models prevents overestimation of the impact of the labor income share on net exports. Economies are less likely to be found profit-led if this methodology is employed.

Onaran and Galanis (2012) analyze the impact of international trade by carrying further the theoretical model and methodology described above. They conduct

an empirical research on 16 of the G20 countries to analyze the interactions among them by calculating global multipliers. Their model enables examination of the impact of a simultaneous change in the labor income share at a global level on the individual countries. For Mexico, Argentina, China, India, and South Africa, their results show that these countries are profit-led contrary to most of the developed countries, which are wage-led with the exception of Australia and Canada. However, the picture changes after incorporating the effects of an increase in an overall profit share. The four of the countries that are profit-led in isolation, namely Canada, India, Mexico, and Argentina, turn out to be wage-led when globalization effects are considered. Australia, China, and South Africa remain profit-led with lower growth rates. The other countries and the Euro area (of 12 countries) are still wage-led. The overall results indicate that a 1% decrease in the labor income share leads to a 0.36% decline in the global GDP growth.

3.1.2 Post-Kaleckian models with technical progress

The theoretical and empirical model considered in the previous sections implicitly assume that the productivity does not change over the course of time. However, there exists a vast theoretical literature integrating technical progress into the Kaleckian models. These models are applied to several economies to characterize demand and accumulation as well as productivity regimes. In this subsection we briefly present these models but we do not review the vast literature on modeling technical progress and productivity growth. We only concentrate on the empirical Kaleckian work on productivity regimes. The results found in these studies are

presented in the last section that summarizes the findings in the empirical literature.

The Kaleckian models with technical progress vary according to the endogeneity/exogeneity assumptions on income distribution and how technical progress is integrated into the model. In some models, among others in those by Cassetti (2003) and Bhaduri (2006), both income distribution and productivity are endogenous, while others assume an exogenous distribution. Technical growth can be embedded into the model in different ways. Verdoorn suggests that the growth rate of output enhances industrial labor productivity.⁷ In that vein, capacity utilization or capital accumulation might be employed as determinants of the latter. In addition to aggregate demand and output dynamics, wage-push variables, such as profit share, are introduced into the Kaleckian models as a determinant of productivity. The intuition behind, owing to Marx and Hicks, is that low unemployment and rising bargaining power of labor unions accelerate both nominal and real wages, which lead to a falling profit share. Consequently firms will be incited to enhance productivity in order to maintain the profit share. (Hein 2014, p.312-18).

Naastepad (2006) employs real wage growth as the wage-push variable in their Kaleckian theoretical model on demand and productivity regimes. She applies this model to the Dutch economy and find that both regimes are wage-led, while the productivity regime is more sensitive to real wage growth. Hein and Tarassow (2010) use profit share, as well as real wage growth, as determinants of produc-

⁷McCombie and Soro (2002) presents a survey on Verdoorn's law, however those who formulate productivity as a function of wage-push factors or profit share are less numerous (Hein 2014).

tivity growth in their study on Austria, France, Germany, Netherlands, the U.K., and the U.S.⁸ The profit share turns out to have a negative impact on productivity growth in the U.K. and the U.S. Since there are structural breaks in profit share series of the other countries, subsample estimations are conducted to those. The productivity regimes in Austria, Germany, and Netherlands are profit-led in the first sub-periods that end in early 1980s, and profit-led in the second sub-period that ends in 2007. In France, the first sub-period is profit-led as well, however, profit share does not have a significant effect on productivity in the second one.

3.2 Empirical work based on system approach (VAR models)

Stockhammer and Onaran (2004), Onaran and Stockhammer (2005),⁹ and Onaran and Stockhammer (2007) employed a system approach through structural VAR models to test the impact of income distribution on growth, accumulation, and employment. They applied this methodology to both developed countries France, the U.K., and the U.S., and to developing countries Turkey and South Korea in these empirical studies.

In these studies several hypotheses related to demand, accumulation, capacity utilization, and labor market are simultaneously tested. Past values of all variables

⁸While the theoretical model treats demand regime, empirical estimations are not carried out in this study.

⁹ Onaran and Stockhammer (2006) summarize the finding of these two empirical studies and develop the policy implications.

influence present values of all others in a VAR model. While this approach enables capturing the simultaneous interaction among the variables its disadvantage is the difficulty of identification of effects of individual variables (Stockhammer and Ederer 2008).

The results found by Stockhammer and Onaran (2004) indicate that the profit share does not have a significant effect on capacity utilization and accumulation. However, demand and accumulation regimes turn out to be wage-led in South Korea and Turkey in the study by Onaran and Stockhammer (2005). In the study concentrating on Turkey, Onaran and Stockhammer (2007) conclude that accumulation is not profit-led and the growth regime is, at least in the short-run, wage-led. Hein (2014, p.298) mentions that “the demand channels through which distribution affects aggregate demand and capital accumulation are difficult to disentangle using this approach”.

3.3 Summary of findings on demand regimes in the literature

In this last section we summarize the findings in the empirical literature on post-Kaleckian models of income distribution and growth. We only present the results on demand regimes, which is the focus of this dissertation.

The tables above combines the results from characterization of demand regimes using different methodologies. For a given country, the results might be in conflict, which means that methodology matters. For example, for the U.S., half of the

Table 3.2: Summary of results on demand regimes in the empirical literature, Panel 1/3

	Period	Austria		Australia		Argentina		Canada		China		Euro area		France	
		DD	TD	DD	TD	DD	TD	DD	TD	DD	TD	DD	TD	DD	TD
Bowles and Boyer (1995)	1953/61-87													W	P
Stockhammer and Onaran (2004)	Late 1960s/Early 1970s-1997:1/2													N.A.	W
Naastepad and Storm (2006/2007)	1960-2000													W	W
Ederer and Stockhammer (2011)	1960-2004													W	P
Hein and Vogel (2008)	1960-2005	W	P											W	W
Stockhammer and Ederer (2008)	1960-2005	W	P												
Hein and Vogel (2009)	1960-2005													W	W
Stockhammer et al. (2009)	1960-2005											W	W		
Wang (2009) [†]	1993-2007									P	N.A.*				
Stockhammer and Stehrer (2011)	1970:1-2007:2	W	N.A.	W	N.A.			W	N.A.					W	N.A.
Onaran and Galanis (2012)	Early 1970s/1980s-2007			W	P	W	P	W	P	W	P	W	W	W	W
Molero-Simarro (2015)	1978-2007									W	P				

[†]For the coastal regions, Wang (2009) finds that China is both domestically and totally profit-led. Wang states that the domestic economy, when all regions are considered, is wage-led, however the sum of the marginal effects for the sample reported at the page 147 is in contradiction with this statement.

DD: Domestic Demand TD: Total Demand W: Wage-led P: Profit-led N.A.: Not Applicable N.E.: No Effect (Neither wage-led nor profit-led)

Table 3.3: Summary of results on demand regimes in the empirical literature, Panel 2/3

	Period	Germany		India		Italy		Japan		Mexico		Netherlands		South Africa	
		DD	TD	DD	TD	DD	TD	DD	TD	DD	TD	DD	TD	DD	TD
Bowles and Boyer (1995)	1953/61-87	W	P					W	P						
Naastepad (2006)	1960-2000									W	W				
Naastepad and Storm (2007)	1960-2000	W	W			W	W	P	P			W	W		
Ederer (2008)	1960-2005											W	W		
Hein and Vogel (2008)	1960-2005	W	W									P	P		
Hein and Vogel (2009)	1960-2005	W	W												
Stockhammer et al. (2011)	1970-2005	W	W												
Stockhammer and Stehrer (2011)	1970:1-2007:2	W	N.A.					W	N.A.			W	N.A.		
Onaran and Galanis (2012)	Early 1970s/1980s-2007	W	W	W	P	W	W	W	W	W	P			W	P

DD: Domestic Demand TD: Total Demand W: Wage-led P: Profit-led N.A.: Not Applicable N.E.: No Effect (Neither wage-led nor profit-led)

Table 3.4: Summary of results on demand regimes in the empirical literature, Panel 3/3

	Period	South Korea		Spain		Switzerland		Turkey		U.K.		U.S.	
		DD	TD	DD	TD	DD	TD	DD	TD	DD	TD	DD	TD
Bowles and Boyer (1995)	1953/61-87									W	W	W	W
Gordon (1995)	1955:1-1988:4									N.A.	N.E.	N.A.	P
Stockhammer and Onaran (2004)	Late 1960s/Early											N.A.	P
	1970s-1997:1/2												
Onaran and Stockhammer (2005)	1965/1970-1997/2000	N.A.	W				N.A.	W					
Barbosa-Filho and Taylor (2006)	1948-2002											N.A.	P
Naastepad and Storm (2007)	1960-2000		W	W				W	W	W	P	P	P
Onaran and Stockhammer (2007)	1965-97							N.A.	N.E.				
Hein and Vogel (2008)	1960-2005									W	W	W	W
Onaran et. al (2011)	1962-2007											W	W
Stockhammer and Stehrer (2011)	1970:1-2007:2									P	N.A.	W	N.A.
Onaran and Galanis (2012) Hartwig (2015)	Early 1970s/1980s-2007 1950-2010	W	W			W	P	W	W	W	W	W	W

DD: Domestic Demand TD: Total Demand W: Wage-led P: Profit-led N.A.: Not Applicable N.E.: No Effect (Neither wage-led nor profit-led)

studies find the total demand to be wage-led and the other half profit-led. sample period also plays a role in the results.



Chapter 4

Theoretical, empirical, and econometric methodology

This chapter covers the post-Keynesian theoretical framework that we adopt in analyzing the demand regimes of South Korea, Thailand, and China. We employ the same theoretical model to these three countries. Empirical aspects of the variables within the model, the econometric approach employed in the estimation of equations, and the relevance of the models to developing countries are discussed.

The first section presents the theoretical approach, which is based on a post-Keynesian, more precisely, a post-Kaleckian, model proposed by Stockhammer, Onaran, and Ederer (2009) and developed by integrating some elements from the international competition analysis by Mathis, Mazier, and Rivaud-Danset (1988). The assumptions of the model are introduced, model equations are presented, and the multipliers that characterize the growth regime of the economies are derived

in this section. The second section provides the description of the variables employed in the theoretical model, along with the databases used to construct the time series for their operationalization in the estimation of the model. The third section is on the econometric methodology used for the estimation of the parameters of the model. The section concludes with a brief discussion of applicability of the post-Keynesian models, in a general sense, to least developed (or semi-industrialized, or developing) countries.

4.1 Theoretical framework

In this section we present the theoretical model employed for the analysis of the demand regimes in the countries under inspection. Our model is developed from that of Stockhammer, Onaran, and Ederer (2009), which itself is based on the model of Bhaduri and Marglin (1990). While maintaining the analytical framework of the former, we employ a structural model by integrating some elements in the trade and export price equations as proposed by Mathis, Mazier, and Rivaud-Danset (1988). The latter propose a theoretical framework on international competition, concentrating on the price and non-price factors.

In Subsection 3.1.1 we have already presented the model of Stockhammer, Onaran, and Ederer (2009). In this section we firstly exhibit our theoretical model along with its equations and then compare it with that of Stockhammer, Onaran, and Ederer (*ibid.*). Then we derive the multipliers of the model for characterizing demand regimes.

4.1.1 Model equations

In our model, no revisions are made in consumption, investment, imports, and domestic price equations, as proposed by Stockhammer, Onaran, and Ederer (2009).¹ We employ the same imports function but we exclude exchange rate in the trade equations since all the macroeconomic magnitudes are in constant dollars in our model. The exports function is different in two points. The first is that it takes into account the export prices of the competitors P_x^{comp} ² instead of the import prices since the competition is within the world markets. This assumption is more appropriate since the importing countries compare the export prices of the exporting country by that of its competitors, not by the exporters' import prices. The effect of the import prices on the export prices is captured via the domestic prices equation, which is also a function of the unit labor costs. The second difference is that global demand is proxied by total (weighted) imports of the world but not by global GDP of the rest of the world. We do not employ a net exports function in our estimations.

Export prices are endogenized in our model in a price-maker/taker setting, as proposed by Mathis, Mazier, and Rivaud-Danset (1988). Export prices are a function of unit labor costs and export prices of the main trade partners. While the latter assumption would not be realistic for price maker countries such Japan, this assumption is valid for South Korea, Thailand, and China.³The comparison

¹See Subsection 3.1.1 for the model by Stockhammer, Onaran, and Ederer (2009).

²Then the exports become a function of relative export prices P_x^{rel} , which is equal to the ratio P_x/P_x^{comp}

³See Jeong, Mazier, and Saglio (2012, p.322).

Table 4.1: Comparison of Stockhammer, Onaran, and Ederer (ibid.) and our model in terms of equations

Equation	Stockhammer et al.(2009)	Our model	Our model in explicit form
Consumption	$C = f(W, R)$	$C = f(W, R)$	$C = const. + e_{CW}W + e_{CR}R$
Investment	$I = f(Y, R)$	$I = f(Y, R)$	$I = const. + e_{IY}Y + e_{IR}R$
Exports	$X = f(Y_{for}, P_x/P_m, E)$	$X = f(M_w, P_x^{rel})$	$X = const. + \beta M_w + \kappa P_x^{rel}$
Imports	$M = f(Y, P/P_m, E)$	$M = f(Y, P/P_m)$	$M = const. + \rho Y + \gamma(P/P_m)$
Net Exports	$NX/Y = f(Y, Y_{for}, RULC)$	-	-
Domestic Prices	$P = f(P_m, ULC)$	$P = f(P_m, ULC)$	$P = const. + \eta ULC + \mu P_m$
Export Prices	$P_x = f(P_m, P)$	$P_x = f(P_x^{comp}, P)$	$P_x = const. + \tau P_x^{comp} + \lambda P$

Note: e_{CW} and e_{CR} are the consumption propensities out of wages and profits, respectively.

of our model with that of Stockhammer, Onaran, and Ederer (2009) is presented in Table 4.1.

4.1.2 Derivation of multipliers

In this subsection we derive the multipliers h_1 and h_2 , which were already described in Subsection 3.1.1, in terms of the parameters of our model.

The first element of the h_1 is the marginal effect $\partial C/\partial Y$, which is equal to multiplication of e_{CY} , the elasticity of C with respect to Y , and the sample average of the ratio C/Y . e_{CY} is not directly derived from the regressions. Stockhammer, Onaran, and Ederer (ibid.) simply sum the consumption propensities e_{CR} and e_{CW} to estimate e_{CY} , since the consumption function is of type Cobb-Douglas; however, Onaran and Galanis (2012) calculate a weighted sum $e_{CR}(R/Y) + e_{CW}(W/Y)$, where R/Y and W/Y are sample averages of the share of capital and labor income in output, respectively. Since the weighted sum, which underestimates the income elasticity, is always lower than e_{CW} , we opt for the former approach. The second and the third elements $\partial I/\partial Y$ and $\partial M/\partial Y$ are equal

to multiplication of the elasticities that are directly obtained from the regressions and the sample averages of the corresponding ratios.

As for the calculation of h_2 , as mentioned before, we use its second version, which is given at the equation 3.3.⁴ In calculation of the $\frac{\partial C/Y}{\partial LS}$ we use the formula $e_{CW}C/W - e_{CR}C/R$, where C/W and C/R are the sample averages of the ratios. Onaran and Galanis (2012) employ an equivalent calculation in their work (p.8).

In order to derive $\frac{\partial I/Y}{\partial LS}$, we express the investment equation in logarithm of the variables as in the following:

$$\log I = \text{const.} + e_{IY} \log Y + e_{IR} \log R \quad (4.1)$$

which gives:

$$\frac{\partial I}{\partial R} = e_{IR} \frac{I}{R} \quad (4.2)$$

Since investment is a positive function of profits and an increasing R implies decreasing W for a constant level of Y_{fac} , the corollary is $\partial I/\partial W = -\partial I/\partial R$. Combining equation 4.2 with this gives:

$$\frac{\partial I}{\partial W} = -e_{IR} \frac{I}{R} \quad (4.3)$$

⁴See Hein (2014, p.298-299) for an explanation of the derivation of the multipliers in percentage growth.

Dividing both the nominator and the denominator by Y we obtain:

$$\frac{\partial I/Y}{\partial W/Y} = -e_{IR} \frac{I}{R} \quad (4.4)$$

Dividing and multiplying the denominator by Y_{fac} we have:

$$\frac{\partial I/Y}{\partial((W/Y_{fac})(Y_{fac}/Y))} = -e_{IR} \frac{I}{R} \quad (4.5)$$

Arranging the terms give:

$$\frac{\partial I/Y}{\partial(W/Y_{fac})} = \frac{\partial I/Y}{\partial LS} = -e_{IR} \frac{I}{R} \frac{Y_{fac}}{Y} \quad (4.6)$$

As for the derivation of $\frac{\partial X/Y}{\partial LS}$, we depart from the domestic prices equation⁵ in logarithm of the variables as below:

$$\log P = const. + \eta \log ULC + \mu \log P_m \quad (4.7)$$

Replacing ULC by its definition $P.LS.(Y_{fac}/Y)$ ⁶ and isolating $\log P$ gives:

$$\log P = const. + \frac{\eta}{1-\eta} \log LS + \frac{\eta}{1-\eta} \log(Y_{fac}/Y) + \frac{\mu}{1-\eta} \log P_m \quad (4.8)$$

⁵See Table 4.1.

⁶ Y_{fac}/Y is the ratio of the GDP at factor cost to GDP at market prices. Since the difference between the two is due to the taxes or subsidies on production and products, different rates of the latter change this ratio. Since tax policy is out of the scope of the model, we assume this ratio to be exogenous. The variable definitions are covered in detail at the following section 4.2

The next step is writing the export prices equation in logarithmic form:

$$\log P_x = \text{const.} + \tau \log P_x^{comp} + \lambda \log P \quad (4.9)$$

Replacing Equation 4.8 in the latter and arranging the terms give the following:

$$\log P_x = \text{const.} + \frac{\lambda\eta}{1-\eta} \log LS + \frac{\lambda\eta}{1-\eta} \log(Y_{fac}/Y) + \frac{\mu\eta}{1-\eta} \log P_m + \tau \log P_x^{comp} \quad (4.10)$$

The following step is to write the exports equation in logarithmic form:

$$\log X = \text{const.} + \beta \log M_w + \kappa \log P_x^{rel} \quad (4.11)$$

Replacing P_x^{rel} by P_x/P_x^{comp} gives:

$$\log X = \text{const.} + \beta \log M_w + \kappa \log P_x - \kappa \log P_x^{comp} \quad (4.12)$$

Finally replacing Equation 4.10 in Equation 4.12 gives:

$$\begin{aligned} \log X = \text{const.} + \frac{\kappa\lambda\eta}{1-\eta} \log LS + \frac{\kappa\lambda\eta}{1-\eta} \log(Y_{fac}/Y) + \frac{\kappa\lambda\mu}{1-\eta} \log P_m \\ + \kappa(\tau - 1) \log P_x^{comp} + \beta \log M_w \end{aligned} \quad (4.13)$$

The derivative of $\log X$ with respect to $\log LS$ and arranging the terms gives

$\partial X/\partial LS = \frac{\kappa\lambda\eta}{1-\eta} \frac{X}{LS}$. Then $\partial X/Y/\partial LS$ becomes $\frac{\kappa\lambda\eta}{1-\eta} \frac{(X/Y)}{LS}$ where $(X/Y)/LS$ is

Table 4.2: Derivation of h_2 and h_1

	Effect of LS	Effect of Y
Consumption	$\frac{\partial C/Y}{\partial LS} = e_{CW} \frac{C}{W} - e_{CR} \frac{C}{R}$	$\frac{\partial C}{\partial Y} = e_{CY} \frac{C}{Y}$
Investment	$\frac{\partial I/Y}{\partial LS} = -e_{IR}(I/R)(Y_{fac}/Y)$	$\frac{\partial I}{\partial Y} = e_{IY} \frac{I}{Y}$
Exports	$\frac{\partial X/Y}{\partial LS} = \frac{\kappa\lambda\eta}{1-\eta} \frac{X/Y}{LS}$	-
Imports	$\frac{\partial M/Y}{\partial LS} = \frac{\gamma\eta}{1-\eta} \frac{M/Y}{LS}$	$\frac{\partial M}{\partial Y} = \rho \frac{M}{Y}$
	$h_2 = \frac{\partial C/Y}{\partial LS} + \frac{\partial I/Y}{\partial LS} + \frac{\partial X/Y}{\partial LS} - \frac{\partial M/Y}{\partial LS}$	$h_1 = \frac{\partial C}{\partial Y} + \frac{\partial I}{\partial Y} - \frac{\partial M}{\partial Y}$

the sample average of this ratio.

In a similar manner, in order to derive $\partial M/Y \partial LS$ we firstly write the imports equation in logarithmic form:

$$\log M = const. + \rho \log Y + \gamma \log(P/P_m) \quad (4.14)$$

Developing the equation gives:

$$\log M = const. + \rho \log Y + \gamma \log P - \gamma \log P_m \quad (4.15)$$

Replacing Equation 4.8 in Equation 4.15 we obtain:

$$\log M = const. + \frac{\gamma\eta}{1-\eta} \log LS + \frac{\gamma\eta}{1-\eta} \log(Y_{fac}/Y) + \frac{\gamma(\mu + \eta - 1)}{1-\eta} \log P_m + \rho \log Y \quad (4.16)$$

Then $\partial M/\partial LS$ becomes $\frac{\gamma\eta}{1-\eta} \frac{M}{LS}$ and consequently $\partial M/Y \partial LS$ becomes $\frac{\gamma\eta}{1-\eta} \frac{M/Y}{LS}$.

The formulas that we derived are summarized in Table 4.2.

4.2 Variables and data

This section relates the variables in the model to the corresponding data series. We operationalize the variables for the econometric estimations of the demand regimes of the countries under examination, which are presented in the next chapters. The first two subsections are on labor cost, labor income share, and their adjustments. The other two subsections are on prices and components of GDP.

4.2.1 Unit labor costs and labor income share

Unit labor costs ULC is the ratio of nominal compensation of workers (total wages) W^n ⁷, to real output, i.e. real GDP at market prices. Equivalently, it is wage per worker divided by labor productivity. We obtain real unit labor cost $RULC$ if the labor compensation is also in real terms. $RULC$ and LS are slightly different. While the former is the ratio of real labor compensation to real GDP in market prices, the latter is the share of real (or nominal) labor compensation in real (or nominal) GDP at factor cost. We summarize the relationship between the three variables in the following equations:

$$ULC = P.RULC \quad (4.17)$$

$$RULC = LS \cdot \frac{Y_{fac}}{Y} \quad (4.18)$$

$$ULC = P.LS \cdot \frac{Y_{fac}}{Y} \quad (4.19)$$

⁷The superscript refers to *nominal*; otherwise, all the other variables are in real terms.

where P is the price deflator. The ratios $RULC$ and LS , as defined above, can be separately compared within a country and among countries. For ULC to be internationally comparable, nominal wages as well as real output should be converted into an international currency. This is not only due to different currencies adopted by countries but also due to price differences among countries. While real GDP is suitable for temporal comparison of output volume within a country, spatial comparisons require PPP adjusted GDPs.

In order to calculate ULC in terms of a common currency, e.g. international U.S. dollars, firstly, nominal compensation of employees in LCU should be converted by means of nominal exchange rate E . Then we have the numerator in current dollars. The second step is dividing the denominator by a PPP index of a base year, e.g. 2005 (PPP^{2005}), as in our calculations, to obtain an internationally comparable output. We can express ULC in international dollars as in the following equation:

$$ULC = \frac{W^n/E}{Y/PPP^{2005}} \quad (4.20)$$

Replacing W^n by $W.P$, the equation can be rewritten as:

$$ULC = \frac{W.P/E}{Y/PPP^{2005}} = \frac{W}{Y} \cdot \frac{P.PPP^{2005}}{E} = LS \cdot \frac{P.PPP^{2005}}{E} \quad (4.21)$$

The term $P.PPP^{2005}/E$ can be considered as the price level in dollars for a given time. The domestic price level P actually refers to this term in our theoret-

ical and econometric model. The calculation of PPP^{2005} and the data series and sources are explained in Subsection 4.2.3.

4.2.2 Adjusting labor income share

Measurement of labor income share in developing countries poses some problems regarding the structure of the economy and treatment of mixed income of self-employed workers, which is also called “Operating Surplus of Unincorporated Enterprises” (OSPUE).⁸ The first problem is related to the function and the role of the agriculture and workers. The second, interrelatedly, is about the portioning out the mixed income, which includes the share of the worker (to be consumed) and that of the capital return (to be invested).

The national accounts usually ignore mixed income or completely attribute it to profits. This leads to underestimation of the labor income share LS . In early-developed capitalist economies, this does not cause serious problems since the share of the self-employed do not constitute an important fraction of the total labor force. However, for countries like Thailand and China, this method underestimates LS by ignoring the income of the self-employed, which is still, but much less than two or three decades ago, an important part of the total labor force.

In this section, we present four methods that we applied for adjustment of labor income share in Thailand. Alternative adjusted series and evolution of labor income share in Thailand are presented in Section 6.2. As for the LS of Korea we used the data from the ILO and the OECD, which we present in Section 5.2. For

⁸We use these terms interchangeably within the text.

China, calculations are more cumbersome, and they are presented in Section 7.2. Evolution of labor income share, with respect to different adjustments, in South Korea, Thailand, and China are treated in detail in the chapters devoted to those countries.

The first adjustment is to attribute the self-employed workers the average compensation of employees, or the average wage. This adjustment is denoted by ALS_1 (Adjusted Labor Share 1). Here it is assumed that the self-employed earn as much as the employees in corporations. This assumption might be realistic or not, depending on the structure of the economy. The less the share of the self-employed in total employment, the more reliable is this approximation. However, this adjustment is biased in late-industrialized countries since this share is much more significant than the early-developed capitalist economies. It might even be the dominant category of employment.

In order to overcome this problem, we consider two other adjustments and another one, which is the average of the second and the third. Gollin (2002) proposes as an adjustment that treats all the mixed income as labor income, which we call ALS_2 hereafter. The inconvenience of this adjustment is that it overstates the labor income share since the capital share of the mixed income is also considered to be a part of the workers' income. He proposes another adjustment that assumes that the mixed income has the same composition as in corporations, hereafter we name it ALS_3 . This adjustment still overstates the labor share, but in a lesser extent, because only a part of the mixed income is considered to be gained by workers. Felipe and Sipin (2004) average the last two adjustments to obtain

Table 4.3: Adjustments of labor income share

Adjustment	Formula
Unadjusted LS	$\frac{CoE}{Y_{fac}}$
ALS_1	$\frac{N_T \frac{CoE}{N_E}}{Y_{fac}}$
ALS_2	$\frac{CoE+MI}{Y_{fac}}$
ALS_3	$\frac{CoE}{Y_{fac}-MI}$
ALS_4	$\frac{ALS_2+ALS_3}{2}$
CoE : Compensation of Employees, Y_{fac} : GDP at factor cost, MI : Mixed In- come. N_T : Total Work Force, N_E : Num- ber of Employees	

another one, which we denote ALS_4 . This adjustment might still be arbitrary but it is probably closer to reality than the others. We summarize the formulation of the four adjustments in Table 4.3.

In some countries, mixed income and number of self-employed workers data are not available, despite the fact that they have significant shares in national economy and total workforce, respectively. For the first case, we have to calculate an imputed Mixed Income or OSPUE. Bernanke and Gürkaynak (2001) employ it in the adjustments presented above. The number of the self employed might be available but it might fail to take into account the number of unregistered self-employed or has to be readjusted as it is the case for China.⁹

In order to calculate the imputed OSPUE, Bernanke and Gürkaynak (ibid.) make two interrelated assumptions: First, employees of the corporate sector and self-employed workers of the non-corporate sector produce the same amount of

⁹We present how we calculate the mixed income and the number of self-employed workers in China in Section 7.2.

value added (both capital and labor income) per worker, i.e. their productivities are the same. Second, they assume that the corporate share of the value added (both capital and labor income) is proportionate to the share of employees in total employment. Then the imputed OSPUE is calculated as the following:

$$\text{Imputed OSPUE} = \frac{CoE + OS}{N_T} N_{SE} \quad (4.22)$$

where OS is the operating surplus of corporate companies and N_{SE} is the number of self-employed.¹⁰ Substituting the imputed OSPUE as mixed income into the pertinent adjustment formulas ALS_2 and ALS_3 above gives us the labor share. A variant of this calculation is proposed by Zhou, Xiao, and Yao (2010). These authors assume that the average operating surplus in the corporate and unincorporated sectors is the same and not the total income as it is in Bernanke and Gürkaynak (2001). They first calculate the average profit by dividing the operating surplus by the number of employees and then multiply it by the number of self-employed workers to obtain the imputed OSPUE. They add this estimate of OSPUE to the compensation of employees. Dividing by the GDP at factor cost gives a new adjusted labor income share. For China we use the average of this adjustment and ALS_1 as did Zhou, Xiao, and Yao (2010).

As Guerriero (2012, p.8) remarks there is no reason to believe that the income and employment shares are the same. In fact, as we mentioned, this would mean that workers in the corporate and in the unincorporated sectors have the same pro-

¹⁰Note that total work force is equal to the sum of the number of employees and that of the self-employed.

ductivity. This assumption is not realistic in the age of monopolies, especially for the developing countries.

Calculated labor income shares are presented in Sections 5.2, 6.2, and 7.2 as graphs and as numbers in Table A.2 in Appendix A.

4.2.3 Price indicators

Domestic prices

GDP deflator P , or domestic prices, is calculated from the data series retrieved from the Penn World Tables (PWT) database (Feenstra, Robert, and Timmer 2013). However, the series are not directly available in the database. P is equal to the ratio of v_gdp to q_gdp , which are GDP at current and constant national 2005 prices, respectively, in the database.

PPP^{2005} is not directly available, however the variable pl_{gdp} , which is the price level of the variable $CGDP_o$ is used to compute it. The latter is defined as “Output side real GDP at current PPPs”. pl_{gdp} is the Price Level Index, i.e. the ratio of the PPP to exchange rate.¹¹ For the base year 2005, PPP is calculated as $pl_{gdp}^{2005} \cdot xr^{2005}$, where xr^{2005} is the nominal exchange rate for the base year 2005.

Then, the domestic prices in dollars can be expressed as the following in terms of the data series from the PWT 8.0 database:

¹¹PLIs “provide a measure of the differences in price levels between countries by indicating for a given component expenditure the number of units of common currency needed to buy the same volume of the component expenditure in each country. At the level of GDP, PLIs provide a measure of the differences in the general price levels of countries.”(EUROSTAT-OECD 2012, p. 14)

$$P = \frac{v_{gdp} p_{gdp}^{2005} .xr^{2005}}{q_{gdp} \quad xr} \quad (4.23)$$

For operationalization of the variable P in the econometric estimations, we normalized it to 1 for the base year 2005.

Export and import prices

The source of the export prices P_x and the import prices P_m series is PWT 8.0 database, as well. They correspond to the variables pl_x and pl_m , respectively, in the database. For the operationalization of the variables, we normalized them to 1 for the base year 2005.

As for the calculation of the export prices of the competitors $P_{x_i}^{comp}$ of a country i , we took into account the shares of exports of the country towards all the trade partners. Then we have $P_{x_i}^{comp} = \sum_{j \neq i}^N \alpha_{i \rightarrow j} P_{x_j}$ where $\alpha_{i \rightarrow j}$ is the share of exports of the country i towards the country j and N the number of trade partners. Then we have $\alpha_{i \rightarrow j} = \frac{X_{i \rightarrow j}}{\sum_{j=1}^N X_{i \rightarrow j}}$ where $X_{i \rightarrow j}$ is the exports of the country i towards country j . The weights are updated for each period. The bilateral trade data, in constant 2005 dollars, is from the CHELEM International Trade Database (CEPII 2013). $P_{x_i}^{rel}$ of a country i is the ratio of P_{x_i} to $P_{x_i}^{comp}$.

4.2.4 Foreign demand

We use the total world imports, both weighted and simple sums, as a proxy for the foreign demand. The first one, denoted as $M_{w_{1_i}}$ can be formulated as

$\sum_{j \neq i}^N \alpha_{i \rightarrow j} M_j$, where $\alpha_{i \rightarrow j}$ is defined as above. The other M_{w_2} is the simple sum of the imports of the rest of the world, which can be formulated as $\sum_{j \neq i}^N M_j$.¹²

4.2.5 GDP and its components

The data on GDP components consumption, investment, exports, and imports of the three countries are retrieved from the World Bank's WDI (World Development Indicators) database in April 2014. Detailed information on the definitions of the series from the WDI are provided in Appendix A.

Adjusted labor income W is calculated by multiplying the adjusted labor share ALS by the GDP at factor cost in 2005 dollars, consequently the residual is the adjusted capital income R . The GDP at factor cost in 2005 dollars is only available for Korea in the WDI database. However, for Thailand and China we calculated the ratio Y_{fac}/Y in LCU¹³ and multiplied it by the GDP at market prices in 2005 dollars in order to calculate the GDP at factor cost in 2005 dollars.

4.3 Econometric methodology

This section covers the econometric approach we employed in the analyses of demand growth regimes of the countries under examination. The first step is to test the stationary properties of the variables. The second step is to choose the

¹²We eliminate the index i of P_x^{comp} , P_x^{rel} , M_{w_1} and M_{w_2} in the representation of the econometric results in the following chapters.

¹³The data on Thailand is supplied from Jetin (2012) and it is updated by the author until 2012. The information on data on China is covered in Chapter 7.

convenient estimation method of the single equations depending on the findings in the first step.

We employed the Augmented Dickey Fuller (ADF) unit root test for testing stationarity. The lag selection is based on the first order autocorrelation of the residuals resulting from the ADF test and the significance of the lags added to the regression. Until the first order autocorrelation of the residuals are less than 0.3 in absolute value, we added lags to the ADF regression. For comparison, we also used the Akaike Information Criterion (AIC), however, this did not always give results with significant lags. When not necessary, we eliminated lags of differences and used the simple DF test.

The ADF tests show that the maximum order of integration of the variables is 1.¹⁴ We categorize the estimated equations into three depending on the stationarity properties of the series:

Type 1: If all the series within the equation are $I(1)$

Type 2: If all the series within the equation are $I(0)$

Type 3: Some variables are $I(0)$ and others are $I(1)$ in the equation.

For the type I equations the first step is to test for cointegration via the residual-based Engle-Granger (EG) method (Engle and Granger (1991)) and “Bounds test” proposed by Pesaran, Shin, and Smith (2001). Those two methods are suitable for our single equation estimation framework. While the former is only applicable to $I(1)$ series, the latter enables the test of cointegration among both $I(0)$ and $I(1)$ variables (see Subsection 4.3.2). If there are n variables in an equation, there are

¹⁴The results of the unit root tests are in Appendix B

$n-1$ possible cointegration vectors among them. If there are more than two variables in an equation, there might exist more than one cointegration vector. While the EG method comes short of detecting all possible cointegration vectors, Johansen test procedure (Johansen (1991, 1995)) can. However, this method is used within a VAR framework in which several equations are estimated simultaneously via maximum likelihood procedure. This method requires larger sample size and interpretation of the coefficients are more difficult.

If there is a long-run relationship among the variables, an ECM (Error Correction Model) is estimated to capture the short-run dynamics, which is the main concern of our estimations. If no cointegration is detected among the variables, their first differences are used to estimate short-run effects via OLS (Ordinary Least Squares). We added an autoregressive term using the Prais-Winsten (PW) method when necessary.

For the type II, the estimation of the equations by the use of the variables in levels (or in logarithms) gives the long-run relation and that in first differences gives the short-run relation. We employ the latter for our purposes.

For the type III, we employed the “Bounds test”, which enables testing of cointegration among variables of different orders, where the maximum order of integration is one. Three outcomes are possible due to the nature of the test. The series might be cointegrated, they might be all stationary, or no conclusion can be drawn from the test. When cointegration tests gave no sign of cointegration or were inconclusive, we applied OLS in differences of the variables no matter they are $I(1)$ or $I(0)$.

ADF and EG cointegration tests, and OLS estimations are conducted using the software GNU Regression, Econometric and Time Series Library (GRET) version 1.9.90¹⁵. As for the Bounds tests we employed Econometric Views 8 (Eviews). In the following two subsections we present the application of the EG method and the Bounds test in detail.

After applying the relevant estimation technique, we check the robustness of the estimated equations by using the standard tests on residuals and coefficients. As for the residuals, we report DW test statistic and the probability values of accepting the null hypotheses of White's heteroscedasticity test, Autoregressive Conditional Heteroscedasticity (ARCH) test with one lag, and Jarque-Bera (JB) or Doornik-Hansen (DH) normality tests¹⁶

For the overall significance of the model and the parameters, probability values of F-test, Ramsey Regression Equation Specification Error Test (RESET), and Cumulative Sum Control Chart (CUSUM) tests are presented. In order to check for the multicollinearity among the regressors, we report the Variance Inflation Factor (VIF).¹⁷ We report the highest VIF of the regressors of a given regression. Values higher than 10 point at multicollinearity. In the table 4.4 we present the null hypotheses of the tests used for the diagnostic checks.

¹⁵See gretl.sourceforge.net

¹⁶ Gelman and Hill (2007) underline that "[t]he regression assumption that is generally least important is that the errors are normally distributed. In fact, for the purpose of estimating the regression line (as compared to predicting individual data points), the assumption of normality is barely important at all." Although normality is not a must for the residuals we report the probability values of the relevant tests.

¹⁷When the PW method is used, GRET) does not calculate the test statistics and probability values for White's heteroscedasticity, RESET, and CUSUM tests.

Table 4.4: Null hypotheses of the tests for the diagnostic checks

Test	Null Hypothesis
White's test	Homoscedasticity
ARCH test	Homoscedasticity
Normality test (Jarque-Bera or Doornik-Hansen)	Normality
F-test	Lack of linear fit
RESET test (with squares)	Linear model
CUSUM test	Parameter stability

4.3.1 Engle-Granger cointegration test

Engle-Granger two step procedure is based on the test of the stationarity properties of the residuals resulting from a simple regression among $I(1)$ variables. The first step to conduct the test is to determine the stationary properties of the series. If each of them turn out to be $I(1)$, the next step is to run a cointegration regression among them. Finally, ADF test is used in order to find out whether the residuals from this regression are stationary or not. Stationarity of the latter implies that there exists a stable relation among the series, hence cointegration. Otherwise, the series are not cointegrated.

4.3.2 Bounds test

Bounds test¹⁸, proposed by Pesaran, Shin, and Smith (2001), is based on the test of an equilibrium correction model,¹⁹ which is constructed in an Autoregressive Distributed Lags (ARDL) setting.²⁰ An ARDL model consists of lags of depen-

¹⁸This subsection is based on the application of the Bounds test by Dave Giles. See <http://davegiles.blogspot.fr/2013/06/ardl-models-part-ii-bounds-tests.html> Date of access: June 2015

¹⁹We use the terms “equilibrium correction” and “error correction” interchangeably.

²⁰It can be shown that ARDL is a re-parametrization of ECM. See Asteriou and Hall (2007, p. 312) for a proof.

dent variable and that of independent variables along with their current values as regressors, as in the formulation below:

$$Y_t = \alpha + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{j=1}^r \sum_{i=0}^{q_j} \gamma_{j,i} X_{j,t-i} + \epsilon_t \quad (4.24)$$

where Y is the dependent variable and X_j are the exogenous variables. p is the maximum number of autoregressive lags, r the number of exogenous variables, q_j is the maximum number of lags of an exogenous variable X_j . β_i and $\gamma_{j,i}$ s are the corresponding coefficients and α is a constant.

In order to apply the Bounds test, a conditional unrestricted equilibrium correction model (ECM) is estimated in differences in the form of an ARDL. The difference between an ECM and an unrestricted ECM is that in the former the long-run coefficients are estimated in a separate equation while in the latter the long-run coefficients are estimated within an ARDL in first differences of the variables. Since we have two independent variables in each of our equations we employ an ARDL of the following form:

$$\begin{aligned} \Delta Y_t = \alpha + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \sum_{i=0}^{q_1} \Delta \gamma_{1,i} X_{1,t-i} + \sum_{i=0}^{q_2} \Delta \gamma_{2,i} X_{2,t-i} + \delta_0 Y_{t-1} + \delta_1 X_{1,t-1} \\ + \delta_2 X_{2,t-1} + \epsilon_t \end{aligned} \quad (4.25)$$

The unrestricted ECM serves testing cointegration via Wald or F-test. This test is based on the joint significance of the coefficients δ_0 , δ_1 , and δ_2 . The test can

be formulated as below:

$$H_0 : \delta_0 = \delta_1 = \delta_2 = 0$$

$$H_1 : \delta_0 \neq \delta_1 \neq \delta_2 = 0$$

If the coefficients are not jointly significant this implies that there is no long-run relationship among the variables. The test statistic does not follow a standard distribution and there are three possible outcomes of the test. Pesaran, Shin, and Smith (2001) provide upper and lower bounds of the critical values, which is a function of number of variables in the ARDL equation (excluding dummy variables).²¹ The three outcomes of the test are as the following:

1. If the test statistic is below the lower bound, than all the variables are I(0) hence there is no cointegration.
2. If the test statistic falls between the two bounds, the test is inconclusive.
3. If the test statistic is higher than the upper bound, there is a sign of cointegration.

Along with this test a “Bounds t-test” must be conducted for the verification of existence of cointegration. The third case must be confirmed by this test with the null and alternative hypotheses below:

$$H_0 : \delta_0 = 0$$

$$H_1 : \delta_0 < 0$$

²¹The critical values provided by Pesaran, Shin, and Smith (2001) are asymptotic. Narayan (2005) calculates the values for sample sizes between 30 and 80.

If the null is not rejected in the latter, cointegration among the variables is not validated. If the null is rejected, the next step is to estimate a long-run equation along with a restricted ECM of the following forms:

$$Y_t = a_0 + a_1 X_{1,t} + a_2 X_{2,t} + u_t \quad (4.26)$$

$$\Delta Y_t = \alpha' + \sum_{i=0}^p \beta_i' \Delta Y_{t-i} + \sum_{i=0}^{q_1} \Delta \gamma_{1,i}' X_{1,t-i} + \sum_{i=0}^{q_2} \Delta \gamma_{2,i}' X_{2,t-i} + \psi \hat{u}_{t-1} + v_t \quad (4.27)$$

where $\hat{u}_t$ are the residuals retrieved from the long-run equation 4.26 and ψ is the adjustment coefficient. a_1 and a_2 are the long-run coefficients and $\gamma_{1,t-i}'$ are the short-run coefficients.

The lag choice p in the ARDL models is based on several information criteria such as AIC, Schwarz Information Criterion (SIC), (aka Bayesian Information Criterion), Hannan-Quinn Information Criterion (HQ). Since the ARDL specifications are estimated via OLS, the residuals should be serially independent. However when the number of lags implied by those information criteria are estimated, the resulting residuals are not necessarily serially independent. We opt for SIC for the lag length selection as a starting point, but if the autocorrelation is not eliminated, we add further lags of the dependent and the independent variables. Since the data is annual and the sample sizes are small, we try specifications with lags from 0 to 2. We checked the first eight orders of autocorrelations of the residuals.

Addition of dummy variables alter the results, and we present the estimations with and without dummies for comparison in Appendices B.1.2, B.2.2, and B.3.2.

4.4 Relevance of post-Keynesian models to developing countries

An attempt to analyze South Korea, Thailand, and China from a post-Keynesian view brings along the question of compatibility between Keynesian growth policies and structure of the economies. This section focuses on this question by considering theoretical and structural dimensions of the discussion drawn from the works of Dutt (1984, 1991, 1996, 2013). According to Dutt, Keynesian policies aiming to increase aggregate demand might be influential on growth under certain conditions. There might exist, separately or simultaneously, capacity, agricultural, balance of payments, and fiscal constraints in these countries. The impact of the Keynesian policies are dependent on these constraints, however applying them might alter their bindingness. These are discussed in the subsequent subsections.

Dutt (1984) analyses the impact of monopoly power, hence income distribution, on economic growth in a one-sector (industry) stagnationist (wage-led) economy. Dutt (1991) later developed this model by integrating agricultural sector. He concludes that growth rate can be increased by improving the income distribution in favor of workers and expanding the market for industrial goods.

Dutt (1996, 2013) classifies semi-industrialized countries as a subset of less developed countries (LDCs). In the former, industrial sector, though considerably

dependent on imports, has a significant share within the GDP and it is relatively advanced in technology, organization methods, and finding markets abroad along with a subsistence economy. The economy is able to meet most domestic consumption and basic intermediate requirements. Exports are not sufficient to meet imports, and the economy is dependent on foreign capital inflows, which are normally sufficient not to apply import compression policies. LDCs consist a range of countries whose economies vary from primary-producing to semi-industrialized, from low to middle income, from post-socialist to mixed.

Dutt (1996) defines Keynesian policies as “cheap money policies, deficit financing, increased government spending, government investment, and redistributive policies shifting the distribution of income towards poorer consumers with higher propensities to consume” (p.128). Development economists argued for the irrelevance of the Keynesian policies in LDCs. They claim that they are only pertinent in short-run but the problems of development are related to long-run. They mention that, rather than demand, supply constraints such as insufficient levels of wage-goods, capital-goods, working capital, skilled labor, foreign exchange, and government controls are the limiting factors behind the low levels of production in LDCs. Even Kalecki, in his *Essays on Development Economics* underlines the importance of supply rather than demand constraints for LDCs. However, from 1970s and 1980s, partly due to the structural changes in LDCs, which showed the signs of demand problems, Keynesian theory found a place within the development economics (Dutt 1996, 2013).

In the following subsections, these constraints are discussed within the frame-

work proposed by Dutt (2013), which is based on Dutt (1996). The model on which the conclusions are based is not explicitly presented but its main aspects are discussed.

4.4.1 Capacity (or capital) constraints

It is frequently stated that effective demand is not crucial for the LDCs but shortage of capital is the major problem in these countries. Despite the fact that the latter is an evident issue for the LDCs, the problem of shortage of capital (capacity constraint) in LDCs is not well defined. It is not clear whether the problem lies in low savings rate or low levels of investment. If the problem is the latter, the Keynesian policies aiming to promote aggregate demand are necessarily pertinent. A third possibility is that the economy might be operating at full capacity by using all the capital available (Dutt 1996, 2013).

If an economy operates at full capacity, excess demand is adjusted through variations in price level. Then three main conclusions are drawn from the model proposed by Dutt. Firstly, if substitution between capital and labor is possible, the “full” capacity level is not fixed. Secondly, even if autonomous demand is at a high level, this does not necessarily imply that economy is at full capacity (Dutt 2013). The first two conclusions imply that an increase in autonomous expenditure and shift of the full capacity level might go hand in hand and promote the growth.

Finally, even if the economy operates at full capacity, an increase in autonomous demand decreases equilibrium real wage and this enhances the growth rate of capital and output (*ibid.*).

These conclusions do not mean that improving income distribution in favor of workers always enhances growth. However, classical Keynesian policies, e.g. government expenditures or investments, might still be relevant for such a purpose despite the fact that real wages might decline and hence worsen the income distribution.

4.4.2 Agricultural constraints

The Keynesian policies are criticized on the grounds that rising aggregate demand increases prices of agricultural products if an economy is constrained by this sector due to institutional barriers.

In Dutt's neo-Kaleckian framework²², in which an economy is always wage-led, aggregate demand is raised by an improvement in income distribution in favor of workers.²³ Integrating the agriculture in the former model, Dutt (1991) generalizes these results. The article focuses on government's role in developing agricultural structure, e.g. irrigation facilities, therefore relaxing the supply constraint.²⁴ The results of the former model holds if agricultural income distribution is improved in favor of workers. It is mentioned that if the improvement in income distribution is due to weakened monopoly power, the results are very likely to hold. They become even more probable if there is a prior improvement in agricultural income distribution. That the rate of growth of output rises due to a more

²²See Dutt (1984)

²³In the article by Dutt (2013, p. 573) the possibility of a profit-led economy is also stated but the model of Dutt (1984), on which his presentation is based, does not explicitly treat this issue.

²⁴It is underlined that the constraints on agriculture are assumed to be infrastructural, not technological or institutional.

egalitarian distribution of income is based on the assumption that the parameters of the model are constant. For instance, if the change in the monopoly power has a negative impact on autonomous investment, or if the collected taxes are spent for unproductive expenses instead of agricultural infrastructure, the results may not hold. It is also mentioned that the model neglects Engel effects, though the results may still be valid under this assumption. The main conclusion of the model is that if an economy is constrained by effective demand and agricultural supply, a pro-labor redistribution of income might relax both constraints and lead to a higher rate of economic growth.

Deepening the discussion on this two-sector model, Dutt (2013) concludes that agriculture constrains industrial growth, but short period expansionary policies promote it. Consequently, economy attains a new long period equilibrium and becomes more industrialized. The more the agriculture constraint is relaxed and the country industrializes, the more the Keynesian policies become relevant for LDCs.

4.4.3 Open economy issues

LDCs are considered to be small, open economies that can export at any amount at world prices. However, this characterization does not fit to all LDCs. If an LDC has a considerable share of manufactured goods in total exports of the world, demand problems may arise. It is more suitable to consider them in monopolistic competition and oligopoly, rather than price taking behavior (ibid.).

Dutt (ibid.), drawing from Taylor (1983, 1991), states that international trade

and balance-of-payments issues can be integrated into the Keynesian framework by assuming that the LDCs import intermediate goods as a fixed proportion of production, capital goods as a fixed proportion of investment expenditure, and consumption goods for capitalists and agricultural rent receivers. LDCs export industrial goods whose quantity depend on world demand and competitiveness, i.e. domestic price, exchange rate, and price of foreign substitutes.

If an LDC has a maximum possible level of trade deficit (as a proportion of capital stock or output), then there are three types of constraints on growth. The first is a demand constraint in which there is excess capacity and trade deficit constraint is not binding. The second is a saving constraint in which the economy operates at full capacity and the trade deficit constraint is still unbinding. The last case is with a foreign exchange constraint along with excess capacity and perhaps with a binding trade deficit constraint. (Dutt 2013)

In an economy characterized by these constraints, the foreign exchange gap is not always binding. In such a case, demand becomes pertinent in fostering growth. However, inflationary impacts of this policy possibly deteriorates the balance-of-payments by decreasing exports and possibly by raising imports. It is argued that even in case of a balance-of-payments constraint, aggregate demand is still important. If the economy “hits” (approaches) a balance-of-payments constraint, in order to prevent it, Keynesian demand management policies, such as running down foreign exchange reserves or contractionary, become necessary. It should be noted that some parameters of the balance-of-payments constraint depend on demand factors. For instance Kaldor-Verdoorn type effects may influence the

exports. Economic growth might lead to lower import coefficients (Dutt 2013).

4.4.4 Remarks

The framework presented above discusses that aggregate demand is relevant for the growth of the LDCS. It is shown that aggregate demand can affect output in short-run, even though it does not alter long-run growth. In some cases the latter might also be affected. Even if there are non-demand constraints on the economy, the role of aggregate demand is still important. One reason behind is that these constraints themselves are altered by aggregate demand policies. Another is that these policies can compensate the detrimental effects of non-demand factors (ibid.).

Chapter 5

Analysis of the demand regime in South Korea

In this chapter, based on the income distribution growth model described in Chapter 4, we analyze the demand regime in South Korea. Demand and accumulation regimes in South Korea, have already been examined from a post-Keynesian view by Onaran and Stockhammer (2005) and Onaran and Galanis (2012). We propose a slightly different theoretical and empirical model from the latter study for the analysis of South Korea. We employ a hybrid labor income share calculated from the databases provided from ILO and OECD.

This chapter is organized as follows. In the introduction we discuss the structural transformation and the macroeconomic performance of South Korea starting from 1960s. In the following section we assess the evolution of labor income share in South Korea and present the measure that we employ in our analysis. In

the third section, we present the econometric analysis of the demand regime of the country. In the last section we evaluate the results and compare them with the previous findings in the literature. We briefly discuss the characterization of the demand regime in South Korea, however, policy conclusions and a general assessment take place in Chapter 8.

5.1 Structural transformation and macroeconomic performance of South Korea

The South Korean growth experience has been shown as a leading success story among the “Four Asian Tigers” or “Newly Industrialized Countries”¹. The country achieved an average growth rate of 7.9 % starting from 1960s until the Asian crisis of 1997 when the economy shrank by 6.9%. Although the growth retook off one year after the crisis, the average post-crisis period growth rate of 4.5% between 1998-2011 is far from the historical records. After the last crisis of 2008, the country passed through two recessions during the two years that followed and recovered in 2010 with a growth rate of 6.3%.²

South Korea was considered to be a low income by the World Bank by 1960. The country suffered from high trade deficits that were covered by the U.S. aid. The coup d’etat in May 1961 by General Park Chung Hee became a turning point

¹Spain, Brazil, Mexico, South Korea, Taiwan, Hong Kong, and Singapore are considered to be NICs (Rutherford 2002).

²The growth rates are calculated from the GDP series in constant dollars retrieved from the WDI database provided by the WB (2014).

in the history of the country. In two decades the country became the top third of all middle income oil importing countries according to World Bank's classification. The average annual growth rate of the economy in the period 1960-70 was 8.6% compared to 5.8% of the average of the middle income countries. During the following decade, the macroeconomic performance of the country was even more impressive: 9.5% compared to 5.6% of the middle income countries. The attained high growth rates are due to the breakthrough in industry (17.2% during 1960-70 and 15.4% during 1970-80) and manufacturing (17.6% during 1960-70 and 16.6% during 1970-80). (Hart-Landsberg 1993, p.26-27).

South Korean economy passed through a rapid and vast structural transformation during those two decades. The share of agriculture in total value added (37% in 1960) and that in total employment (66%) halved in two decades, while the share of industry in total value (20%) doubled and that in employment (9%) more than tripled. However, the share of services in economy remained stable while the share of this sector in total employment increased from 27% to 37% (ibid., p.28-29). The transformation of the economy in terms of sectoral composition during the period 1965-2011 and sectoral employment during the period 1980-2011 according to more up-to-date statistics are presented in Figures 5.1 and 5.2, respectively.

Industrialization, which went hand in hand with export-led growth, altered the composition of exported and imported products. The exports of the primary goods in total exports decreased from 23% to 3% from 1967 to 1980, while its share in total imports increased from 25% to 45% in the same period. While the exports

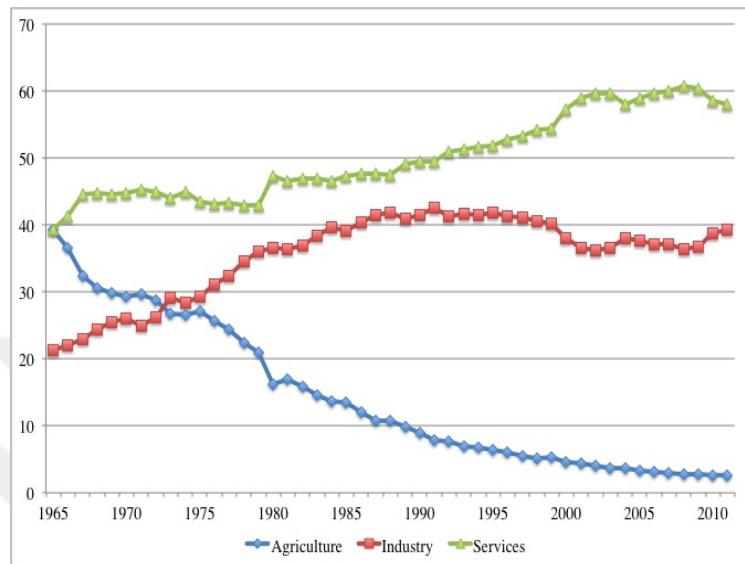


Figure 5.1: South Korean GDP by sector composition (% of GDP) (1965-2011)

Source: WDI

of primary goods attenuated in the course of time, the imports share of the latter steadily decreased until the 1997 crisis and retook off again. The long term trends, from 1967 to 2013, indicate that the share of consumption goods in exports has decreased from 31% to 18% while the share of equipment goods has increased from 3% to 28%, and they constitute the most important export items. The trends also point to a long-run decline in the share of intermediate and equipment goods within the total imports. Figures 5.3 and 5.4 depict the evolution of composition of exports and imports, respectively.

During the period 1960-70, the average annual growth rate of exports was 34.1%, far outpacing that of the middle-income oil importing countries whose average annual growth rate of exports was 7.1%. 1970s witnessed a similar pace

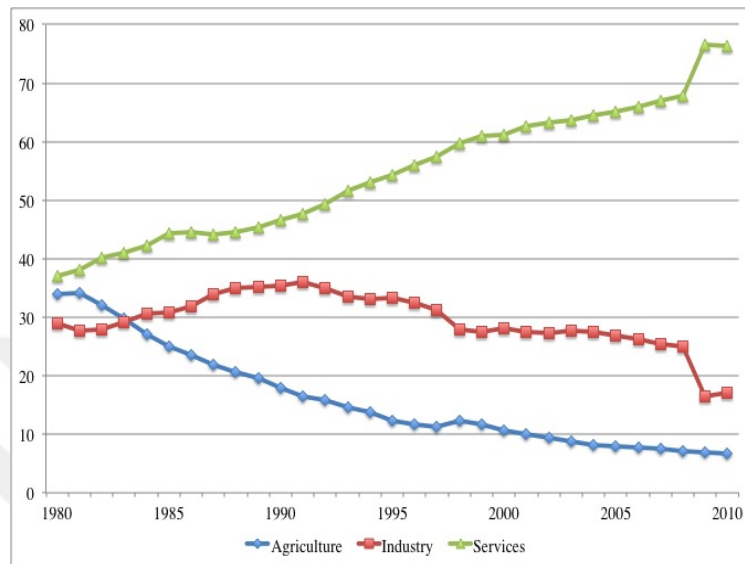


Figure 5.2: Distribution of the workforce across economic sectors in South Korea (% of total employment)(1980-2011)

Source: WDI

with 23% compared to 4.3% (Hart-Landsberg 1993, p.31). However, the growth in exports was accompanied by a trade deficit that persisted until the 1997 Asian crisis. The weight of the trade volume in total output was also subject to change in the course of time. International trade was almost negligible for South Korea in 1960, however, in 1980, the share of the exports in total value added was 10%, and that of the imports was 16 %. The weight of international went far beyond these figures by the continuation of the export-led growth. In 2011, the exports constituted the half of the GDP, while the imports to GDP ratio was 43%. The rise of international trade was accompanied by an increasing share of investment until the 1997 Asian crisis. While the investment share of GDP almost steadily increased and peaked up to 39 % just before the crisis in 1996, it has been declin-

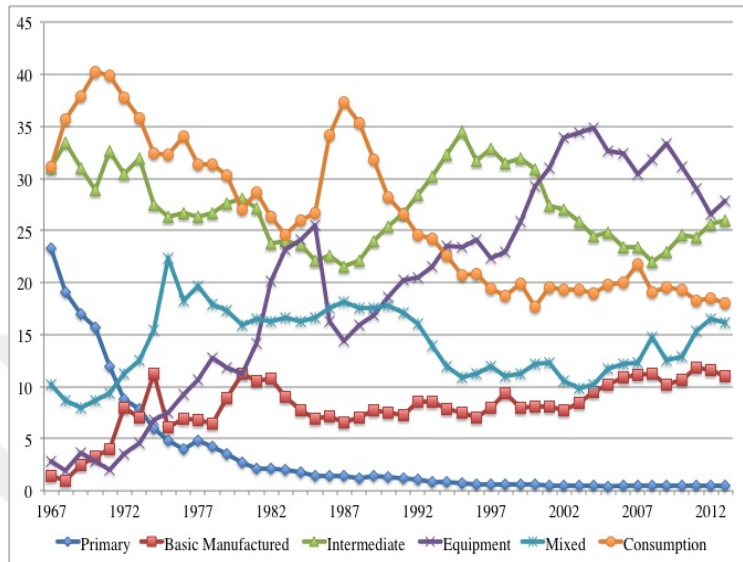


Figure 5.3: Composition of Korean exports with respect to stages of production (% of total exports) (1967-2013)

Source: CHELEM

ing since then. As of 2011, investment only constitutes one quarter of the GDP of South Korea. Meanwhile the economy was confronted with a steadily declining consumption share, which was 77% in 1960 and became 51% in 2011. The latter was also accompanied by a decreasing labor income share, which we present in the next section. Figure 5.5 depicts the evolution of GDP components in South Korea.

Hart-Landsberg (2009) explains the rapid export-led growth between the early 1960s and 1997 in South Korea by two international and two domestic factors. At international level, the Japanese were ready to export their technology, components, and machinery to the *chaebols*,³ and the U.S. was willing to politically and

³Chaebols are Korean family-owned holding companies.

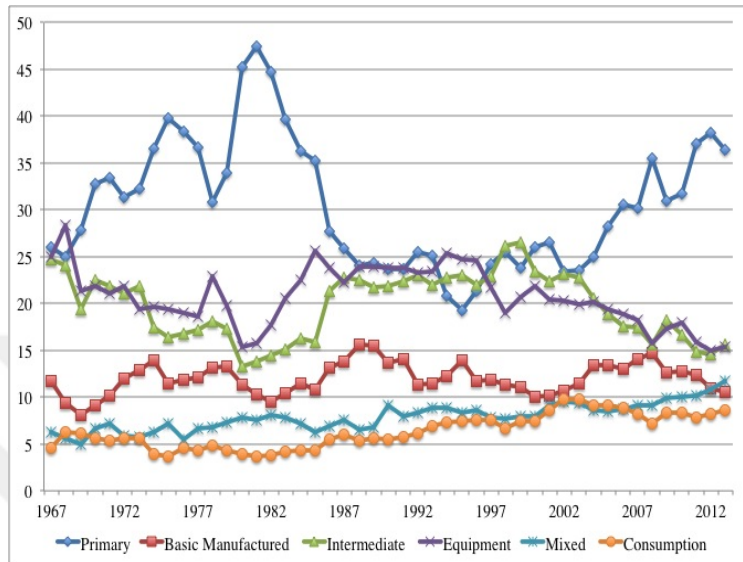


Figure 5.4: Composition of Korean imports with respect to stages of production (% of total exports)(1967-2013)

Source: CHELEM

financially support the South Korean government. At domestic level, the economy was controlled by the state, which was ruled by the military, and the labor force was repressed. However, Hart-Landsberg (2009) asserts that South Korea's growth after the 1997 crisis owed to four factors: Government deficit spending, foreign direct investment, consumer spending, and exports.

South Korea, starting from a low income agriculture economy, turned into an export base in a few decades. However, this growth pattern was accompanied by a long-run decline, except some periods, in the share of the labor in total value added. This decline became even more significant after the 1997 crisis and the last global financial crisis even worsened the share. In the next section, we present the evolution of labor income share in South Korea according to different sources.

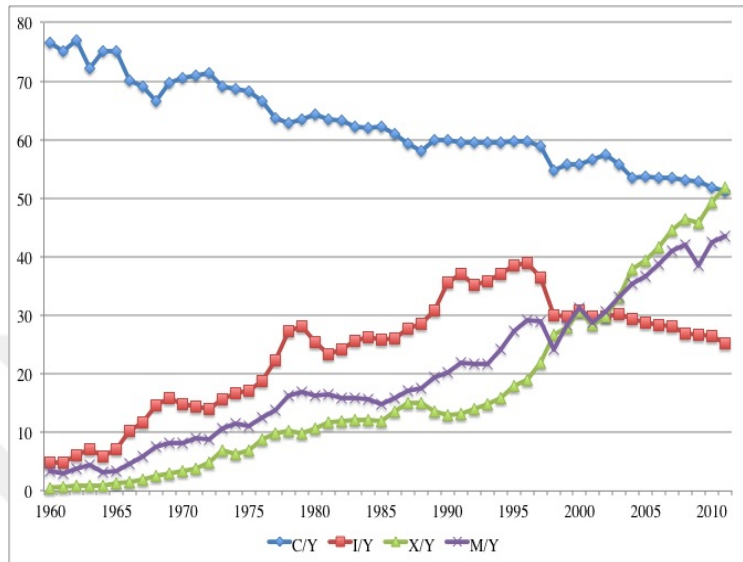


Figure 5.5: Evolution of GDP components by expenditure in South Korea (in %) (1960-2011)

Source: WDI

5.2 Labor income share in South Korea

Measuring labor share in South Korea, as a member country of OECD, is a relatively easier task, compared to other economies in the region. We used two sources, namely those by ILO and OECD, for labor income share and constructed a new series through retropolation.

ILO, in the *Global Wage Database*⁴, provides two labor share series, an unadjusted, i.e. total compensation of employees as a share of GDP, and an adjusted, for the self-employed, for South Korea. The former series, available from 1995 to 2011, oscillate around 50%, while the latter declines from 74% to 63% in the

⁴<http://www.ilo.org/> Date of access: May 2014

same time span. The series calculated by the OECD cover the period 1970-2011 and they have a similar trend with the adjusted ILO series during the period 1995-2011.

The unadjusted series provided by the ILO underestimate the labor income share in South Korea while the OECD series seem to overestimate it.⁵ Since the adjusted ILO series cover only a short span of time, we opt for using these series for the period 1995-2011 along with the retropolated OECD series. Maintaining the former series, we depart from the level of its first available point, i.e. in 1995, and recalculate a new series using the growth rate of the OECD series for the period 1970-1995. Those new series, titled “ILO-OECD Reconstructed” are presented along with the other series from the ILO and the OECD in Figure 5.6.

The reconstructed series, starting with 88% is in a steady trend of decline during the whole period except two sub periods. We observe two temporary periods of rise in the late 1970s until early 1980s and another starting in late 1980s until the 1997 Asian crisis. However, the labor income share continues decreasing in the post-crises period. The decline is even more apparent when the share of labor income in GDP at market prices is considered, as in Figure 5.7. The decline is more than 20% in four decades. After the last economic/financial crisis of 2008, a faster decline in the labor share is observed. As stated in the previous section, in parallel with the decline in the labor income share, the consumption share in GDP decreased and exports share, along with imports, in GDP increased from 1960s on. This, at the first sight, might be a sign of a long-run trade off between

⁵As of 1970, it takes the value of 95% and 71% in 2011

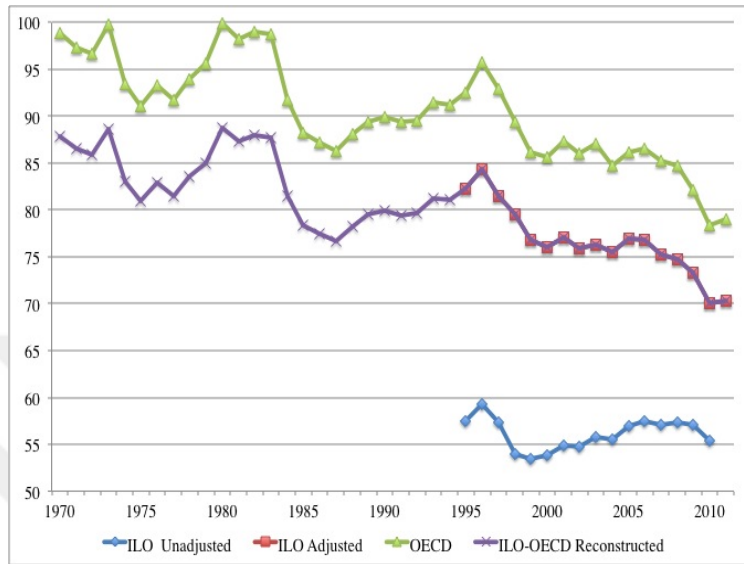


Figure 5.6: Labor income share in Korea (% of GDP at factor cost) (1970-2011)

Source: ILO, OECD, and author's calculations

consumption/labor income and exports. As for the investment we do not observe a stable pattern, though. In order to analyze the impact of the labor income share on GDP and its components, in the next section we estimate our model described in Chapter 4.

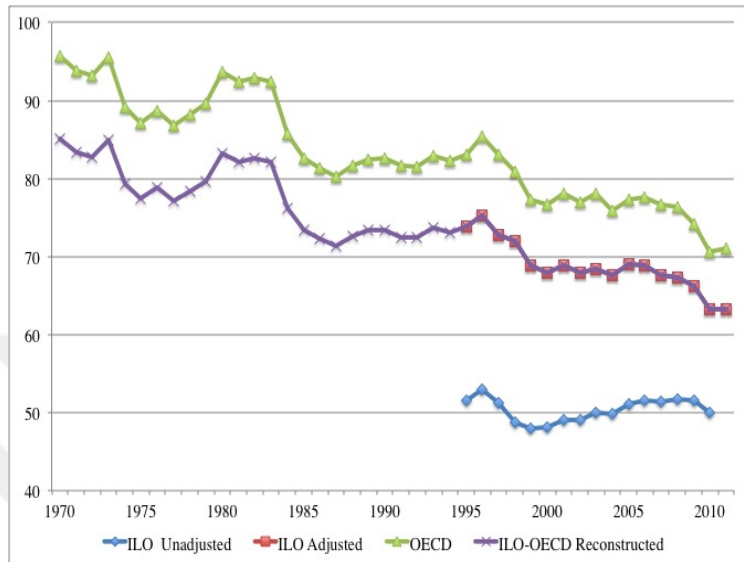


Figure 5.7: Labor income share (% of GDP at market prices) in Korea (1970-2011)

Source: Author's calculations

5.3 Econometric analysis of the demand regime in South Korea

In this section we present the estimation procedure of the equations of our post-Kaleckian demand income distribution model applied to South Korea. We discuss the econometric aspects of the estimation and interpret the economic meaning of the results in the following section.

Table 5.1: Consumption equation estimations for Korea (1970-2011)

Dependent variable: $\Delta \ln C$				
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-0.01	-1.80*	0.01	1.06
$\Delta \ln W$	0.96***	11.44	0.71***	8.08
$\Delta \ln R$	0.16***	6.33	0.13***	5.93
$D1998$			-0.11	-5.23
$\rho_{\ddagger}^{\dagger}$			0.25	
Diagnostics				
R-Squared	0.78		0.87	
Adjusted R-Squared	0.77		0.86	
DW statistic	2.01		1.84	
White's test $\dagger$	0.00			
ARCH test (1 lag) $\dagger$	0.14		0.42	
Normality test $\dagger$	0.16		0.02	
F-test $\dagger$	0.00		0.00	
RESET test $\dagger$	0.00			
CUSUM test $\dagger$	0.76			
Highest VIF	1.14		1.77	

***, ** and * represent 1, 5 and 10% significance levels, respectively.

$\ddagger$ The autoregression parameter of the PW Method.

$\dagger$ Probability values of the corresponding tests.

5.3.1 Consumption equation

Consumption and labor income (W) series in logarithm are non-stationary but the $\ln R$ is stationary according to the ADF unit root tests in Table B.2 in Appendix B.1.1. At the first step we conducted Bounds tests for the consumption equation whose results are presented in Table B.3 in Appendix B.1.2. While the Bounds F-test statistic shows signals of cointegration, this is not confirmed by the Bounds t-test statistic. There is either no cointegration, or no conclusion can be drawn with respect to the critical values in Table B.1. Therefore, we estimated the equation in differences of the series. The results of the regressions are presented in Table 5.1.

We conducted two regressions for the consumption function. The first specification suffers from heteroscedasticity and the sum of the propensities to consume

out of two income types is superior to unity. In order to overcome this problem, we employed a dummy variable controlling the sharp decline in consumption and income due to the 1997 crisis and used the PW method since otherwise the errors were autocorrelated.⁶ The propensities obtained in the second estimation are more realistic. As expected, the propensity to consume out of wages is higher than that out of profits. The high differential of 0.58 is an indication of wage-led growth, at least for the domestic economy. We use the results of this second specification in our calculations.

5.3.2 Investment equation

The unit root tests show that investment (I) and capital income (R) series in logarithm are stationary while output series ($\ln Y$) is non-stationary. The Bounds t-test shows no indication of cointegration among the series in Table B.4 in Appendix B.1.2. Consequently we estimated the equation in differences of the variables by using two specifications. The regression results are in Table 5.2.

The first regression without dummy variables ended up with a problem of heteroscedasticity. In order to prevent it we added a dummy variables for the 1997 crisis, however, it did not turn out to be significant. The residuals showed that the outlier was the year 1978, and we added a dummy for this year, which became significant. The White test for the first regression shows that the residuals are

⁶We carried out the estimations using the software GRET. Heteroscedasticity, RESET, and CUSUM tests are no available when the PW method is used. However, while the residuals became homoscedastic, autocorrelation among the series was detected by adding the variable $D1998$. We do not report the results of this intermediate estimation.

Table 5.2: Investment equation estimations for Korea (1970-2011)

Dependent variable: $\Delta \ln I$				
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-0.08	-5.69	-0.07	-4.57
$\Delta \ln Y$	2.46***	12.35	2.30***	11.77
$\Delta \ln R$	-0.05	-0.97	-0.05	-1.09
$D1978$	0.15***	3.49	0.12***	3.01
ρ			0.30	
Diagnostics				
R-Squared	0.83		0.84	
Adjusted R-Squared	0.82		0.83	
DW statistic	1.60		1.86	
White's test†	0.60			
ARCH test (1 lag)†	0.41		0.78	
Normality test†	0.12		0.18	
F-test†	0.00		0.00	
RESET test†	0.84			
CUSUM test†	0.82			
Highest VIF	1.10		1.10	

***, ** and * represent 1, 5 and 10

‡The autoregression parameter of the PW Method.

†Probability values of the corresponding tests.

homoscedastic, however, the Durbin-Watson statistic is at the limit (1.60). In order to improve the estimation, we used the PW method in the second estimation. We opt for this specification in our calculations. The results show that profit share is not significant in both of the estimations. While the aggregate demand multiplier is 2.46 in the first estimation, it became 2.30 in the second one, which we employ in our calculations.

5.3.3 Exports equation

We estimated the exports equation with two alternative measures of world demand, a weighted sum of exports (M_{w1}) and a simple sum (M_{w2}), as already stated in Chapter 4. Both series in natural logarithms are integrated of order 1,

while exports ($\ln X$) and relative export prices ($\ln P_x^{rel}$) series are stationary for South Korea. As we previously did for the consumption and investment equations, we applied the Bounds test to the exports equation. The test results in Table B.5 and B.6 in Appendix B.1.2 clearly show no sign of cointegration among exports, world demand and relative export prices series. We estimated the equation in differences of the variables as shown in Table 5.3.

We used two specifications for the two sets of estimations of the exports function with different world demand measures. The first regressions suffer from heteroscedasticity, which is due to the sharp rise and falls in the exports in 1970s. We observe a sudden growth in exports in 1973, at around 56%, in sharp contrast to the contraction by 2% in the aftermath of the oil crisis.⁷ After a few years the Korean economy recovered and in 1976 achieved a 40% growth rate in the exports. In order to solve the problem of heteroscedasticity, we tried several combinations of dummy variables corresponding to those three years. We finally kept all the variables for the years 1973, 1974, and 1976 in the second regressions, in which they are all significant with the expected signs. We employed the PW method to eliminate the autocorrelation.

The results of the second specifications in the both set of regressions show that an increase in the world demand by 1% leads to around 0.3% rise in the exports of the South Korea. However, the magnitude of the coefficients for the relative export prices differ considerably among the regressions with alternative measures of the

⁷In 1973 the South Korean government had launched a program to establish some industries for both import-substituting and export-generating purposes. The government applied subsidizations to capital in new heavy and chemical industries (Hart-Landsberg 1993, p.38).

Table 5.3: Exports equation estimations for Korea (1970-2011)

Dependent variable: $\Delta \ln X$	j=1				j=2			
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Regressors								
Constant	0.10***	5.44	0.09***	5.64	0.10***	5.18	0.09***	5.57
$\Delta \ln M_{w,j}$	0.30***	2.19	0.38***	3.80	0.29**	2.21	0.31***	2.95
$\Delta \ln Price$	-0.53	-1.33	-0.76***	-2.68	-0.40	-1.05	-0.63**	-2.17
$D73$			0.26***	4.21			0.22***	3.28
$D74$			-0.24***	-3.48			-0.22***	-2.98
$D76$			0.21***	3.09			0.24***	3.43
$\rho^{\ddagger}$			0.29				0.24	
Diagnostics								
R-Squared	0.13		0.65		0.13		0.62	
Adjusted R-Squared	0.08		0.60		0.08		0.56	
DW statistic	1.80		1.84		1.80		1.89	
White's test [†]	0.00				0.00			
ARCH test (1 lag) [†]	0.04		0.07		0.08		0.22	
Normality test [†]	0.03		0.72		0.03		0.51	
F-test [†]	0.08		0.00		0.08		0.00	
RESET test [†]	0.31				0.82			
CUSUM test [†]	0.00				0.00			
Highest VIF	1.07		1.32		1.01		1.38	

***, ** and * represent 1, 5 and 10% significance levels, respectively

[†]The autoregression parameter of the PW Method.

[‡]Probability values of the corresponding tests.

Table 5.4: Imports equation estimations for Korea (1970-2011)

Dependent variable: $\Delta \ln M$		
Regressors	Coefficient	t-ratio
Constant	-0.04*	-1.93
$\Delta \ln Y$	2.27***	7.29
$\Delta \ln P/P_m$	0.12	0.97
Diagnostics		
R-Squared	0.73	
Adjusted R-Squared	0.72	
DW statistic	1.66	
White's test†	0.80	
ARCH test (1 lag)†	0.51	
Normality test†	0.22	
F-test†	0.00	
RESET test†	0.90	
CUSUM test†	0.35	
Highest VIF	1.67	

***, ** and * represent 1, 5 and 10% significance levels, respectively.

†Probability values of the corresponding tests.

world demand. The exports are more sensitive (-0.76) to export price variations if the measure of the world demand is M_{w1} . We use the results of this regression in our calculations.

5.3.4 Imports equation

All the variables in the imports equation are I(1) according to the ADF unit root tests. However, we fail to reject the null hypothesis of no cointegration in Table B.7 in Appendix B.1.3. Consequently, we estimated the equation in differences as in Table 5.4.

Estimation results show that domestic to import prices ratio ($\ln P/P_m$) is not significant in determining the imports of South Korea. An increase in the domestic demand by 1% leads to a 2.27 % rise in the imports.

Table 5.5: Domestic prices equation estimations for Korea (1970-2011)

Dependent variable: $\Delta \ln P$				
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.01*	2.00	0.01**	2.38
$\Delta \ln ULC$	0.94***	21.34	0.94***	24.04
$\Delta \ln P_m$	0.02	0.31	-0.04	-0.52
$D74$			0.08***	3.36
Diagnostics				
R-Squared	0.95		0.96	
Adjusted R-Squared	0.95		0.96	
DW statistic	2.12		2.19	
White's test †	0.31		0.95	
Normality test†	0.05		0.07	
ARCH test (1 lag)†	0.74		0.43	
F-test†	0.00		0.00	
RESET test†)	0.44		0.14	
CUSUM test†	0.19		0.85	
Highest VIF	1.62		1.74	

***, ** and * represent 1, 5 and 10% significance levels, respectively.

†Probability values of the corresponding tests.

5.3.5 Domestic prices equation

The ADF unit root tests point to stationarity of the variables in the domestic prices equation. We estimated an OLS in differences of the variables, instead of levels, since we are interested in the short term effects. The regression results are presented in Table 5.5.

We estimated an alternative regression with a dummy variable controlling for the year 1974, when South Korea witnessed an unexpectedly high inflation rate due to the oil crisis. However, adding this variable neither changed the results qualitatively nor the estimated magnitude of the effect of unit labor costs on domestic prices. Both specifications indicate that a 1% increase in the unit labor costs lead to a 0.94% increase in the domestic prices. The import prices have no effect on the domestic prices.

Table 5.6: Export prices equation estimations for Korea (1970-2011)

Dependent variable: $\Delta \ln P_x$		
Regressors	Coefficient	t-ratio
Constant	0.00	0.30
$\Delta \ln P$	0.22***	4.10
$\Delta \ln P_x^{comp}$	0.65***	6.69
Diagnostics		
R-Squared	0.75	
Adjusted R-Squared	0.74	
DW statistic	2.36	
White's test†	0.98	
ARCH test (1 lag)†	0.65	
Normality test†	0.00	
F-test†	0.00	
RESET test†	0.22	
CUSUM test†	0.46	
Highest VIF	1.31	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

5.3.6 Export prices equation

All the variables in the export prices equation are stationary according to the unit root tests. Following the same approach in the previous subsection, we estimated an OLS equation in differences of the variables. The results of the estimation is presented in Table 5.6.

The regressions show that both domestic prices and export prices of the competitors are significant in determining the export prices of South Korea. An increase in the domestic prices by 1% leads to a 0.22% rise in the export prices while the effect of the competitors' prices are almost threefold.

5.4 Evaluation of the econometric results and their comparison with the literature

In this section we evaluate the econometric results found in the previous section and compare them with those found in the literature. The comparison takes place in terms of the estimations of the parameters of the model, marginal effect of a 1% increase in labor income share on GDP components, and overall results.

Onaran and Galanis (2012) had already analyzed the growth regime in South Korea using the single equation methodology described in Section 3.1.1. The estimated consumption propensities out of wages and profits are 0.85 and 0.07, respectively, in the study by the latter; while our findings are 0.71 and 0.13, respectively. Onaran and Galanis (*ibid.*) find no impact of profits on investment, which is in line with our study. The effect of total output on investment (e_{IY}) is 2.51, while our estimation is 2.30.⁸. Onaran and Stockhammer (2005), in their study based on VAR model, find a negative impact of the private share on investment in Korea. However, these results are not comparable with those of Onaran and Galanis (2012) and ours. The exports functions are not directly comparable since the measures of world demand and the relative price variables are different. However they find a positive impact of the world demand on the Korean exports and a negative impact of a rise in export prices, which is parallel to our findings. As for the imports function, which have the same variables and form in both studies, the effect of domestic demand on the imports are identical: 2.27. The impact

⁸This coefficient is 2.46 in the first specification

Table 5.7: Total effect of a 1% increase in the labor income share on the demand in South Korea (1970-2011)

	1970	Mean	2011
Consumption	-0.18	0.12	0.33
Investment	0.00	0.00	0.00
Exports	-0.09	-0.61	-1.75
Imports	0.09	0.00	0.62
Net Exports	-0.18	-0.61	-2.37
Private excess demand	-0.37	-0.49	-2.04
Total effect	-0.82	-1.24	-1.17

of P/P_m on the imports are not significant at 5% in both studies. However, the coefficient in their estimation is significant at 10%. The impact of unit labor costs on domestic prices are 0.75 in their estimation, while ours is 0.95. In both studies import prices do not have an effect on domestic prices at 5%, though at 10% it is significant in their study. The estimations on export prices equations are not directly comparable since the explanatory variables are different.

Following the methodology and the multipliers presented in Section 4.1.2, we calculated the effect of a 1% increase in the labor income share on the GDP components for a constant level of output, private excess demand, and aggregate demand. The marginal effects for the sample as well as at the beginning and the end of the sample are presented in Table 5.7.

The calculations in Table 5.7 show that the aggregate South Korean demand is profit-led, while the domestic demand is wage-led. The variations in the labor share do not have short term impact on the investment and imports. The trade-off between the effects of a rise in labor share is between those on the consumption and the exports. Redistribution of income in favor of wages in the short term has no negative impact on the investment but it might promote consumption. A 1%

increase in labor income share rises consumption by 0.12% for a given level of GDP. However, while the imports are not influenced by such a policy, the exports are expected to decrease by 0.61%, due to increasing unit labor costs. We find that a 1% increase in labor income share leads to a 1.24% decline in the South Korean demand.

The results in the previous study by Onaran and Galanis (2012), which is in general sense comparable with ours in terms of methodology, are partially in contradiction with our findings. While the both studies show that income distribution has no impact on the investment (and imports at 5%), they find that the overall economy as well as the domestic one are wage-led. A 1% increase in labor income share results in a 0.12% growth in GDP. An increasing labor income share's effect on consumption more than offsets its effect exports in their study, while in our study the exports effect is quite strong.

In the last chapter, we provide a further discussion on these results and draw policy conclusions from our findings along with those found in the subsequent chapters.

Chapter 6

Analysis of the demand regime in Thailand

This is the first application of a post-Keynesian model of income distribution and growth on Thailand. In this chapter we firstly describe the structural change in agriculture, and industry and trade policy in Thailand. The second section presents different measures of labor income share and their evolution. The econometric application of the model presented in Chapter 4 to Thailand takes place in the third chapter. In the last section we evaluate the findings of the application of the model to Thailand and compare them with those in the literature on other developing countries. We provide a short discussion on the demand regime in Thailand. Policy conclusions and a general assessment are provided in Chapter 8.

6.1 Structural transformation and macroeconomic performance of Thailand

In this section we focus on the macroeconomic performance of Thailand in association with the structural transformation in agriculture, industry, and international trade after the World War II period.¹

Thailand is an export-led growth economy belonging to the second generation of newly industrialized Southeast Asian countries. Along with the founders of ASEAN, Thailand belongs to the second generation of newly industrialized countries, after the first generation of the four “dragons”. Thailand is also referred as a NAIC (Newly Agro-Industrializing Country) (see, for example, Dixon (1999), Suehiro (2008)).

Thailand was a poor country after the World War II, but now it is a part of the upper middle-income group of countries according to the World Bank. This high rate of growth was achieved due to a strong industrial push during a boom phase (1987-1996) that spurred a dramatic increase of manufacturing exports, which now account for more than 80 % of total exports. During the boom period, Thailand experienced the fastest growth record in the world. The global financial crisis affected Thailand through a shrinking of the world demand for the manufactured goods, rather than through the problems associated with the financial markets. Compared to the precedent Asian crisis in 1997, the effects were less but still

¹For a history of the economic change in Thailand prior to the World War II, see Feeny (1982). For a history of Thailand see Ingram (1971) and Baker and Phongpaichit (2014)

important (Warr 2014).

After the Bowring Treaty of 1855 between United Kingdom and the Kingdom of Siam² the foreign trade of the country had been liberalized. Thai economy from then on grew through agricultural exports. Brown (2004) draws from Ingram (1971) that between the early 1870s and early 1930s, the volume of exports of rice was multiplied by twenty by extension of agrarian land. Brown (2004, p. 17) mentions, citing from Hewison (1989), that “although it appears that the specialization in rice production necessitated no radical break from the pre-capitalist socio-economic structure, significant changes did occur with the rise of a system of peasant commodity production”. He underlines that even though the producers in the rural areas were not completely detached from the means of production, their labor was steadily “formally” absorbed under the capitalist mode of production to serve for market demand. This shows that the transformation of the agriculture from a subsistence to a market based economy has its roots going back to the period before World War II.

The structural change in agriculture was accelerated after the war. The international agencies aimed to increase Thai surplus in rice production to meet the demand of the other devastated Asian countries. The investment in agriculture did not give satisfactory results at the beginning. However, starting from the 1960s rice production and exports increased and Thailand became the number one in rice exports. On the one hand, along with the development in the agriculture the number of households without land or with too little land steadily increased; but

²The former name of Thailand

on the other hand, the proportion of the households below the poverty line in the central region decreased from two-fifths in 1962-63 to one-eighth within a span of 13 years. By the 1970s, around a fifth of households in the central plain and in the northern valley had no land and around one tenth were land-poor. The important transformation led to smallholders' tighter dependence on commercial markets (Baker and Phongpaichit 2014).

In Thailand, employment in agriculture represented around 80% of total employment in 1969. It is down to 42% in 2013. Among those working in agriculture, unpaid family helpers amounted to around 50% of employment in agriculture in 1970. Their share is now down to 17% as many have left for jobs in industry or services, which now accounts respectively for 20% and 38% of total employment. These estimations for employment by industry are taken from the National Statistical Office of Thailand. In the next section we use these data for the estimations of the labor income share in Thailand. Here we present the figures of employment from the WDI database of WB (2014) in Figure 6.1, as we did in the previous chapter on South Korea for comparability with the other countries that we analyze.

It should be mentioned that, although subsistence farming plays an important role for poor farmers, especially those living from upland agriculture, cash crop is dominant in the plain and has allowed farmers to also engage increasingly into wage labor. Less than a quarter of rural people live exclusively from farming activities and around two thirds of their income is derived from off-farm activities (Walker 2012). In 2013, the share of agriculture, industry, and services in value

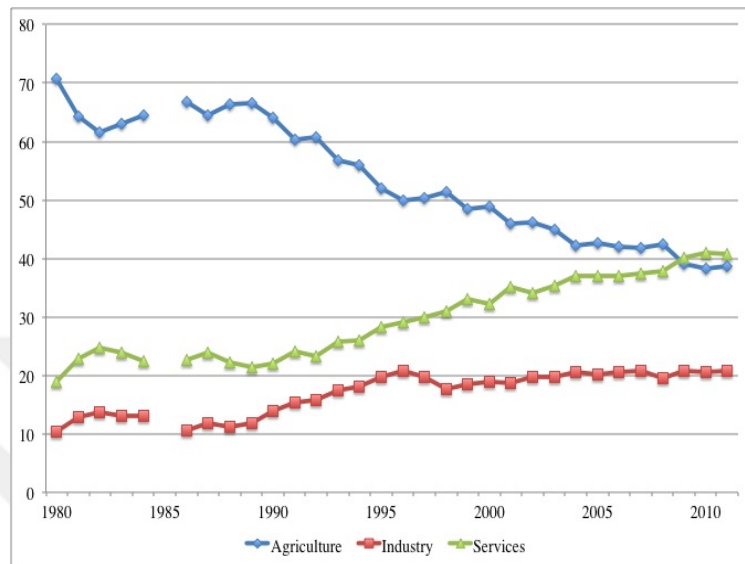


Figure 6.1: Distribution of the workforce across economic sectors in Thailand (% of total employment) (1980-2011)

Source: WDI

added was 9.5%, 43 %, and 47.5%, respectively. The evolution of the sectoral composition of the value added is presented in Figure 6.2.

From the 1950s until the end of 1970s, Thailand adopted an imports substitution policy (Jetin 2012). After the passing of the New Investment Promotion Act in 1977, the economy switched to an export promotion system (Suehiro 2008). The growth in exports was mainly led by manufacturing, which was accompanied by a striking fall in the export share of primary products starting in the early 1980s. However, this decline should be taken with caution since the volume and diversity of the exports of the latter doubled between the period 1986-1994 (Dixon 1999, p.7).³ Among the manufactured goods, agro-industrial products such as tinned

³The data from CHELEM gives a similar picture for 1995. See Figure 6.3.

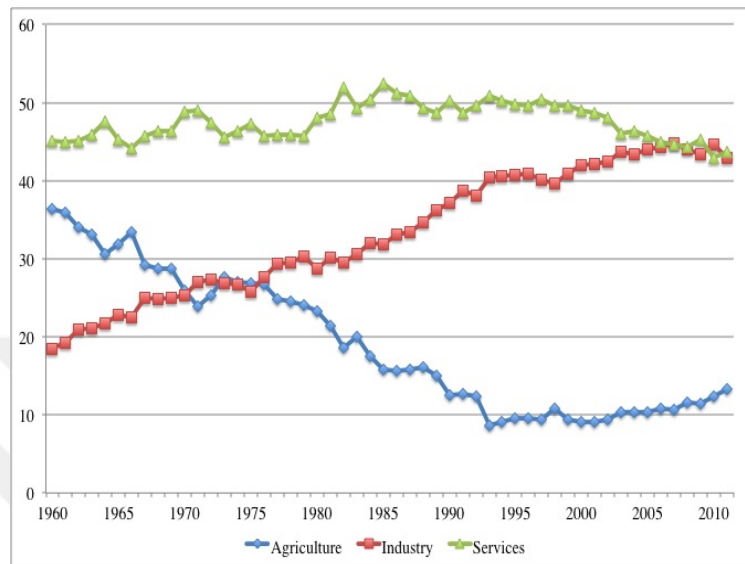


Figure 6.2: Thai GDP by sector composition (% of GDP) (1960-2011)

Source: WDI

fruit, frozen goods etc. have an important share. This is the reason why some researchers consider Thailand as a NAIC (Dixon 1999, p.9). The primaries constitute around 10% of the total exports by 2013. Starting from the 1980s until the 1997 Asian crisis, the share of equipment goods among the manufactured goods increased. Since then its share has been steady and in 2013 it is around 25%. Figure 6.3 depicts the evolution of the composition of Thai exports with respect to stages of production.

The composition of imports has also changed in the course of time. The import share of primary products has dramatically declined from 30% at the beginning of 1980s to around 10% until the Asian financial crisis. Dixon (ibid.) states that the reasons behind are the exploitation of the oil and gas reserves in the Gulf of

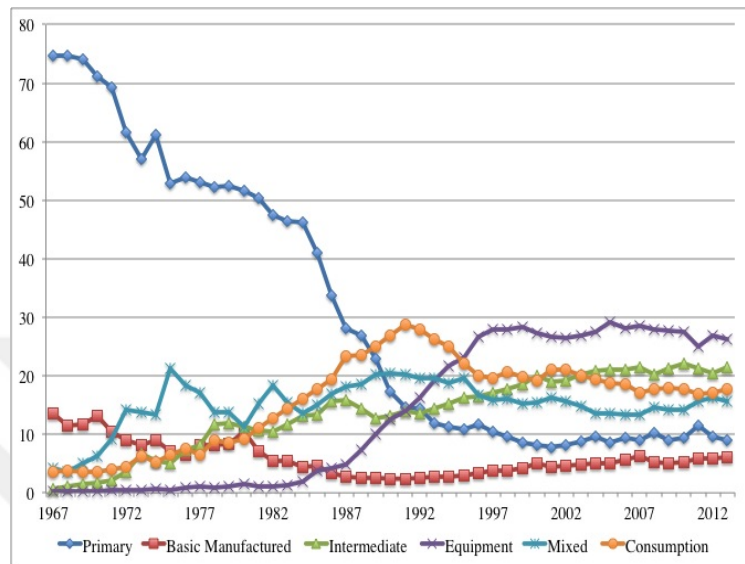


Figure 6.3: Composition of Thai exports with respect to stages of production (% of total exports)(1967-2013)

Source: CHELEM

Thailand and the increase in the imports of machinery, non-consumer manufactured goods, components, and raw materials. However, after the crisis we observe an increasing trend of this share, which is around 20% by 2013. Within the same period, an inverse trend is observed in both equipment and intermediate goods, the former being more volatile. Those goods, separately, constitute 20% of the total imports by 2013. See Figure 6.4). Dixon (1999) underlines that the Thai manufacturing had become deeply dependent on imports from Japan and the NIEs.

All these elements indicate that Keynesian policies have become more applicable in Thailand in the course of time. In this respect, the analysis of the subsample that covers the last three decades is expected to give more reliable results in terms of applicability of our post-Keynesian model to Thailand. We firstly an-

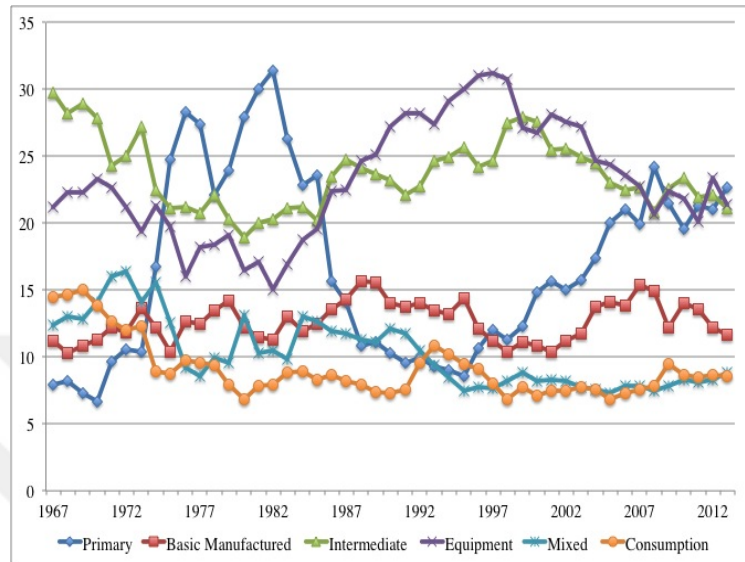


Figure 6.4: Composition of Thai imports with respect to stages of production (% of total imports)(1967-2013)

Source: CHELEM

alyze the period 1970-2011 in Section 6.3 and then restrict the period of analysis to 1980-2011 in Section 6.3.7.

Warr (2014) periodizes the economic growth of Thailand into seven distinct stages: Pre-boom (until 1987), boom (1987-96), Asian financial crisis (1997-99), recovery from the Asian financial crisis (2000-07), global financial crisis (2008-09), and recovery from the global financial crisis (from 2010 on). The growth rates during those periods are shown in Table 6.1.

The shift in the growth policy in 1970s altered the shares of the GDP components in the course of the time. Exports to GDP ratio (X/Y) leaped up to 80% in 2013 from its level of 20% in 1980s. Along with the exports, accompanies a similar trend of the imports to GDP ratio (M/Y), which oscillated in the range of

Table 6.1: Average per annum growth of GDP and its sectoral components in Thailand (1968-2012)

Period	Pre-boom 1968-86	Boom 1987-96	Asian Crisis 1997-99	Recovery 2000-07	Global Crisis 2008-09	Recovery 2010-12	Whole Period 1968-2012
Total GDP	6.7	9.5	-2.5	5.1	0.1	4.8	6
Agriculture	4.5	2.6	0.1	3.2	2.8	2.8	3.4
Industry	8.5	12.8	-1.7	6.1	-0.9	4.2	7.6
Services	6.8	9	-3.6	4.5	0.6	5.9	5.9

Source: Warr (ibid., p.417), gathering data from Bank of Thailand, National Economic and Social Development Board (NESDB) of Thailand and the World Bank.

30-40% until the second half of 1980s. This ratio has reached, as well, to 80%, with sharp falls during the two crises. We observe that the already declining trade deficit had widened during the boom period of 1987-1996. However, from the Asian financial crisis until now, a trade surplus is achieved. The share of investment increased from 1960s until the crisis and peaked at 52% in 1996. The slump after the crisis has not recovered and the investment share has been oscillating around one quarter of the Thai GDP.

The share of consumption has also been steadily decreasing. In the next section we present the change in labor income share, which has also been decreasing since 1970s. The evolution of the components of the Thai GDP are presented in Figure 6.5.

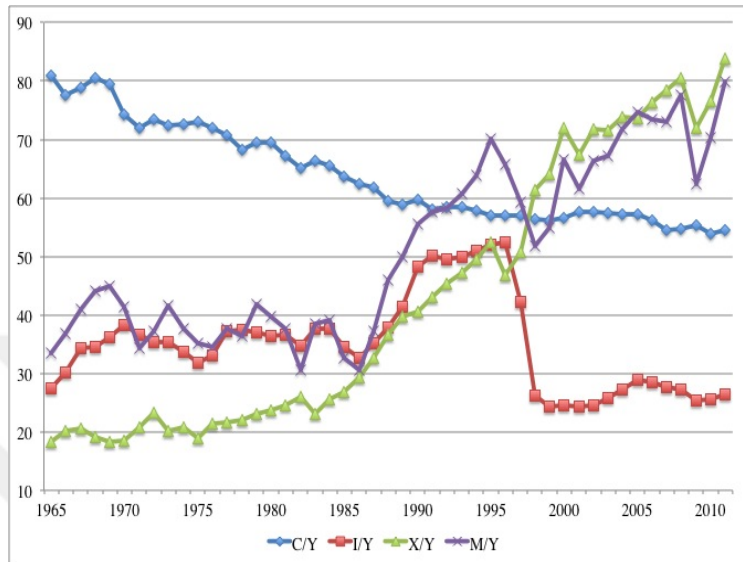


Figure 6.5: Evolution of GDP components by expenditure in Thailand (% of GDP) (1965-2011)

Source: WDI

6.2 Labor income share in Thailand

In this section we present four alternative measures for the Thai labor income share ALS , which are already described in Subsection 4.2.2.

Except from limited periods of time, Thai workers have never fully benefited from the growth cycle described above because their real income have lagged behind productivity gains contributing toward achieving a high profit rate in the Thai economy as a whole and in particular in manufacturing (Jetin 2012). Nonetheless, industrialization and the high growth rate induced a profound structural change of the Thai society, which is reflected in the reduction of poverty incidence, the change in employment structure and the increase of income inequality. In 2013,

absolute poverty headcount is close to 0% of the population according to the PPP \$ 1.25 international poverty line of the World Bank, and 10% according to the national poverty line in 2013, down from respectively 17.2% and 65.2% in 1988 when the boom period kicked off. The Gini coefficient of income inequality rose from 0.42 in 1962 to 0.53 in 2006 (Warr 2009).

The calculations of the labor share are based on the National Income and Product Accounts (NIPA) provided by the NESDB of Thailand. Wage earners' income is registered as compensation of employees while that of own-account workers (such as farmers, shop retailers, barbers, doctors, lawyers etc.) is registered as OSPUE. Family helpers live with own-account workers and receive an income in kind or small amount of money from own-account workers, usually the head of the family. This means that OSPUE is shared between own-account workers and family helpers. In 1970, OSPUE amounted to 66% of GDP at factor cost while the share of compensation of employees amounted to 25%. As of 2011, OSPUE had decreased to 35% and the compensation share of employees was up to 42%. The decrease in OSPUE share is explained by a decline in the income of both farmers and other own-account workers. Figure 6.6 shows the evolution of different measures of labor income share along with the share of compensation of employees and OSPUE in Thailand.

One can see that measured only by compensation of employees, the Thai labor share almost doubled in 34 years due to the fast process of industrialization and the growing gap between employees' compensation and self-account workers' income in the farm sector. However, during the years 2000, the share of employees'

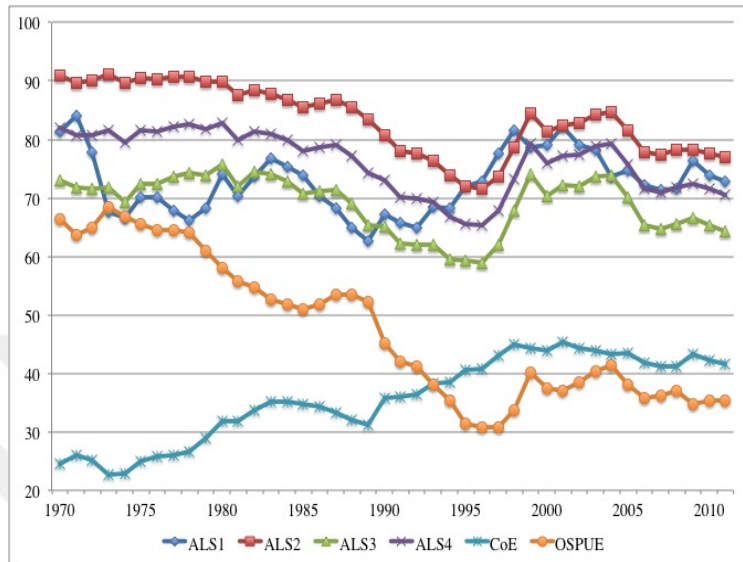


Figure 6.6: Labor income, compensation of employees, and OSPUE in Thailand (% of GDP at factor cost) (1970-2011)

Source: Based on Jetin (2012) and updated by the article's author

compensation in GDP lost its impetus and stagnated around 40%, which reflects the stabilization of the structural change. ALS_1 , which imputes the compensation of employees to all self-account workers, has a much higher average over the period and shows no clear long-term trend. ALS_2 and ALS_3 give the lower and upper bounds of the labor share because the former attributes all mixed income to labor and the latter part of it only. The average of both, ALS_4 , although far from perfect is our preferred estimate because it avoids too unrealistic hypotheses. There is a downward trend from 1970 to 1996 when the industrialization boom ends. The increase that follows is due to the sharp Asian crisis of 1997, when profits plummeted. With the return to growth in the years 2000, ALS_4 resumed its decline. In 2011, ALS_4 was around 11% below its level of 1970. The

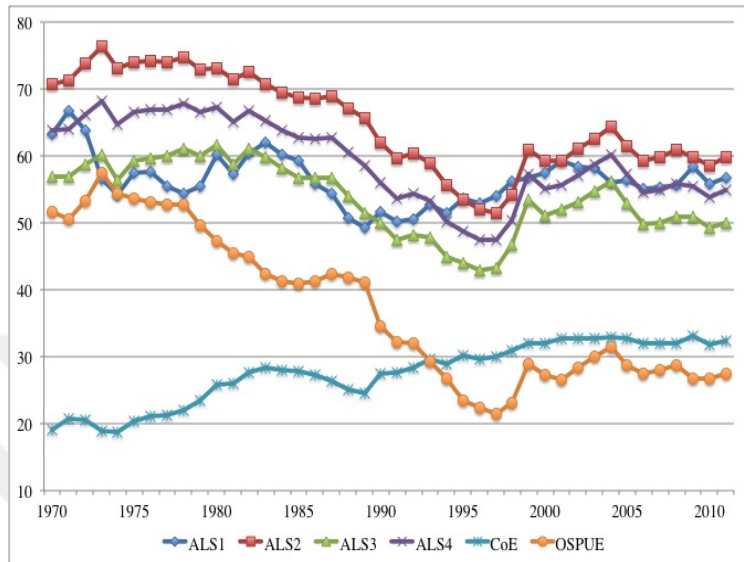


Figure 6.7: Labor income, compensation of employees, and OSPUE in Thailand (% of GDP at market prices) (1970-2011)

Source: Based on Jetin (2012) and updated by the article's author

decline in labor income share becomes more visible and increase in the share of compensation of employees is more modest when they are calculated as a share of GDP at market prices as in Figure 6.7.

6.3 Econometric analysis of the demand regime in Thailand

We estimated our model described in Chapter 4.1 over the sample period 1970-2011, and the sub-period 1980-2011. We followed the methodology described in Section 4.3. The ADF tests did not give straightforward results for the estimation

of the equations. ULC and the price indicators (except the domestic prices) turn out to be stationary and all the other variables are $I(1)$ for the full sample at 5% significance level. The results of the ADF tests are in Table B.8 in Appendix B.2.1.

6.3.1 Consumption equation

Since $\ln C$, $\ln W_i$ and $\ln R_i$ ⁴ series are all found to be $I(1)$ according to the ADF tests, we firstly tested cointegration among consumption, and labor and capital income series via Bounds and Engle-Granger tests. The results of the Bounds tests are in Tables B.10 and B.11 in Appendix B.2.2, and those of the EG tests are in Table B.36 in Appendix B.2.3. The F-test statistic of the Bounds tests, in some cases, point to cointegration; however, the t-test does not confirm these indications. The EG tests clearly show that there is no long-run relationship among $\ln C$, $\ln W_i$, and $\ln R_i$. Consequently, we estimated the consumption equation in first differences. The estimations are presented at Table 6.2.

e_{CW} is higher than e_{CR} for the four measures of income distribution ranging from 0.49 to 0.65, whereas those of e_{CR} are between 0.16 and 0.24. ALS_1 registers the highest differential between the elasticities (0.49) while for the three other adjusted labor shares it is in the range 0.25-0.38.

⁴ i is the index of different ALS . W_i and R_i are the corresponding labor and capital incomes, respectively.

Table 6.2: Consumption equation estimations for Thailand (1970-2011)

Dependent variable: $\Delta \ln C$									
Regressors	i=1			i=2			i=3		
	Coefficient	t-ratio		Coefficient	t-ratio		Coefficient	t-ratio	
Constant	0	0.69		0.01	1.11		0.01	1.19	
$\Delta \ln W_i$	0.65***	9.05		0.55***	6.66		0.49***	6.27	
$\Delta \ln R_i$	0.16***	7.92		0.17***	5.96		0.24***	6.85	
Diagnostics									
R-Squared	0.76			0.69			0.69		
Adjusted R-Squared	0.74			0.67			0.67		
DW statistic	1.87			1.76			1.75		
Heteroscedasticity test [†]	0.72			0.05			0.71		
ARCH test (1 lag) [†]	0.94			0.17			0.22		
Normality test [†]	0.61			0.52			0.89		
F-test [†]	0.00			0.00			0.00		
RESET test [†] (with squares)	0.22			0.07			0.05		
CUSUM test [†]	0.82			0.89			0.99		
Highest VIF	1.05			1.00			1.00		

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[†]Probability values of the corresponding tests.

6.3.2 Investment equation

$\ln I$, $\ln Y$, and $\ln R_i$ series are $I(1)$ according to the ADF tests. As in the previous section, we tested for cointegration through Bounds tests and EG methods.⁵ EG test rejects cointegration, but the results with the Bounds test are less clear cut for some measures of ALS . At the first sight there seems to be cointegration according to Bounds F-test and t-test statistics. However, after inclusion of the dummy variable $D9798$ ⁶ in the regressions, cointegration can not be confirmed according to the Bounds t-tests. For the other measures of LS , Bounds test statistics of the ARDL regressions with and without $D9798$ do not reject the null of no cointegration. Consequently, we estimated the regressions in first differences of the variables, with and without $D9798$. The results of the regressions for the four labor income shares are shown in Tables 6.3 and 6.4.

The regression results show that e_{IY} lies between the range 2.55-2.97, but this interval is not robust to inclusion of the crisis variable into the equation, which shifts the interval to 2.12-2.40. As for the e_{IR} , the significance of the coefficient depends on the specification and the measure of capital income employed in the equation. The regressions with the profits calculated with respect to ALS_2 , ALS_3 and ALS_4 result in coefficients of 0.17, 0.22 (significant at 10%), and 0.23, respectively. However, the coefficients become insignificant with addition of the dummy variable, which is highly significant and reflects the negative impact of

⁵See Tables B.12, B.13, B.14, and B.15, and B.36 in Appendix B.2.2 for the Bounds tests and EG methods, respectively.

⁶This variable is employed to take into account the 1997 Asian financial crisis and takes the value 1 for 1997 and 1998; 0 otherwise. This variable enables us to capture the sharp fall in investment after the 1997 crisis, which constitutes an outlier of the growth rate of the $\ln I$ series.

Table 6.3: Investment equation estimations for Thailand (1970-2011) Panel 1/2

Dependent variable: $\Delta \ln I$	i=1			i=2		
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Regressors						
Constant	-0.12	-6.45	-0.07	-4.45	-0.11	-7.24
$\Delta \ln Y$	2.97***	10.4	2.40***	9.44	2.61***	10.05
$\Delta \ln R_i$	-0.03	-0.5	-0.07	-1.23	0.17**	2.08
D9798			-0.2***	-4.56		
$\rho^\dagger$	0.25			0.16	-0.18***	-3.89
Diagnostics						
R-Squared	0.84		0.89		0.85	
Adjusted R-Squared	0.83		0.88		0.85	
DW statistic	1.82		1.72		1.82	
F-statistic [†]	0.00		0.00		0.00	
White's test [†]			0.21		0.51	
Normality Test [†]	0.26		0.28		0.07	
RESET test [†] (with squares)			0.13		0.12	
CUSUM test [†]			0.09		0.07	
ARCH test (1 lag) [†]	0.96		0.51		0.39	
Highest VIF	1.50		2.08		1.66	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[†]The autoregression parameter of the PW Method.

[†]Probability values of the corresponding tests.

Table 6.4: Investment equation estimations for Thailand (1970-2011) Panel 2/2

Dependent variable: $\Delta \ln I$		i=3			i=4		
Regressors		Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant		-0.11***	-7.41	-0.07***	-4.31	-0.11***	-7.55
$\Delta \ln Y$		2.57***	8.82	2.14***	7.89	2.55***	9.01
$\Delta \ln R_i$		0.22*	1.91	0.11	1.01	0.23**	2.12
D9798				-0.18***	-3.9		
$\rho^{\ddagger}$						-0.18***	-3.87
Diagnostics							
R-Squared		0.84		0.90		0.85	
Adjusted R-Squared		0.84		0.88		0.84	
DW statistic		1.64		1.75		1.64	
F-statistic		0.00		0.00		0.00	
White's test		0.00		0.02		0.00	
Doomik-Hansen normality test		0.56		0.10		0.55	
= RESET test (with squares)		0.00		0.11		0.00	
CUSUM test		0.04		0.08		0.03	
ARCH test (1 lag)		0.17		0.29		0.17	
Highest VIF		1.96		2.34		1.88	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

$\ddagger$ The autoregression parameter of the PW Method.

$\dagger$ Probability values of the corresponding tests.

the crisis on investment during the years 1997-1998. We base our final calculations on the specification with the dummy variable $D9798$; but, as a crosscheck, we also consider this non-robust effect of the capital income on investment in determination of the character of the growth regime.

6.3.3 Exports equation

The ADF tests show that the $\ln X$, $\ln M_{w_1}$ and $\ln M_{w_2}$ series are $I(1)$; however, the $\ln P_x^{rel}$ turns out to be stationary. Since the variables are integrated of different orders we applied the Bounds test in order to test for cointegration among the variables. These tests rejected cointegration among the exports, total world demand (with the two alternative measures) and the relative export prices of Thailand (see Table B.16 in Appendix B.2.2). As a result, we estimated the equation in first differences of the variables. The results of the regressions are shown in Table 6.5.

We obtain identical results with the two alternative measures of the world imports. The coefficients have almost the same magnitudes and they are highly significant. The growth of the world demand by 1% leads to 0.3 % growth in the exports of Thailand. The impact of international price competition is also substantial. A 1% increase of the relative prices of the exported products shrinks the exports by around 0.7 %.

Table 6.5: Exports equation estimations for Thailand (1970-2011)

Dependent variable: $\Delta \ln X$	j=1		j=2	
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.06***	3.35	0.06***	4.41
$\Delta \ln M_{wj}$	0.30***	3.15	0.30***	2.9
$\Delta \ln P_x^{rel}$	-0.66***	-3.28	-0.67***	-2.93
$AR2_{\ddagger}$	0.35**	2.26		
Diagnostics				
R-Squared	0.26		0.32	
Adjusted R-Squared	0.23		0.28	
DW statistic	1.91		1.80	
Heteroscedasticity test [†]	0.38			
ARCH test (1 lag) [†]	0.45		0.25	
Normality test [†]	0.28		0.77	
F-test [†]	0.00		0.00	
RESET test [†] (with squares)	0.07			
CUSUM test [†]	0.96			
Highest VIF	1.06		1.04	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[‡]The autoregression parameter of order 2

[†]Probability values of the corresponding tests.

6.3.4 Imports equation

The imports equation has similar characteristics with the exports equation in terms of the econometric properties of the series. The series $\ln M$ and $\ln Y$ are non-stationary but the $\ln P/P_m$ series are stationary. Bounds test shows no sign of cointegration among the series (see Table B.17 in Appendix B.2.2). We estimated the regressions using the first differences of the variables. The results of the regressions are displayed in Table 6.6.

Both coefficients are highly significant. The imports are more sensitive than the exports to the relative prices; a rise in the relative prices by 1% tends to increase the imports by 0.91% for a given level of domestic demand.

Table 6.6: Imports equation estimations for Thailand (1970-2011)

Dependent variable: $\Delta \ln M$		
Regressors	Coefficient	t-ratio
Constant	-0.01	-0.58
$\Delta \ln Y$	1.67***	4.51
$\Delta \ln P / P_m$	0.91***	3.91
Diagnostics		
R-Squared	0.63	
Adjusted R-Squared	0.61	
DW statistic	2.25	
Heteroscedasticity test [†]	0.62	
ARCH test (1 lag) [†]	0.89	
Normality test [†]	0.59	
F-test [†]	0.00	
RESET test [†] (with squares)	0.23	
CUSUM test [†]	0.58	
Highest VIF	1.25	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[†]Probability values of the corresponding tests.

6.3.5 Domestic prices equation

The ADF test indicates that $\ln P$ series are non-stationary, but the two explanatory variables $\ln P_m$ and the four measures of $\ln ULC$ are stationary. We conducted Bounds tests with and without two dummy variables that control for the 1973 petrol crisis ($D7374$) and the 1997 Asian financial crisis ($D9798$), which had unprecedented inflationary and deflationary effects on the evolution of the domestic prices in Thailand, respectively. The tests do not verify existence of cointegration among domestic and import prices, and unit labor costs, which are calculated according to the four measures of ALS ⁷. Hence we estimated the equations in first differences of the variables. We present the estimations of two specifications for each of the unit labor cost measures in Tables 6.7 and 6.8.

⁷See the appendices B.18, B.19, B.20, and B.21 for the Bounds tests

We also included the two dummy variables in the regressions. Addition of these variables eliminated heteroscedasticity. The estimations display the variability of the significance and magnitude of the coefficients depending on the measure of unit labor costs. The regressions with $\ln ULC_1$ point that μ lies between 0.63 and 0.80. The magnitude of this coefficient is quite influential on the characterization of the growth regime due to its direct effect on the domestic prices and its indirect effect on the export prices. η takes the values 0.23 and becomes insignificant when the two dummy variables are added. For our calculations we opt for the second specification in which the dummy variables are included. The regressions with $\ln ULC_2$ give less variable results. μ is between the range of 0.67 and 0.75, while the η is within the range 0.21-0.27. Since the dummy variable of the 1973 crisis is not significant, we employ the specification that only includes the dummy variable of the 1997 crisis. As for the regressions with $\ln ULC_3$, μ is within the interval 0.55-0.69, and η is between 0.19 and 0.23. Finally, the last set of regressions with the fourth measure of the unit labor costs indicates that those intervals are 0.60-0.73 and 0.18-0.23, respectively. We employ the second specifications in those regressions, as well.

Table 6.7: Domestic prices equation estimations for Thailand (1970-2011) Panel 1/2

Dependent variable: $\Delta \ln P$			ALS_1			ALS_2		
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.00	-0.1	0.01	1.58	0.00	0.29	0.00	1.3
$\Delta \ln U/LC_i$	0.80***	7.75	0.63***	6.13	0.75***	13.56	0.67***	10.6
$\Delta \ln P_m$	0.23**	2.07	0.11	1.12	0.21***	2.87	0.17***	3.07
$D7374$			0.09***	3.42				
$D9798$			-0.09***	-3.16			-0.07***	-2.77
$\rho^\ddagger$					0.42		0.30	
Diagnostics								
R-Squared		0.76		0.84		0.89		0.91
Adjusted R-Squared		0.74		0.83		0.89		0.90
DW statistic		2.11		1.80		1.95		1.93
White's test [†]		0.38						
ARCH test (1 lag) [†]		0.70		0.78		0.35		0.57
Normality test [†]		0.20		0.71		0.78		0.77
F-test [†]		0.00		0.00		0.00		0.00
RESET test [†]		0.00						
CUSUM test [†]		0.86						
Highest VIF		2.09		2.04		1.75		1.91

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[†]The autoregression parameter of the PW Method.

[‡]Probability values of the corresponding tests.

Table 6.8: Domestic prices equation estimations for Thailand (1970-2011) Panel 2/2

Dependent variable: $\Delta \ln P$			ALS_3			ALS_4		
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	Coefficient	t-ratio	t-ratio
Constant	0	0.14	0.01*	1.76	0	0.01	0.21	1.59
$\Delta \ln ULC_i$	0.69***	9.75	0.55***	7.77	0.73***	0.60***	11.77	9.03
$\Delta \ln P_m$	0.27***	2.95	0.19***	2.3	0.23***	0.18**	2.88	2.31
$D7374$			0.06**	2.13		0.05*		1.91
$D9798$			-0.11***	-4.01		-0.09***		-3.48
$\rho^{\ddagger}$	0.32		0.23		0.38	0.30		
Diagnostics								
R-Squared	0.82		0.88		0.87		0.90	
Adjusted R-Squared	0.81		0.87		0.86		0.89	
DW statistic	1.88		1.95		1.82		1.93	
F-test	0.00		0.00		0.00		0.00	
Normality test	0.55		0.78		0.66		0.77	
ARCH test (1 lag)	0.23		0.35		0.18		0.57	
Highest VIF	1.33		1.75		1.36		1.91	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

$\ddagger$ The autoregression parameter of the PW Method.

$\dagger$ Probability values of the corresponding tests.

6.3.6 Export prices equation

As already stated, ADF test indicates that $\ln P$ series are non-stationary; however, the $\ln P_x$ and $\ln P_x^{comp}$ series are stationary. Bounds tests, at the first sight, show no sign of cointegration; however, including the dummy variables $D7374$ and $D9798$ into the ARDL equation alters the results, as in the specifications 4, 5, 6, and 8 in Table B.16 in Appendix B.2.2. At 5% the Bounds t-test rejects the null of no cointegration. We estimate an ECM model with long-run and short-run equations, respectively, as below:

$$\ln P_x = constant + \tau_{LR} \ln P_x^{comp} + \lambda_{LR} \ln P + u_t \quad (6.1)$$

$$\Delta \ln P_x = constant + \tau_{SR} \Delta \ln P_x^{comp} + \lambda_{SR} \Delta \ln P + \psi \hat{u}_{t-1} + v_t \quad (6.2)$$

where τ_{LR} and λ_{LR} are the long-run, and τ_{SR} and λ_{SR} are the short-run coefficients. $\hat{u}_t$ are the residuals retrieved from the long-run equation 6.1 and ψ is the adjustment coefficient. We estimated two short-run equations. The first one is without dummy variables, and in the other we included $D7374$. We also tried another regression with $D9798$, which we do not present, however the dummy variable was not significant. The regressions results are presented in Table 6.9.

The first specification suffers from heteroscedasticity but the variable $D7374$ overcomes this problem. We adopt the parameters from the second equation for

Table 6.9: Export prices equation estimations via ECM for Thailand (1970-2011)

Dependent variable	$\ln P_x$		$\Delta \ln P_x$	
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-0.04	-3.18	0.00	0.32
$\ln P$	0.80***	8.12		
$\ln P^{comp}$	0.25***	2.31		
$\Delta \ln P$			0.43***	3.69
$\Delta \ln P_x$			0.56***	3.80
EC			-0.38***	-2.98
$D7374$			0.13***	5.09
Diagnostics				
R-Squared	0.99		0.72	
Adjusted R-Squared	0.99		0.69	
DW statistic	1.74		1.64	
White's test†	0.03		0.71	
ARCH test (1 lag)†	0.98		0.72	
Normality test†	0.05		0.29	
F-test†	0.00		0.00	
RESET test†	0.00		0.02	
CUSUM test†	0.40		0.10	
Highest VIF	1.97		2.09	

***, **, and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

our calculations.

The long-run equation shows that at the effect of a 1% increase in the domestic prices on the export prices of Thailand is 0.8% and that in the export prices of competitors on the export prices is 0.25%. The error correction coefficient EC , being significant and negative, indicates that a short-run deviation from the equilibrium is adjusted by 37% in the succeeding year. As for the short-run, the second estimation shows that the impact of a 1% increase in the domestic prices on export prices is 0.32%, and that in the export prices of competitors is 0.47%.

Along with the ECM, we estimated a simple difference equation as in the other equations for comparison. The results of the estimations are reported in Table 6.10

Table 6.10: Export prices equation estimations in first differences of the variables for Thailand (1970-2011)

Dependent variable: $\Delta \ln P_x$				
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.01	0.65	0.01	1.06
$\Delta \ln P$	0.42***	3.32	0.31***	2.89
$\Delta \ln P_x^{comp}$	0.51***	3.16	0.41***	3.1
$D7374$			0.13***	4.39
Diagnostics				
R-Squared	0.65		0.77	
Adjusted R-Squared	0.63		0.75	
DW statistic	1.74		1.64	
F-statistic†	0.00		0.00	
White's test†	0.03		0.71	
Normality test†	0.05		0.29	
RESET test (with squares)†	0.00		0.02	
CUSUM test†	0.40		0.10	
ARCH test (1 lag)†	0.98		0.72	
Highest VIF	1.97		2.09	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

Since the 1973 petrol crisis ceiled the export prices, we added the dummy

variable $D7374$ in the regressions. Addition of this variable not only solved the heteroskedasticity problem, but also being highly significant, it reflects the inflationary impact of the petrol shock on the export prices. We also tried a third specification, which we do not report here, by including the dummy variable for the Asian crisis, but this variable was not significant. As in the ECM, the second estimation is more convenient.

Comparing the ECM estimation (Equations 6.1 and 6.2) and the simple OLS estimation in differences (Equation 6.10) we observe that the estimated coefficients λ_{SR} (0.32) and λ (0.31) are identically the same. However, the coefficients τ_{SR} (0.47) and τ (0.41) differ significantly. The effect of the crisis is around 0.13 in both of the equations. We opt for the parameters of the OLS estimation in first differences of the variables for our calculations.

6.3.7 Sub-period analysis of the demand regime in Thailand

The motivation behind using a subsample after 1980s is twofold. The first reason is, as discussed in Section 4.4, the impact of what Dutt (1996) calls “agriculture constraint”. LDCs are constrained by low-productive agriculture, which despite being overstaffed finds it hard to supply enough food for the population. According to Dutt, the more the agriculture constraint is relaxed and the country industrializes, the more Keynesian policies become relevant for LDCs. The second reason is that an analysis of the sub-period 1980-2011 gives us the opportunity to cross check the results obtained for the entire sample. We skip the intermediate stages of the econometric investigation, e.g. estimations of the model equations, whose

results are tabulated in Appendix B.2.4. We evaluate the findings of this analysis in the next section.

6.4 Evaluation of the findings and their comparison with literature

In this section we evaluate the econometric results found in the previous section and compare them with those found in the literature on other developing countries. The comparison takes place in terms of the estimations of the parameters of the model, marginal effect of a 1% increase in labor income share on GDP components, and overall results. We also discuss the findings of the subsample analysis.

Following the methodology presented in Section 4.1.2, we calculated the effect of a 1% increase in the labor income share on consumption for a given level of output. The marginal effects for the sample as well as at the beginning and the end of the sample are presented in Table 6.11.

We obtain different results at the sample mean, at the beginning, and the end of the period of the sample as shown in Table 6.11. For the whole period, the effect is positive for ALS_1 , which imputes the average compensation to own-account workers, and negative for the three other adjusted labor shares which include the income of own-account workers. The marginal total effect on consumption suggests that a 1% increase in the labor income share leads to a 0.24% rise in the consumption, for a given level of production, when ALS_1 is considered. For the

Table 6.11: Effect of a 1% increase in the labor share on the consumption in Thailand

	ALS_1	ALS_2	ALS_3	ALS_4
1970	-0.03	-1.23	-0.22	-0.51
Mean	0.24	-0.42	-0.07	-0.2
2011	0.22	-0.02	0.06	0.01

other measures of labor shares we obtain a decrease in the consumption ranging from 0.07 to 0.42%. This confirms that as far as consumption is concerned, demand is profit-led in Thailand when own-account workers' income is taken into consideration. A redistribution of income in favor of labor is more likely to raise consumption at the end of the period.

The possibility of a such phenomenon, though in contradiction with the a priori hypothesis $\frac{\partial C}{\partial LS} > 0$, has recently been discussed within the post-Keynesian framework by Stockhammer and Stehrer (2011) and Kapeller and Schutz (2015). The former authors, in their empirical analysis based on Goodwin (1967) and Kalecki, name the occurrence of a such effect as “perverse consumption differential” and observe it at the U.K., Ireland, Australia, and the U.S. They state that their framework does not explain this phenomenon but add that missing variables might be the underlying reason. They suggest that some factors such as strong wealth effects in consumption might engender such a case. The latter authors develop the “perverse effects” on theoretical grounds drawing from the *conspicuous consumption* concept of Veblen and placing it in the post-Keynesian framework of wage-led vs. profit-led growth regimes. They show, in two different cases, that, a decrease in labor's income share might have different impacts on the labor class if

it is composed of heterogeneous workers. In their model, in which the labor class is composed of two types of workers, a decrease in the labor share is only passed on one type of the workers (type 2), while the other's share stays constant (type 1). In such a setting, the type 2 workers, facing a reduction in their wages, try to keep up with the consumption levels of the type 1 workers through increasing their consumptions with or without debt burden. Thus the relative consumption concerns of the type 2 workers might lead to two cases of consumption-driven profit-led regimes. In the Thai case, our findings might be a sign of a such segregation within the labor class. Further investigation on the composition of the labor class in Thailand and their corresponding saving rates and consumption behavior are required in order to highlight these results.

The findings on the investment function are in line with the results found for South Korea in the previous chapter. Investment does not depend on profits in the short term according to several studies on developed and developing countries. Exports and imports functions give the expected results. The effect of a 1% increase in the labor income share on demand growth in Thailand is shown in Table 6.12, along with its impact on the GDP components.

The results clearly indicate that the economy is profit-led with respect to the four different measures of the labor income share. The effect of a 1% increase in the labor share shrinks the GDP by around 2% for most of the adjusted labor income shares. In the case of ALS_2 , the decline in GDP approaches to 3%. The results are even stronger when the non-robust effects are considered. Our final results show that the total effect of a change in the distribution of income is the

Table 6.12: Total effect of a 1% increase in the labor income share on the demand in Thailand

	ALS_1			ALS_2			ALS_3			ALS_4		
	1970	Mean	2011	1970	Mean	2011	1970	Mean	2011	1970	Mean	2011
Consumption	-0.03	0.24	0.22	-1.23	-0.43	-0.02	-0.22	-0.07	0.06	-0.51	-0.20	0.01
Investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment [†]	0.00	0.00	0.00	-0.74	-0.41	-0.20	-0.32	-0.26	-0.17	-0.48	-0.34	-0.20
Exports	-0.08	-0.22	-0.40	-0.08	-0.22	-0.45	-0.06	-0.16	-0.32	-0.07	-0.18	-0.37
Imports	0.51	1.07	1.09	0.46	1.14	1.04	0.57	0.84	1.24	0.51	0.95	1.13
Net Exports	-0.59	-1.29	-1.50	-0.54	-1.36	-1.48	-0.63	-1.00	-1.57	-0.58	-1.13	-1.50
Private excess demand (h_2)	-0.62	-1.05	-1.27	-1.77	-1.80	-1.51	-0.85	-1.07	-1.50	-1.08	-1.33	-1.49
Total effect ($h_2/(1 - h_1)$)	-1.59	-1.98	-1.23	-3.76	-2.63	-1.54	-1.59	-1.62	-1.07	-2.24	-1.95	-1.25
Private excess demand (h_2) [†]	-0.62	-1.05	-1.27	-2.51	-2.21	-1.71	-1.17	-1.33	-1.67	-1.57	-1.67	-1.69
Total effect ($h_2/(1 - h_1)$) [†]	-1.59	-1.98	-1.23	-5.06	-3.23	-1.67	-2.15	-2.00	-1.18	-3.08	-2.46	-1.39

[†]Calculated with the non-robust e_{IR} coefficients.

highest found until now by the literature. In the case of China, which is also an example of an export-led economy, Onaran and Galanis (2012) using what we called ALS_1 in our article found that a 1% increase in the profit share has a total effect of 1.57% on growth, the highest total effect of their sample while Molero-Simarro (2015) found a total effect of 0.01%. Our results are robust to various estimates of the labor income share and reveals the strong dependency of Thailand on foreign markets due to its high export and import to GDP ratios and its sensitivity to price competitiveness in the past decades.

The findings for the subsample 1980-2011 gives a slightly different picture. As for the consumption function, we obtain similar results as in the analysis of the entire sample. However, globally, the negative effects are smaller in absolute value for ALS_2 to ALS_4 and the positive effects are higher for ALS_1 . This reflects the greater influence of wage labor in the economy and confirms that demand is becoming less profit-led. The results of the regressions are almost identical for the investment functions. The impact of profits is null, and the non-robust positive effects are weaker, or of the same magnitude for ALS_2 and ALS_4 . The trade equations, except for the calculations based on ALS_1 , point that the export-led pattern is still present but weaker. The overall character of the growth regime persists to be profit-led, however, a 1% percent increase of labor income share results in a 1 to 1.5 % decrease of the GDP at market prices, except for ALS_1 , which gives an identical result as in the entire sample. Overall, the results validate our expectations of a weaker profit-led regime. The effect of a 1% increase in the labor income share on demand components, private excess demand, and total

demand in Thailand for the subsample 1980-2011 are presented in Table 6.13.

We discuss the policy implications of the findings along with the others on South Korea and China in the last chapter.



Table 6.13: Total effect of a 1% increase in the labor income share on the demand in Thailand for the subsample 1980-2011)

	ALS_1			ALS_2			ALS_3			ALS_4		
	1980	Mean	2011	1980	Mean	2011	1980	Mean	2011	1980	Mean	2011
Consumption	0.46	0.43	0.40	-0.99	-0.27	0.07	-0.28	-0.01	0.09	-0.51	-0.12	0.03
Investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment [†]	0.00	0.00	0.00	-0.64	-0.35	-0.36	0.00	0.00	0.00	-0.52	-0.34	-0.22
Exports	-0.08	-0.18	-0.30	-0.05	-0.11	-0.20	-0.03	-0.10	-0.14	-0.04	-0.11	-0.18
Imports	0.54	1.48	1.09	0.44	0.89	1.09	0.44	0.79	1.04	0.48	0.85	1.13
Net Exports	-0.62	-1.67	-1.40	-0.49	-1.00	-1.29	-0.48	-0.89	-1.18	-0.52	-0.96	-1.31
Private excess demand (h_2)	-0.16	-3.62	-0.99	-1.48	-0.94	-1.22	-0.76	-0.90	-1.08	-1.03	-1.08	-1.28
Total effect ($h_2/(1-h_1)$)	-1.02	-1.95	-1.25	-2.45	-1.08	-0.94	-1.12	-1.11	-0.63	-1.67	-1.28	-0.87
Private excess demand (h_2) [†]	-0.16	-3.62	-0.99	-2.12	-1.29	-1.58	-0.76	-0.90	-1.08	-1.55	-1.42	-1.50
Total effect ($h_2/(1-h_1)$) [†]	-1.02	-1.95	-1.25	-3.44	-1.49	-1.16	-1.12	-1.11	-0.63	-2.48	-1.69	-1.01

[†]Calculated with the non-robust e_{IR} coefficients.

Chapter 7

Analysis of the demand regime in China

In this chapter, we analyze the demand regime in China through our model in Chapter 4. China has already been examined using a post-Keynesian framework by Wang (2009), Onaran and Galanis (2012), and Molero-Simarro (2015). We propose a slightly different theoretical and empirical model for the analysis of China employing three alternative measures of labor income share. The aim of this chapter is to provide some discussions on the transformation of the Chinese economy and its macroeconomic performance, and to examine the latter from a post-Keynesian view. Such an analysis does not claim to fully explain the growth dynamics of China, but the main target is to establish the relationship between functional income distribution and demand.

This chapter is organized as follows. First, we present the political and struc-

tural transformation in China, and the macroeconomic performance of the economy after World War II. In the second section we discuss the issues related to measurement of GDP, working force, and labor income share in the country. In that section we exhibit three labor income share measures that we calculated. In the following section, we present the econometric analysis of the demand regime of the country. In the final section we evaluate the results and compare them with other findings in the literature. We discuss characterization of the demand regime in China in a brief manner. Policy conclusions and a general assessment of the findings take place in the last chapter.

7.1 Political and structural transformation, and macroeconomic performance of China

China's political and economic transformation, and the high growth rates attained by the country are of the most attention grabbing phenomena of the world economy since, at least, two decades. Surpassing Germany, in 2009, and becoming the world's largest exporter and more recently overtaking the U.S., in 2014, and becoming the world's largest economy, the Chinese growth pattern is subject to miscellaneous praises and criticisms. Reformation of the country after the Maoist period and the "market socialism" model was hailed for decades and presented as a success story by both commentators from the right and the left. While the macroeconomic performance has long been magnified, the stagnation of the U.S. economy came along with criticisms directed towards China.

This section is devoted to an evaluation of political and structural transformation of the Chinese economy from the beginning of the Maoist period until the end of 2000s. The accent will be on the post-Maoist period starting with Deng Xiaoping in 1978.¹ In the next subsection we briefly give a picture of the Maoist period. Then we proceed with the post-Maoist period in which the market started to dominate central planning and later on became the essential of the economy. In the last subsection we evaluate the structural transformation and macroeconomic performance of China.

7.1.1 Maoist period: 1949-1976

China was a centrally planned economy under the rule of Mao Zedong (1893-1976). The weight of exports was insignificant, and the production was carried out by state-owned enterprises in order to meet domestic consumption demand. This period was marked by a rapid growth and industrialization (Hart-Landsberg 2010). Maurice Meisner (as cited in Hart-Landsberg (ibid.)) states that “[s]tarting with an industrial base smaller than that of Belgiums in the early 1950s China emerged at the end of the Mao period as one of the six largest industrial producers in the world.” This process was remarkable, however, the cost of the imbalance between the agriculture and the industry was terrible: The famine between 1959 and 1961 caused death of millions of people (Aglietta and Bai 2012).

Aglietta and Bai (ibid.) describes the political regime and the economic policies in China between 1952 and 1978 as follows: While the political regime is

¹For a history of the Maoist period see Meisner (1999).

defined as “people’s democratic dictatorship”, there exists instabilities within the ruling Communist Party of China (CPC). The priority in industrialization policy is given is to the vertically integrated heavy industry. The agriculture is based on collectivization and state procurements at low prices. The investment of the state was the main source of the demand and the household income growth rate was low. The openness of the economy was kept at minimal level and the economic coordination was centrally planned under the direction of the CPC .

The 1949-1952 period was dedicated to high investment in industry. The industrial output increased by 11.2% within the period 1952-1970 and this rate was 10% for 1966-1976. However, the rate of development of the agriculture was much less than that of the industry due to the investment imbalances, which were in favor of the heavy industry at the expense of light industry (Hart-Landsberg and Burkett 2005). Despite the intensive industrialization, agriculture output growth was a bottleneck to the industry. However, the already installed industrial capacity was promising for the future (Aglietta and Bai 2012). The reforms after Mao’s death in 1976 paved the way for attainment of high growth rates.

7.1.2 Post-Maoist period: 1978-present

Deng Xiaoping (1904-1997), who became the leader of China two years after Mao’s death, had put the country on the way of a series of reforms that led the installation of a market economy in the country. Hart-Landsberg (2010) states that “[r]egardless of intentions, the [Communist] Party’s post-1978 reform program ended up dramatically transforming the Chinese economy into a capitalist one

(although with ‘Chinese characteristics’).”

Hart-Landsberg and Burkett (2005) divide the post-Maoist period into three stages. The first one is from 1978, when Deng Xiaoping came into the power to 1983. The second stage is between 1984-1991 and the last is from 1991 until now (by 2005). Drawing from their study, we present the political and structural transformation of the economic agents in the following subsections.

Stage 1: 1978-1983

The first stage of the reform period was initiated by the Third Plenum of the CPC in December 1978. The party appealed for more room to be given to regional units of administration, however, centralized planning would keep on determining the general structure and the route of the economy. State companies and local governments would behave in a profit-seeking manner and the market forces would satisfy the people’s needs and the overall planning policies of the party. The reforms started to take place in some urban areas in 1979. The main goal of the reforms was the creation of a labor market for the “market socialism”. In some selected companies, the life-time contracts of the workers descending from the Maoist revolution were abolished in the name of increasing efficiency and productivity of the economy. In 1983, this decision became the rule for the State-Owned Enterprises (SOE) and the new workers were started to be hired on a contractual basis. This policy led to inequalities and disparities among the industrial labor class. The reforms also took measures to encourage the private sector. The already-existing limit on the number of workers in the private enterprises was raised and it was

completely removed in 1987. While the number of workers in this sector started to increase, the SOEs were still dominant and most of the economy was controlled by the central planning mechanism.(Hart-Landsberg and Burkett 2005, p.40-42).

One of the important elements of the reform process was attracting foreign capital. In this direction, the “open door policy” was launched by Deng in 1979. Four industrial zones were opened in the southern coast. At the beginning, the state was not very successful in promoting foreign investment. The restrictions on FDI was later on eased in 1983 (ibid., p.42).

The agricultural policy was also subject to change during the transformation of the economy. In 1980 de-collectivization of agriculture was commenced. The family-based household production system took the place of the commune based system. By 1983, almost all the peasant households were operating according to this system. Along with the transformation of agriculture emerged the Town and Village Enterprises (TVE). The number of TVEs increased tremendously after the first period of the reform process: From 1.5 million in 1987 to 25 million in 1993. The TVE share of rural employment more than doubled from 9.2% in 1978 to 18.8% in 1984. It should be noted that TVEs, which were considered as an alternative to SOEs by some leftist authors, did not enhance the conditions of the working class. The basic wages of the workers in these companies were lower than the minimum wage and even not guaranteed since they were set by the local authorities who sought the maximization of the profits (ibid., p.43-45).

Stage 2: 1984-1991

In the second stage of the reform process, the state decided to speed up the transformation in urban areas from 1984 on. This second stage was characterized by more dependence on the markets and a focus on non-state production. While economic planning was the priority in the Twelfth Congress of the CPC in 1982, “planned commodity economy” was adopted in 1984 (Hart-Landsberg and Burckett 2005, p.46).

During this period of the reform, the SOEs started to operate through their after-tax retained earnings, instead of receiving from and transferring funds to the state. Provincial governments gained more economic and budgetary autonomy. Price controls over the agricultural commodities and most of the industrial products were abolished, while the control of the state over the basic and essential industrial products remained (ibid., p.46-47).

The labor market was subject to more devastating measures during this period. The right to strike had already been canceled in 1982 and the life time employment guarantee had been abolished during the first period of the reform process. However, a compromise was found such that the already employed workers of the SOEs would keep their benefits but the newly hired on October 1985 would be exposed to this new regulation. Workers’ resistance to this new system resulted in deceleration of productivity growth (ibid., p.47-48).

The promotion of the foreign investment continued with the expansion of the already existing economic zones and the addition of the new ones in the period 1984-1985. In 1986, in this direction, more liberal regulations such as lowering

taxes were introduced. In 1987, Zhao Ziyang, the secretary general of the CPC in that period, stated that China should aim to develop an “export-oriented economy” in the Thirteenth Congress of the party (Hart-Landsberg and Burkett 2005, p.49).

The reforms resulted in some imbalances in the Chinese economy. The imports increased sharply, especially due to the demand for basic inputs and machinery. The economy was exposed to vast trade deficits in 1985 and 1986. The inflation rose rapidly along with a decline in the real wages. The Chinese government took some measures to cool down the economy by tightening the money supply and reducing bank loans and investment due to the rising trade and budget deficits, inflation, food shortages, and labor unrest. These policies eventuated in a recession in 1989 and led to the Tienanmen Square events (ibid., p.49-51).

Stage 3: 1991-Present

In early 1992, after a period of a slowdown of the Chinese economy, Deng Xiaoping gave the start signal for the third stage of the reforms. In October 1992, the CPC declared that it would create a “socialist market economy with Chinese characteristics”. The importance of this stage is that SOEs would loose their central role in the economy. The small SOEs, while the top 1000 companies reserved to State control, were being transformed into Share-based Cooperatives (SBC). Since 1995, privatization of small SOEs had continued at full tilt. The SOE employment share within the total economy decreased to 12% and the value added to 38% at the end of the 1990s. The privatization policy was defended by the CPC on grounds that SOEs were less efficient than private companies. TVEs were also

exposed to the privatization vague (Hart-Landsberg and Burkett 2005, p.51-57).

To sum up, during the first stage of the reform process the central planning was weakened in order to build a market socialist economy. During the second stage, the market was privileged over planning. In the last stage, private enterprises are privileged over state enterprises, and foreign enterprises and markets gained advantage over domestic ones (ibid., p.61). The gradual transformation of the economic institutions was accompanied by a structural change in production, employment, and international trade. In the next subsection we depict this structural transformation along with the macroeconomic performance of China.

7.1.3 Structural transformation and macroeconomic performance of China

In this section we discuss the macroeconomic performance of China along with the structural transformation in agriculture, industry, and international trade.

The transformation of the country and promotion of the market economy were accompanied by a structural change in sectoral characteristics of the Chinese economy. The share of agricultural in total value added has already been declining since 1960s, and this decline accelerated since 1980s. Conversely, the share of industry has been increasing since 1960s, however it has been oscillating around 45% since 1980s. Meanwhile the share of services in total value, which has been in decline until 1980s, has been increasing since three decades and almost attained the same share as the industry. The structural change in employment

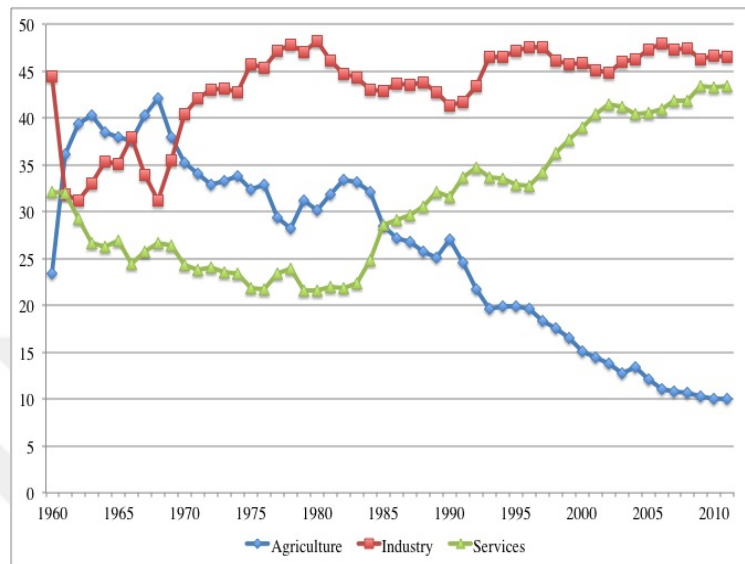


Figure 7.1: Chinese GDP by sector composition (% of GDP) (1960-2011)

Source: WDI

passed through similar stages, however, the share of employment of the sectors are almost equal in 2011. The share of agriculture is still high compared to developed countries although it halved in terms of percentage since 1980s. The share of services is higher than that of industry although its share in value added is lower than the latter's share. The evolution of the sectoral shares in the value added and employment in China are depicted in Figures 7.1 and 7.2, respectively.

The international trade patterns have also changed in the course of time. The exports share of primary goods has been declining since mid 1980s, while imports share of these goods has also decreased until early 1990s but it has been increasing since then. Consumption goods were the most important item within the exports until mid 1990s, however, its share has been steadily declining since then and

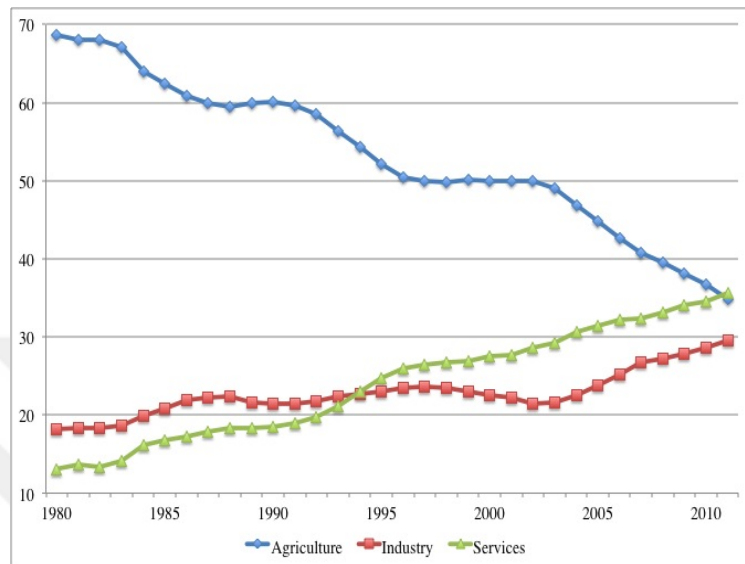


Figure 7.2: Distribution of the workforce across economic sectors in China (% of total employment) (1980-2011)

Source: WDI

by the beginning of 2000s the equipment goods took its place. The share of the latter in total exports has been increasing since mid 1980s while its imports share rose until mid 1990s and has been declining since then. Imports share of basic manufactured goods is in decline while its exports are stable. The share of the other items are subject to significant fluctuations with no clear trend in their shares in international trade. The change in the Chinese exports and imports with respect to stages of production are presented in Figures 7.3, 7.4, and 7.5.²

Zhu and Kotz (2011) divide the post-Maoist period in to four stages in order to evaluate the macroeconomic performance of China. They decompose the domestic and imported contents of the exports and calculate the growth of the former.

²For technical reasons, we split the figure for stages of exports into two.

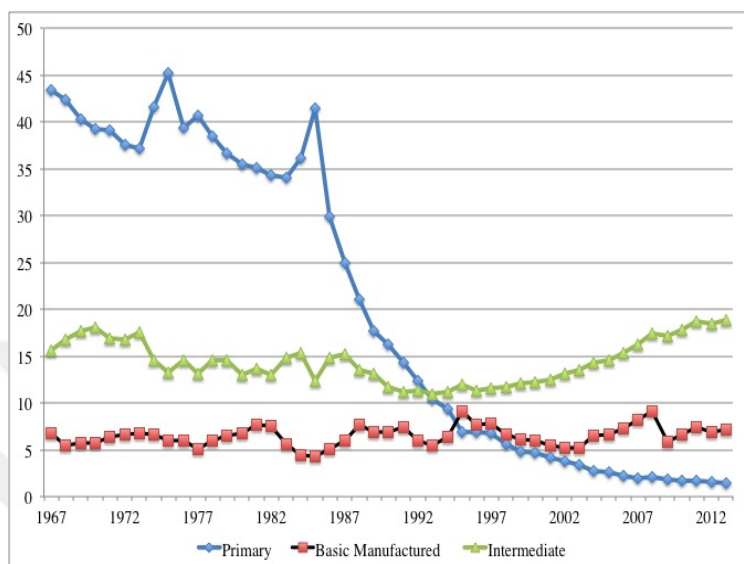


Figure 7.3: Composition of Chinese exports with respect to stages of production (% of total exports) (1967-2013) Panel 1/2

Source: CHELEM

The first period of “Balanced, Domestic Market-led Growth” starts in 1978 and ends the year before the events in Tiananmen Square in 1988. During this period, the government pursued policies to gain the support of peasants by increasing the prices of agricultural products. The average annual growth rate is 10.1% in this period. While the Gini coefficient decreased in the beginning of this period, in 1988 it became 0.38, which was 0.29 in 1978 (Zhu and Kotz 2011).

The second period, “Investment-led Slowdown” (1988-91), is marked by a slowdown in growth due to the decline in investment after the Tienanmen Square events. The high rate of inflation rates during 1988-89 was settled down by the cuts in state investment. The growth rate of consumption was also lower than that of GDP, however, government consumption grew almost twice as fast as GDP.

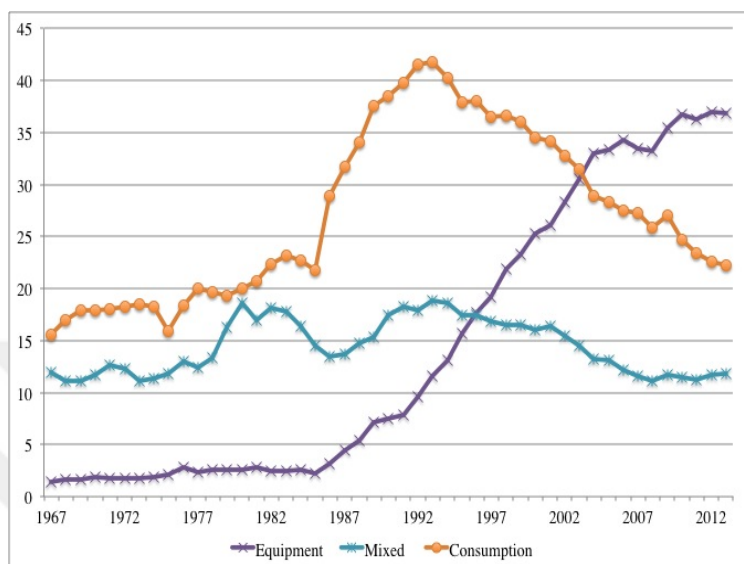


Figure 7.4: Composition of Chinese exports with respect to stages of production (% of total exports) (1967-2013) Panel 2/2

Source: CHELEM

Moreover, the exports share of GDP played the most important role in the recovery of the growth rate (Zhu and Kotz 2011).

The third period covering 1991-2001 was based on investment-led growth. The beginning of the period almost coincides with Deng Xiaoping's southern tour in January 1992 and ends with China's entrance to the WTO in December 2001. In this period SOEs and SBCs became more dependent on the market mechanism. Compared to the previous period, the role of exports in the Chinese growth was relatively less important, and imports grew faster than exports in that period (ibid.).

The last period, from 2001 to 2007 is marked by the leading roles of both exports and investment. During this period China attained significant trade sur-

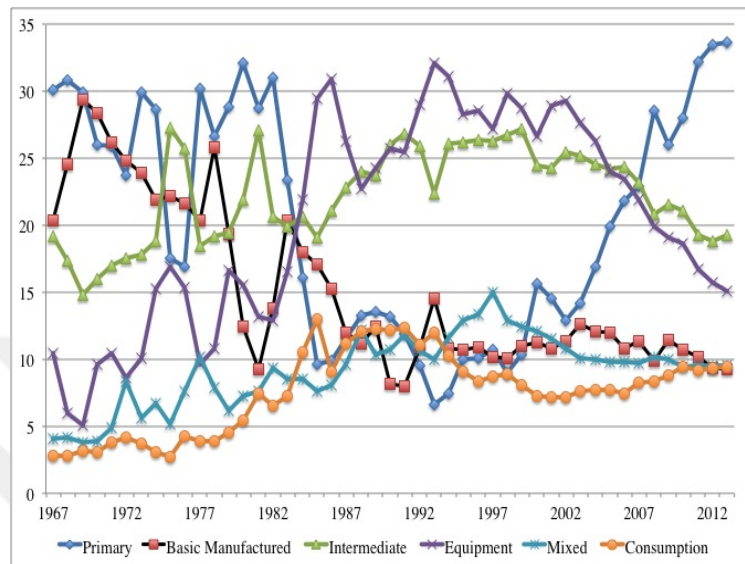


Figure 7.5: Composition of Chinese imports with respect to stages of production (% of total imports) (1967-2013)

Source: CHELEM

pluses along with an increasing rate of investment share in GDP. As of 2007, the shares of investment and exports peaked at 40% of the GDP. While the share of investment kept rising after 2007, that of the exports declined due to the shrinkage in the world after the global crisis of 2008. The evolution of GDP components as a share of total output is depicted in Table 7.6.³

We observe that since the beginning of the post-Maoist period, the share of consumption in GDP has been steadily decreasing. While in 1978 it constituted 70% of the GDP, in 2011, it shrank to half its share in GDP. The decline in consumption share has been accompanied with a decreasing share of labor income

³The statistics employed by Zhu and Kotz (2011) and us are not identical. The former use those of Chinese National Accounts from several years while we refer to the WDI data.

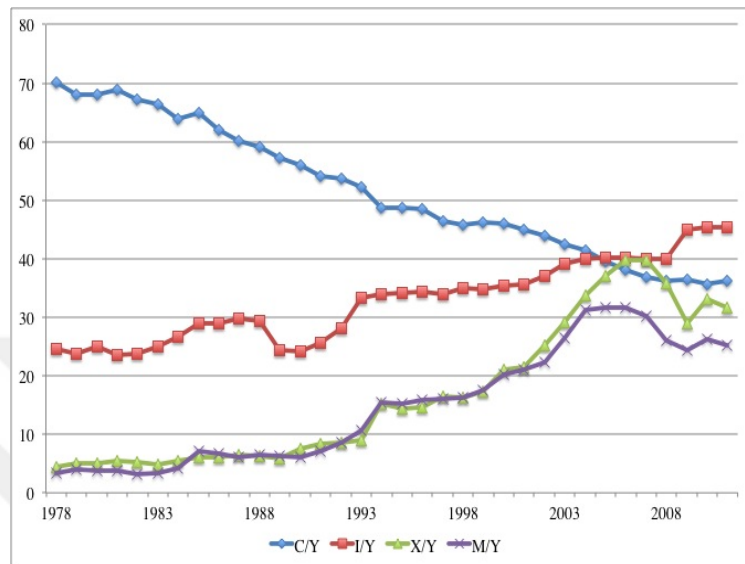


Figure 7.6: Evolution of GDP components by expenditure in China (% of GDP) (1978-2011)

Source: WDI

share, which we analyze in the following section. The common view among economists is that China's exports and investment centered growth model can not be sustained. It is also asserted in the public discussions that the exchange rate policy of the country is the main reason behind the trade balance with the U.S. ("The Role of Income Inequality as a Cause of the Great Recession and Global Imbalances", p.135). While many left intellectuals have applauded the transformation of the country toward socialism, it is claimed that China's "market socialism" paved the way for the restoration of capitalist relations (Hart-Landsberg and Burkett 2005, p.35).

7.2 Labor income share in China

The transformation of the economy and that of the national accounts system renders measuring the labor's income share in China a difficult task. Before 1992, the only data available were provided by Hsueh and Li (1999), who collected provincial data based on "GDP by Primary Distribution of Income" for the 1978-1995 period (Molero-Simarro 2015). Zhou, Xiao, and Yao (2010) and Bai and Qian (2010) provide extensive information on the evolution of the labor share in China, from which we draw in this section. We base the labor share series on those provided by the former and update them with respect to three different methods.

There are two major problems regarding the measurement of the labor share in China. The first one is the availability of data and their quality. The other is methodology employed and underlying assumptions in measuring the labor share. At the root of the problem lies the rise of self-employed workers in China, which include employers with fewer than 7 employees plus own-account workers and contributing family workers. In 2011, according to the China Statistical Yearbook (CSY) provided by the National Bureau of Statistics (NBS), they amounted to at least 80 million workers or 10% of total employment (NBS-China 2014). It is much less than it is in other developing countries like Thailand where it accounts for around one third of the total workforce. But still, it is large enough to justify estimates of the labor force that take self-employed workers into consideration and not just employees.

There are two main issues regarding the data necessary for calculation of the

labor income share. The first concerns the GDP series in China and the other the number of self-account workers and their income level. In the first two subsections these problems are addressed. In the last subsection, based on the availability of data and different assumptions, three alternatives of the labor share are calculated and presented.

7.2.1 Gross Domestic Product in China

Since there are no consolidated data series at the national level, the GDP by income approach is found by summing the regional GDPs (by income approach), which are called Gross Regional Product (GRP). This calculation may engender some problems. For some years, there are important statistical discrepancies between the summed GRPs (hereafter *provincial GDP*, as called by Bai and Qian (2010)) and the overall GDP by expenditures approach, which is regularly updated with some revisions introducing significant changes. The provincial GDP is the longest data series available spanning the 1978-2011 period. It provides data for compensation of employees, net taxes on production including subsidies, depreciation of capital, and net operating surplus.

The second source of data is the Flow of Funds (FoF). It provides the GDP by income approach of households, government, and non-financial and financial enterprises. Value added, compensation of employees, and net taxes are available for these economic agents but not depreciation of fixed assets. They have been revised several times and the quality of the data is enhanced. However, the series only cover the period 1992-2012.

The third data source is the input-output tables. Value added compensation of employees, net taxes and subsidies, depreciation of capital, and net operating profit are in these tables. They are available from 1992 until 2010, and are published biannually or triannually. The series do not provide enough data points for econometric investigation but they are useful to cross-check the other data sets.

The data from the FoF have different values than the ones calculated by summing from the provincial GDP by income approach. The FoF GDP is lower than the provincial GDP beginning from 2003 and the gap is growing since 2008 by reaching 10% in 2012. For compensation of employees, the data from the FoF is much higher than the provincial GDP data until 2009 and lower since then. In terms of the ratio compensation of employees/GDP, i.e the naive estimation of the labor income share, the two data series follow a downward trend. However, for the FoF data series, the decline of this ratio over the period 2003-2009 is much less than the for the provincial GDP data series, which can be explained by the change in methodology introduced by the NBS in 2004 that we discuss below.

Considering all the advantages and disadvantages of these data sources, we chose the provincial GDP series, which are the only one that cover the 1978-2011 period. These series can be combined with the employment data published by the NBS and cross-checked with the economic census realized every 5 years, the last being for the year 2013 and whose results were published in December 2014.

7.2.2 Mixed income and self-account workers in China

Two critical data sets are missing for the calculation of the labor income share series in China. The first one is a separately calculated OSPUE for agricultural and non-agricultural sectors. The other is an accurate and exhaustive estimate of the number of self-employed workers with a breakdown among employers, own-account workers, and contributing family workers. The absence of publication of these data is a problem for the computation of adjusted labor shares that include mixed income of the self-employed. We had to resort to different methods than the ones employed for calculating the adjusted labor income share of Thailand since these information are not available for China.

In the case of China, the absence of exhaustive data is particularly important because the NBS of China has changed the methodology of calculation of the factor income distribution in 2004. The first adjustment concerns the agricultural sector. Prior to this year, the profits of the state-owned and collective farms were counted as a part of the operating surplus in agriculture. After 2004, the NBS decided to count all income excluding depreciation and net production tax in those farms as labor compensation, which led to a sharp increase of the registered labor income in some provinces. As expected this change caused an increase of the labor share in agricultural sector (Bai and Qian 2010).

The second adjustment in the national accounts concerns the mixed income of self-employed in the non-agricultural sector. Prior to 2004, the mixed income of the self-employed and their employees' "wages" were counted as labor compensation. However, beginning from this year, the former is counted as operating

surplus by the NBS, while the “wages” remained as a part of the labor compensation (Bai and Qian 2010).

Bai and Qian (*ibid.*) recalculate the labor share in 2004 by reversing these two underlying assumptions, i.e. by holding those prior to 2004, to demonstrate their overall and separate impacts. While the official figures suggest a 5.25% decline in the labor share, when the earlier assumptions are retained they find a 1.04% rise between 2003 and 2004. They base their calculations on the OSPUE provided by the Chinese Economic Census in 2004. However, it is not possible to update this calculation for the following years since the required data for urban self-employed OSPUE were not published by the subsequent economic censuses.

We first deal with the problem of the inclusion of the totality of the operating surplus of the state-owned and collective farms as compensation of employees. Fortunately, the input-output data series provide detailed information on compensation of employees and operational surplus in agriculture before and after the change of the methodology. We recalculated the share of compensation of employees in value added for the years 1992 to 2005 by adding the entire operating surplus to compensation of employees in agriculture as it is done for the years 2007 and 2010. The labor share (calculated as compensation of employees/GDP) increases by at most 2% in 1992 and 1995 but the gap narrows to 0.5% in 2005, the last year the calculation is possible. We conclude that the effect of the change of methodology in agriculture can be neglected at the national level.

The inclusion of the entire mixed income of urban self-employed is probably more troublesome because their number has been rising from around 0% at the

start of 1990s to around 12% in 2013 according to the CSY and will probably keep on growing in the future. The precise problem is that OSPUE of urban self-employed workers is not known. To deal with this problem, alternative estimations are calculated on the base of three hypothesis on the employment data of the self-employed. The calculations are presented at the next subsection.

7.2.3 Alternative measures of labor income share in China

The CSY only presents data of the registered self-employed workers. The Chinese Economic Census gives another estimate of the number of self-employed every four or five years and is deemed more accurate and exhaustive. In 2004, the economic census estimated the number of self-employed to a total of 94.2 million while in the CSY there were only 45.9 million registered self-employed workers. The difference, 48.5 million individuals were considered as unregistered self-employed employees by several authors like Bai and Qian (2009) and Zhou, Xiao, and Yao (2010). As a consequence, the adjusted labor share calculated by these authors is based on 94.2 million self-employed workers in 2004 and for the following years, this figure is updated by the rate of growth of the number of registered self-employed published by the CSY, i.e. assuming that the rate growth of the number of the registered and that of the unregistered ones are identical. Following this method leads to an estimate of 118.6 million in 2008 and 177.2 million self-employed workers in 2012 for the two subsequent economic censuses. The problem is that for 2008 and 2012 the Economic Census published data for registered self-employed workers only without any data for unregistered workers

contrary to the statistical communique of the 2004 Economic Census. Worse, the total urban employment published in 2008 and the absolute increase from 2004 to 2008 is not equal to the figure published in 2004. In short, the data from the 2004 economic census and the one published in 2008 are inconsistent while the data from the 2008 and 2013 economic census are fortunately consistent.

In these circumstances, it is therefore impossible to correct the extrapolation made from the number of 94.2 million registered and unregistered self-employed workers published for the year 2004. However, 177.2 million of self-employed, half of them being unregistered, is not absurd. It amounts to around 25% of total employment. A well-known problem of Chinese employment data is that migrant workers working in cities are not officially registered.

For all these reasons, we have decided the following: From 1978 to 2003, we retained the labor share series calculated by Zhou, Xiao, and Yao (2010), which is the average of the labor share imputing the average compensation to self-employed, like the ALS_1 defined in Subsection 4.2.2, and the labor share that imputes the same operating surplus to self-employed as explained in the same subsection. From 2004 to 2012, we have updated the labor share according three assumptions for the number of self-employed (see Figure 7.7). The first assumption (ALS_1)⁴ is that the number of self-employed is the one published each year by the CSY. It is the lowest figure for most of the period starting at around 46 million in 2004 up to 86 million in 2012. The second assumption (ALS_2) is that the

⁴Index of the adjusted labor share series in this section should not to be confused by those defined in Subsection 4.2.2 since they are not identical.

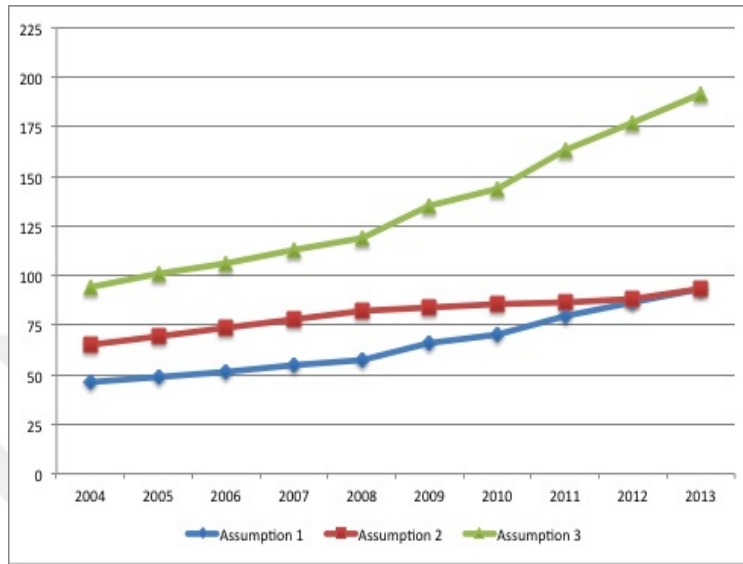


Figure 7.7: Evolution of the number of the self-employed (in millions of workers) in China between 2004 and 2012

Source: Calculations made with Bruno Jetin

number of self-employed is consistent with the figures of registered self-employed published in the Economic Census of 2008 and 2013. We have interpolated the data between 2008 and 2013 and retrofitted from 2008 back to 2004. This gives an intermediate number of self-employed of around 65 million self-employed in 2004 and around 86 millions in 2013. The last assumption (ALS_3) follows Zhou, Xiao, and Yao (2010) method, which updates the 94 million of self-employed in 2004 according to the rate of increase of the registered self-employed, which is around 177 million in 2012.

The three alternative adjusted labor shares are presented in Figure 7.8. They show that ALS_1 and ALS_2 which follows the first and second assumptions are very closed with a labor share of 60% in 2012. Not surprisingly, ALS_3 , which is

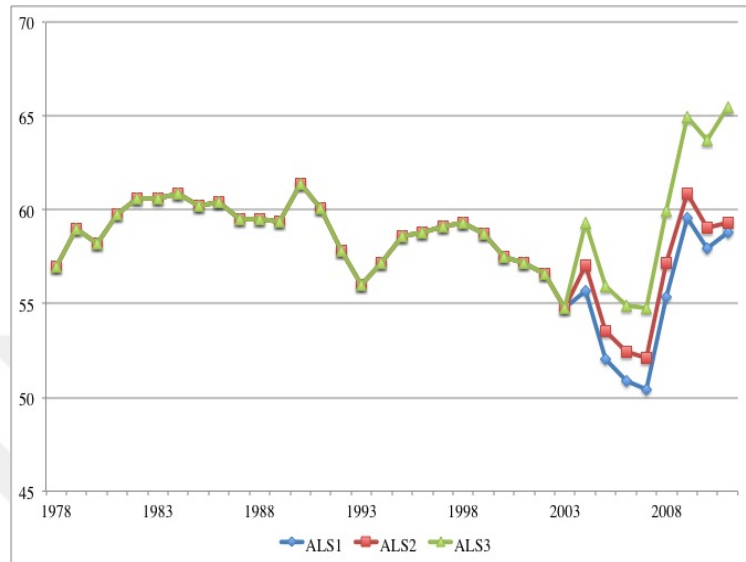


Figure 7.8: Labor income share (% of GDP at factor cost) in China (1978-2012)

Source: Calculations made with Bruno Jetin

based on the third assumption gives a much higher labor income share of 67.6% in 2012.

We also present the other labor income share calculations by other authors for a comparison with our calculations. In Figure 7.10 the three measures of labor income share that we calculated are presented along with the estimations of other authors. Holz (2008), Bai and Qian (2010), and Zhou, Xiao, and Yao (2010) exclude net taxes on production and depreciation in the denominator (GDP); while Molero-Simarro (2015) includes the net taxes but excludes depreciation.

Since we adopted the labor share series calculated by Zhou, Xiao, and Yao (2010) from 1978 until 2003, we compare the years 2004 to 2011 with the other studies. The other studies confirm the decline in labor income share from 2004

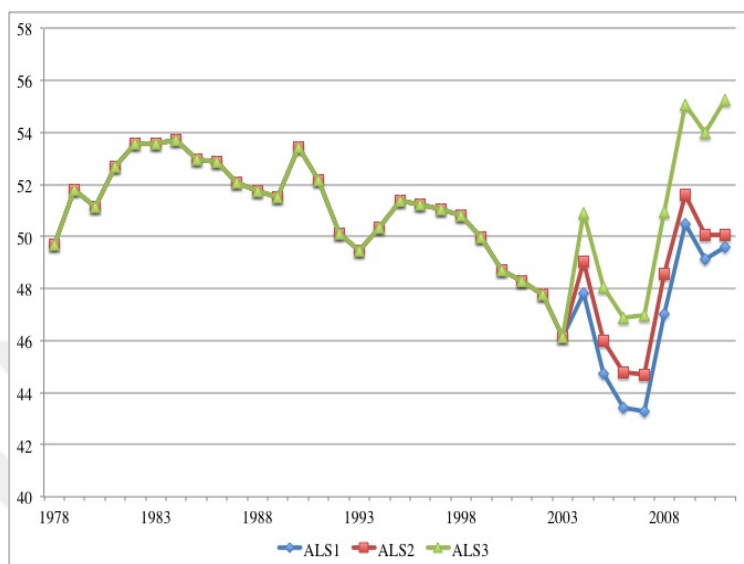


Figure 7.9: Labor income share (% of GDP at market prices) in China (1978-2012)

Source: Calculations made with Bruno Jetin

to 2007. Those studies only cover the period until 2007, while another study on China's labor share by Qi (2014) confirms the increase in after 2007.⁵ However, the increase in the latter's study, is not high enough to attain the share in the beginning of 2000s. In contrast, among the three measures that we calculated, *ALS3* attains a historical peak, which seems to overestimate the labor share in China. However, the increase in the two other measures *ALS1* and *ALS2* are more modest. In the next section we present the econometric estimations of our model based on these three alternatives of the labor income share in China.

⁵We could not access to the numbers calculated in this article.

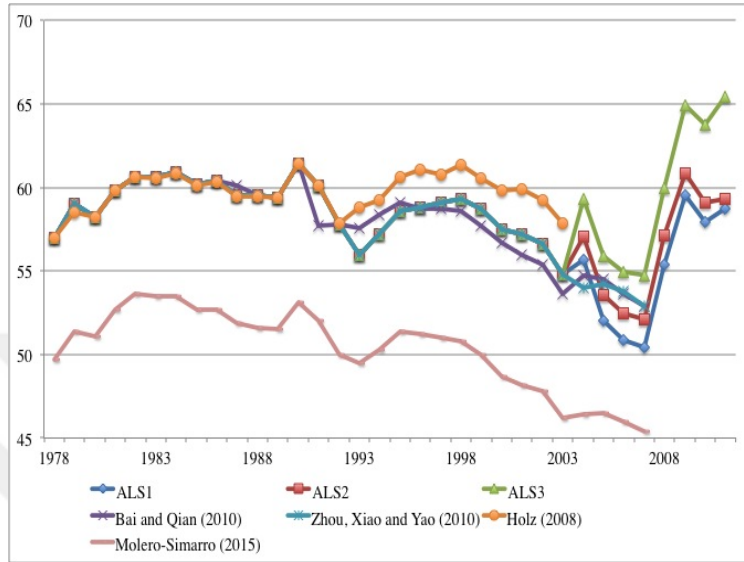


Figure 7.10: Labor income share in China from different sources

7.3 Econometric analysis of the demand regime in China

We estimated our model presented in Chapter 4.1 over the sample period 1978-2011. We pursued the methodology described in Section 4.3.

7.3.1 Consumption equation

The ADF tests, reported in Table B.3.1 in Appendix B.45, did not give straightforward results for the estimation of the consumption equation. Since the series $\ln C$ and $\ln W_i$, for $i = 1, 2, 3$, are $I(1)$ but the $\ln R_1$ and $\ln R_2$ are stationary, at the first step we conducted Bounds tests for the consumption equation of the first two measures of the labor income. For the consumption equation involving $\ln W_3$ and

Table 7.1: Consumption equation estimations for China (1978-2011)

Dependent variable: $\Delta \ln C$	i=1		i=2		i=3	
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.00	0.19	0.00	0.32	0.01	0.42
$\Delta \ln W_i$	0.46***	4.11	0.44***	3.93	0.45***	4.14
$\Delta \ln R_i$	0.30***	4.35	0.31***	4.37	0.28***	4.15
Diagnostics						
R-Squared	0.50		0.49		0.46	
Adjusted R-Squared	0.46		0.45		0.43	
DW statistic	2.00		1.98		1.97	
White's test†	0.79		0.89		0.85	
ARCH test (1 lag)†	0.94		0.87		0.69	
Normality test†	0.80		0.76		0.79	
F-test†	0.00		0.00		0.00	
RESET test†	0.30		0.31		0.26	
CUSUM test†	0.93		0.98		0.91	
Highest VIF†	1.05		1.05		1.12	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

$\ln R_3$, in which all the series are $I(1)$, we employed the EG cointegration test along with the Bounds test. The results of the tests, presented in Table B.46 in Appendix B.3.2 and in Table B.55 in Appendix B.3.3, show no sign of cointegration among consumption, and labor and profit income series. Consequently, we estimated the equations in first differences of the variables. The estimation results are presented in Table 7.1.

As expected, the propensity to consume out of labor income e_{CW} is higher than the propensity to consume out of capital income e_{CR} . The former is around 0.45 while the latter is between the range 0.28-0.31 for the three measures of the income distribution in China. Redistribution of income in favor of labor is likely to promote consumption.

7.3.2 Investment equation

The ADF tests show that $\ln I$, $\ln Y$, and $\ln R_3$ series are stationary while the $\ln R_1$ and $\ln R_2$ are $I(1)$. We conducted Bounds tests for the investment equation for the three measures of the labor income since the maximum order of integration of the variables is 1. At the first set of tests, shown in the first three to four columns of the tables B.47, B.48, and B.49 in Appendix B.45, no sign of cointegration is observed among the variables. However, the tests with addition of the dummy variable $D1989$, which captures the negative impact of the Tienanmen events on the Chinese investment, indicates existence of cointegration.

Consequently, at the first stage, we estimated two ECM specifications for each measure of the labor income share. In the first specification, $D1989$ is only included to the short-run equation. In the second one, this variable is added to the long-run specification with two alternative short-run equations, one with and the other without $D1989$. The dummy variable is significant in all the equations and captures the negative impact of the Tienanmen events of 1989 on the investment. However, while the aggregate demand (Y) turns out to be significant in the ECM specifications, the capital income (R) was insignificant both in the long-run and short-run equations for all of the measures of the labor share. These results do not confirm cointegration among the series. Consequently, we estimated an OLS specification for the three alternative labor shares with the $D1989$ and based our calculations on their results. The results of the ECM and OLS regression are in Tables 7.2, 7.3, and 7.4.

The results of the OLS estimations show that the effect of output growth on

Table 7.2: Investment equation estimations of ALS_1 for China (1978-2011)

Dependent variable	ECM1				ECM2				OLS			
	Coefficient	t-ratio	$\Delta \ln I$	ln I	Coefficient	t-ratio	$\Delta \ln I$	ln I	Coefficient	t-ratio	$\Delta \ln I$	t-ratio
Regressors												
Constant	-6.64***	-13.92	-0.07**	-6.62***	-0.10***	-3.09	-0.05*	-0.10***	-0.06*	-1.70		-1.78
$\ln Y$	1.00***	4.57		1.03***								
$\ln R$	0.21	0.98		0.17								
$\Delta \ln Y$			1.82***		2.24***	5.16	1.65***		1.75***	4.41		3.94
$\Delta \ln R_i$			0.12		-0.01	-0.06	0.10		0.12	0.60		0.64
EC			-0.33***		-0.42***	-3.06	-0.39***			-3.60		
$D1989$			-0.15***	-0.16***		-2.74	-0.16***		-0.16***	-4.11		-3.61
Diagnostics												
R-Squared	1.00		0.82	1.00	0.72		0.82				0.74	
Adjusted R-Squared	1.00		0.79	1.00	0.69		0.80				0.71	
DW statistic	0.74		1.85	0.85	2.00		1.91				1.83	
White's test†	0.28		0.72	0.08	0.06		0.15				0.08	
ARCH test (1 lag)†	0.00		0.95	0.01	0.99		0.99				0.64	
Normality test††	0.01		0.06	0.00	0.03		0.10				0.03	
F-test†	0.00		0.00	0.00	0.00		0.00				0.00	
RESET test†	0.54		0.54	0.73	0.08		0.82				0.63	
CUSUM test†	0.24		0.16	0.08	0.64		0.22				0.23	
Highest VIF	347.42		2.44	348.98	2.10		2.45				2.43	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

Table 7.3: Investment equation estimations of ALS_2 for China (1978-2011)

Dependent variable: Regressors	ECM1						ECM2						OLS					
	lnI		$\Delta \ln I$		lnI		$\Delta \ln I$		lnI		$\Delta \ln I$		lnI		$\Delta \ln I$		lnI	
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-6.65	-14.78	-0.06	-2.27	-6.62	-16.18	-0.10	-3.06	-0.05	-1.68	-0.05	-1.68	-0.06	-1.76	-0.06	-1.76	-0.06	-1.76
$\ln Y$	0.97***	4.18			1.00	4.76												
$\ln R$	0.24	1.06			0.20	0.98												
$\Delta \ln Y$			1.79***	4.74			2.20***	5.13	1.63***	4.38	1.63***	4.38	1.73***	3.93	1.73***	3.93	1.73***	3.93
$\Delta \ln R_i$			0.14	0.84			0.01	0.05	0.12	0.72	0.12	0.72	0.14	0.74	0.14	0.74	0.14	0.74
EC			-0.33***	-3.35			-0.41***	-3.03	-0.39***	-3.57	-0.39***	-3.57	-0.39***	-3.57	-0.39***	-3.57	-0.39***	-3.57
$D1989$			-0.15***	-3.74	-0.16***	-2.74			-0.16***	-4.12	-0.16***	-4.12	-0.16***	-3.63	-0.16***	-3.63	-0.16***	-3.63
Diagnostics																		
R-Squared	1.00		0.82		1.00		0.71		0.82		0.82		0.74		0.82		0.74	
Adjusted R-Squared	1.00		0.79		1.00		0.69		0.80		0.80		0.72		0.80		0.72	
DW statistic	0.74		1.85		0.85		2.00		1.91		1.91		1.83		1.91		1.83	
White's test†	0.30		0.75		0.05		0.07		0.19		0.19		0.13		0.19		0.13	
ARCH test (1 lag)†	0.00		0.89		0.01		1.00		0.94		0.94		0.64		0.94		0.64	
Normality test†	0.00		0.04		0.00		0.02		0.09		0.09		0.03		0.09		0.03	
F-test†	0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00	
RESET test†	0.47		0.55		0.66		0.09		0.83		0.83		0.62		0.83		0.62	
CUSUM test†	0.35		0.18		0.13		0.66		0.25		0.25		0.27		0.25		0.27	
Highest VIF	391.16		2.39		392.80		2.06		2.40		2.40		2.38		2.40		2.38	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

Table 7.4: Investment equation estimations of ALS_3 for China (1978-2011)

Dependent variable	ECM1			ECM2			OLS		
	lnI	lnI	lnI	lnI	lnI	lnI	lnI	lnI	lnI
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient
Constant	-6.93	-20.36	-0.07	-2.62	-6.85	-22.10	-0.10	-3.33	-0.05
lnY	1.11***	6.38			1.13	7.11			
lnR	0.10	0.58			0.09	0.53			
$\Delta \ln Y$			1.98***	5.70			2.33***	6.00	1.79
$\Delta \ln R_i$			0.03	0.23			-0.07	-0.43	0.02
EC			-0.35***	-3.62			-0.43***	-3.28	-0.41***
D1989			-0.14***	-3.68			-0.17***	-2.76	-0.15
Diagonistics									
R-Squared	1.00		0.82		1.00		0.73		0.83
Adjusted R-Squared	1.00		0.80		1.00		0.70		0.80
DW statistic	0.74		1.90		0.87		2.04		1.97
White's test†	0.30		0.66		0.17		0.04		0.14
ARCH test (1 lag)†	0.00		0.99		0.01		0.97		0.91
Normality test†	0.00		0.09		0.00		0.04		0.15
F-test†	0.00		0.00		0.00		0.00		0.00
RESET test†	0.30		0.60		0.48		0.09		0.83
CUSUM test†	0.71		0.22		0.31		0.66		0.29
Highest VIF	216.49		2.09		216.82		1.76		2.07

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests

investment growth is within the range 1.73-1.85, while the coefficients for the first two measures are almost identical. $D1989$ is found -0.16 in all the estimations. As in the cases of South Korea and Thailand, profits have no impact on investment.

7.3.3 Exports equation

The ADF tests indicate that exports and both measures of world demand series are $I(1)$ while relative export prices are stationary. Since the order of the variables are different and the maximum order of integration is 1, we tested for cointegration through the Bounds test. The results in Tables B.51 and B.50 in Appendix B.3.2 showed no sign of cointegration among the variables. We proceeded with an OLS estimation in first differences of the variables. In these tests we alternatively used a dummy variable $D1994$ for the year 1994, when Yuan was devalued and the exports boomed unprecedentedly. The sign of $D1994$ turned out to be positive in our estimations. The results of the estimations for the two measures of the world demand are presented in Table 7.5.

The results show that all the variables are significant at 5%. The dummy variable, as mentioned, turns out to be positive in both set of estimations. The impact of the world demand is 0.67 in the estimation in which the world demand measure is the weighted sum of the imports of the trade partners. For the other, in which the simple sum of imports are employed as a proxy for the world demand, the coefficient is 0.61. An increase in the relative export prices lead to a decrease in the volume of exports, as expected. We observe that addition of $D1994$ reduces the coefficient for the impact of the export prices in both estimations, which re-

Table 7.5: Exports equation estimations for China (1978-2011)

Dependent variable: $\Delta \ln X$		j=1			j=2		
Regressors		Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant		0.10***	3.24	0.08***	2.95	0.10***	3.72
$\Delta \ln M_{ex}$		0.67***	2.81	0.67***	4.05	0.68***	2.86
$\Delta \ln P_{ex}^{rel}$		-0.86**	-1.98	-0.70**	-2.22	-0.81*	-1.91
D_{1994}				0.49***	5.88	0.48***	-2.09
$\rho_{\dagger}^{\ddagger}$				0.34		0.26	5.39
Diagnostics							
R-Squared		0.22		0.62		0.22	
Adjusted R-Squared		0.16		0.58		0.17	
DW statistic		1.83		1.87		1.80	
White's test		0.89				0.87	
ARCH test (1 lag)		0.83		0.33		0.86	
Normality test		0.00		0.00		0.00	
F-test		0.00		0.00		0.00	
RESET test (with squares)		0.38				0.34	
CUSUM test		0.55				0.61	
Highest VIF		1.36		1.40		1.29	
							1.33

***, ** and * represent 1, 5, and 10% significance levels, respectively.

$\dagger$ The autoregression parameter of the PW Method.

$\ddagger$ Probability values of the corresponding tests.

sult in coefficients of identical magnitude (-0.70). For our calculations we use the coefficients in the second specification of the first measure of the world demand.

7.3.4 Imports equation

According to the ADF tests, the imports series are $I(1)$, while $\ln Y$ and $\ln P/P_m$ are stationary. Hence, we tested for cointegration among the series through the Bounds test. The results exhibited in Table B.52 in Appendix B.3.2 do not point to cointegration among the variables. Consequently, we estimated the equation in first differences of the variables. The results of the regressions are in Table 7.6.

We employed two specifications for the imports regressions. Along with the basic specification, we estimated another with addition of two dummy variables to take into account the import booms in 1985 and 1994. The dummy variables $D1985$ and $D1994$ are highly significant, while the coefficient of impact of the domestic to import prices on the imports is insignificant. The addition of the dummy variables also decreased the magnitude of the coefficient e_{MY} . We use the coefficients estimated in the second regression for our calculations.

Table 7.6: Imports equation estimations for China (1978-2011)

Dependent variable: $\Delta \ln M$				
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-0.20	-2.13	-0.08	-0.92
$\Delta \ln Y$	3.72***	3.90	2.28***	2.61
$\Delta \ln P/P_m$	-0.30	-1.24	0.26	1.21
D_{1985}			0.43***	4.29
D_{1994}			0.36***	3.03
$\rho_{\ddagger}^{\dagger}$			0.34	
Diagnostics				
R-Squared	0.34		0.65	
Adjusted R-Squared	0.29		0.60	
DW statistic	1.63		1.84	
White's test [†]	0.03			
ARCH test (1 lag) [†]	0.88		0.55	
Normality test [†]	0.52		0.00	
F-test [†]	0.00		0.00	
RESET test [†]	0.06			
CUSUM test [†]	0.75			
Highest VIF	1.05		1.43	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[‡]The autoregression parameter of the PW Method.

[†]Probability values of the corresponding tests.

7.3.5 Domestic prices equation

Since the series for the three unit labor costs and domestic prices in logarithms are I(1) and import prices are stationary, we conducted Bounds tests among the variables. The results of the tests in Table B.53 in Appendix B.3.2 show no sign of cointegration. We performed OLS estimations in first differences of the variables, as shown in Table 7.7.

We employed two dummy variables to take into account the deflationary shocks in 1990 and 1994. They turned out to be highly significant and their inclusion into the regressions decreased the coefficient that measures the impact of the unit labor costs on the domestic prices. A rise in the ULC by 1% leads to a 0.68 % increase in the domestic prices for the first and the second measures of the income distri-

Table 7.7: Domestic prices equation estimations for China (1978-2011)

Dependent variable: $\Delta \ln P$	i=1			i=2			i=3		
	Coefficient	t-ratio		Coefficient	t-ratio		Coefficient	t-ratio	
Regressors									
Constant	0.00	-0.10		0.01	-0.09		0.01	-0.53	
$\Delta \ln U/LC_i$	0.88***	16.44		0.68***	16.23		0.68***	15.02	
$\Delta \ln P_m$	0.08	1.23		0.07	1.03		0.09	1.24	
$D1990$				-0.09***	-4.40		-0.10***	-4.10	
$D1994$				-0.12***	-4.32		-0.12***	-4.12	
ρ				0.59			0.55		
Diagnostics									
R-Squared	0.92			0.91			0.94		
Adjusted R-Squared	0.91			0.91			0.94		
DW statistic	1.78			1.96			1.93		
White's test†	0.19			0.21			0.22		
ARCH test (1 lag)†	0.63			0.31			0.35		
Normality test†	0.65			0.54			0.18		
F-test†	0.00			0.00			0.00		
RESET test†	0.00			0.00			0.00		
CUSUM test†	0.28			0.29			0.50		
Highest VIF	1.14			1.15			1.50		
				1.48			1.14		
							1.47		

***, ** and * represent 1, 5, and 10% significance levels, respectively.

‡The autoregression parameter of the PW Method.

†Probability values of the corresponding tests.

bution, while for the third one this impact is somewhat less. The coefficient of import prices is not significant, which is in line with the findings of the previous subsection. We employed the coefficients from the second specifications of each labor income share measure in our calculations.

7.3.6 Export prices equation

The ADF tests show that the export prices of China are stationary, while those of the competitors' and the domestic prices are $I(1)$. The Bounds tests point to cointegration among the variables, with respect to the second test shown in Table B.54 in Appendix B.3.2. Consequently, we estimated alternative ECM specifications as we did for the investment equations. The results of the regressions are presented in Table 7.8.

We added two dummy variables to the estimations in order to capture the impact of the unexpected shocks on the export prices. The first one, $D1979 - 80$ is for the two subsequent years of the drastic export price inflation in 1979 and 1980. The other, $D2008 - 09$ is to capture the successive inflation and deflation of the export prices due to the crisis of 2008. In the first ECM specification, the dummy variables are only added to the short-run equation where both of the dummy variables turned out to be significant. However, the ECM term is not significant in the short-run equation, which is a sign of no cointegration. In the second specification the dummy variables are added to the long-run equation where they are both insignificant. Among the two alternative short-run equations based on this second estimation, ECM term turns out to be significant only in the first one in

Table 7.8: Export prices equation estimations for China (1978-2011)

Dependent variable	ECM1			ECM2			OLS		
	$\ln P_x$	t-ratio	Coefficient	$\Delta \ln P_x$	t-ratio	Coefficient	$\Delta \ln P_x$	Coefficient	t-ratio
Regressors									
Constant	-0.05***	-3.36	-0.01	-0.75	-3.14	0.00	-0.01	-0.01	-0.89
$\ln P$	0.14***	2.61			1.98				
$\ln P_x \text{ comp}$	0.84***	14.85			12.26				
$\Delta \ln P$			0.20***	2.79		0.20**	0.20***	0.20***	2.94
$\Delta \ln P_x \text{ comp}$			0.95***	7.35		0.91***	0.96***	0.96***	7.76
EC			-0.04	-0.32		-0.44***	-0.01		-0.04
$D1979 - 80$			0.16***	4.58	0.01		0.16***	0.16***	6.31
$D2008 - 09$			-0.05*	-1.77	0.46		-0.05*	-0.05***	-2.01
Diagnostics									
R-Squared	0.89		0.85		0.89	0.72	0.85		0.85
Adjusted R-Squared	0.88		0.83		0.88	0.69	0.83		0.83
DW statistic	0.62		2.06		0.62	1.17	2.10		2.10
White's test†	0.00		0.07		0.03	0.43	0.16		0.31
ARCH test (1 lag)†	0.00		0.71		0.00	0.61	0.78		0.79
Normality test†	0.00		0.00		0.01	0.00	0.01		0.01
F-test†	0.00		0.00		0.00	0.00	0.00		0.00
RESET test†	0.00		0.21		0.00	0.60	0.32		0.34
CUSUM test†	0.01		0.64		0.00	0.02	0.62		0.68
Highest VIF	1.03		2.15		1.46	1.14	2.058		1.204

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

which there are no dummy variables. However, inclusion of these variables into the short-run equation makes the ECM term insignificant, while $D1979 - 80$ is significant at 5% and $D2008 - 09$ at 10%. We also estimated an OLS regression in first differences of the variables as a cross-check of the short-term parameters. It turns out that the coefficient of the impact of domestic prices on export prices is 0.20 in all the regressions, while that of export prices of the competitors' is between the range 0.91-0.96.

7.4 Evaluation of the findings and their comparison with literature

In this section we evaluate the econometric findings in the previous section and compare them with those found in the literature on China. The comparison is in terms of the estimations of the parameters of the equations, marginal effect of a 1% increase in labor income share on GDP components, and overall results. The marginal effect of a 1% increase in the labor income share on the consumption holding the aggregate demand constant, for the whole sample as well as at the beginning (1978) the end of the period (2011) are presented in Table 7.9.

The results show that for the whole sample the consumption demand is weakly wage-led. For the first and the third measure of the labor share, the impact of an increase on the consumption are relatively higher. At the end of the sample period, the consumption demand is less wage-led for the three labor shares, while it is null for the ALS_2 .

Table 7.9: Effect of a 1% increase in the labor share on the consumption in China

	ALS_1	ALS_2	ALS_3
1978	0.09	0.05	0.11
Mean	0.04	0.01	0.04
2011	0.02	0.00	0.04

The results of the estimation of the investment function are in line with the estimations of Onaran and Galanis (2012) who find no significant impact of profit share on private investment in several developing countries like China, India, and Turkey. However, Wang (2009) and Molero-Simarro (2015) who base their estimations on total investment, including those of SOEs, find a significant positive effect of profits on total investment. The econometric methodology employed by Wang (2009), in which they use panel data, is not directly comparable to ours. The estimations by Molero-Simarro (2015) cover a shorter period (1978-2007) and the different results probably stem from the difference between the calculation of the labor income share, hence total profits.

The estimations of exports and imports function give the expected results, however, the relative prices are not significant in the imports function. This situation might be explained by the composition of China's imports. The share of primary goods within total imports has been steadily increasing and consumption goods have a relatively low share. An increase in primary good prices, e.g. of petroleum products, might not hinder the imports. It might be the case that imported goods are not substitutable with the domestic goods in short-run.

The effect of a 1% increase in the labor income share on demand components, private excess demand, and total demand in China are shown in Table 7.10. The

Table 7.10: Total effect of a 1% increase in the labor income share on the demand in China (1978-2011)

	<i>ALS₁</i>			<i>ALS₂</i>			<i>ALS₃</i>		
	1978	Mean	2011	1978	Mean	2011	1978	Mean	2011
Consumption	0.09	0.04	0.02	0.05	0.01	0.00	0.11	0.04	0.04
Investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.02	-0.09	-0.16	-0.02	-0.08	-0.15	-0.02	-0.07	-0.12
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Exports	-0.02	-0.09	-0.16	-0.02	-0.08	-0.15	-0.02	-0.07	-0.12
Private excess demand	0.07	-0.04	-0.14	0.03	-0.07	-0.15	0.09	-0.03	-0.08
Total effect	0.50	-0.13	-0.18	0.21	-0.20	-0.20	0.69	-0.08	-0.11

Chinese economy is profit-led according to the three different measures of the income distribution. However, the marginal effect of an increase in labor share for the whole sample is rather modest: A 1% increase leads to 0.08 to 0.20% decrease in aggregate demand. Molero-Simarro (2015) even finds a weaker total effect of 0.01%. In contrast to those findings, Onaran and Galanis (2012) find a strong profit-led demand regime in which a rise in labor share leads to 1.93% shrinkage in total demand.

While investment and imports are not affected by the short term variations in the income distribution, consumption and exports are subject to change. An increase in consumption due to an rise in labor share is not sufficient to offset the latter's negative effect on exports, which is the main reason behind the profit-led character of the economy. In the last chapter we discuss the policy implications of those results along with our findings on South Korea and Thailand.

Chapter 8

General conclusion and policy implications

In this concluding chapter, we evaluate the econometric results found in Chapters 5, 6, and 7 and discuss policy implications. We start with a discussion on the shortcomings of the model that we employed in our analyses.

8.1 Shortcomings of the model

The post-Kaleckian model presented above brings along some shortcomings regarding some assumptions and operationalization of the equations. First, the exogenous income distribution assumption is questionable since production and distribution simultaneously take place they have feedback effects on each other. While it is plausible to consider the income distribution as an outcome of power

relations, more precisely that of class struggle between workers and capitalists, rather than marginal productivities of labor and capital; in terms of econometrics, using instrumental variables would give more reliable results. However, finding appropriate instruments with sufficient number of observations for the countries that we analyzed, especially for Thailand and China, is not an easy task.

Second, the model does not take into account financialization, especially issues concerning household debts and rentier class. These elements are especially important for determination of consumption and investment. “Debt-led consumption boom” has been a driving factor before the sub-prime crisis, especially in the U.S., the U.K., and Australia (Lavoie and Stockhammer 2013a, p.11). Integration of rentier class, who receive dividends and interest payments, in the model would be more complete for consumption and investment functions, as in the study by Onaran, Stockhammer, and Grafl (2011). However, availability of data rises as a problem in this case, as well.

Another shortcoming, in relation with the first one, is that the consumption equation that we used might be flawed due to econometric reasons. The reason behind employing a consumption equation, as a function of wages and profits, is to estimate the corresponding consumption propensities out of these two income types. Since national accounts do not provide data on decomposition of consumption, such an estimation becomes compulsory. The econometric problem that could arise is the collinearity of wages and profits. However, although *levels* of wages and profits are likely to be collinear, this is not necessarily the case for their *growth rates*, which is logarithmic differences in our case. The estimations

indicate that there is no long-run relationship between consumption, wages, and profits series for all the countries under examination. Therefore, the consumption equations are estimated in first differences of logarithms of these variables. VIFs also show no indication of collinearity among them.

The investment function and the data series used in its estimation also deserve to be discussed. The model does not take into account accumulation of capital, which is employed in the typical Kaleckian investment function, and its long-term effects. However, since our research is restrained to short-term demand growth, employing such an investment function is not inconsistent.¹ The investment data series also rises some questions, especially for China. It might be argued that the reason behind the insignificance of the profits in the regressions is that the investment of private and state enterprises of several kinds are not separately treated. However, such a treatment also requires information on the profits of private and state enterprises, which is not available to our knowledge.²

The relevance of the model, in reference to the remarks discussed in Section 4.4, is also open to discussion, especially when the sample period of econometric analysis is considered. The three countries passed through different and enor-

¹It might be argued that the series span a too long period for estimation of a short-term model. If monthly or quarterly data series were available for the variables, the equations could have been estimated for much shorter periods, in terms of years, since the number of observations would increase. Then the econometric estimations would have been much more consistent with the theoretical model.

²Onaran and Galanis (2012) assume that share of private investment in total investment is proportional to share of private profits in total profits. This assumption might not necessarily hold for China, in which the investment of state companies has not the same targets as the private ones. Onaran and Galanis (ibid.) also find that the profits are insignificant in the investment function.

mous transformations in terms of sectoral compositions of economy, labor force, and international trade. For South Korea, this transformation started the earliest and poses the least problem for the applicability of our model. Thailand is a second wave export-led country that followed the latter in Southeast Asia. However, China comes the latest among the three and the applicability of a post-Keynesian model is more questionable in terms of the sample period. However, when the current stage of development of capitalism is considered, lack of effective demand might argued to be a problem for these countries. Having sad that, this is not actually the case for the years during which the transformation started. That is to say, the econometric analysis should have covered a more recent period for China. For South Korea, this was not actually a problem, and for Thailand we used a subsample to have more reliable results. However, for China a post 1990 sample would be more appropriate, but this comes with the cost of decreasing sample size, which leads to less robust results. Future econometric research with larger and more recent sample sizes will give more reliable and robust results.

Last but not least, two other critiques regarding the theoretical framework and term-dependent character of demand regimes are worth mentioning. Palley (2014) underlines that demand regimes are not exogenous but they are endogenously determined. That is to say, beyond the conflict between pro-labor and pro-capital policies, it is possible to transform demand regimes of economies. The other critique by Blecker (2015) mentions the importance of the time dimension of characterization of demand regimes. He states that demand regimes that are profit-led in the short-run might be wage-led in the long-run. Regarding the components of

the aggregate demand, a higher profit share might lead to higher investment and net exports in the short-run, but its negative effects on consumption are likely to be evident in the long-run.³

8.2 General evaluation of the results

In this section we synthesize the econometric findings from Chapters 5, 6, and 7 and discuss them in comparison to each other. The findings about the estimated coefficients and demand regimes are summarized in Table 8.1.

The overall results show that the domestic regimes of the countries are wage-led, though for Thailand this is only the case according to one of the measures of the labor share⁴, while total economies are profit-led. This result is in line with the findings of the literature on most of the developing countries. The “perverse effects” (Stockhammer and Stehrer (2011) and Kapeller and Schutz (2015)) found for the consumption function of Thailand with the three other labor share measures is not a new phenomenon. Since *functionality* of distribution is the key element in determination of demand, redistribution of income in favor of profits might have a positive impact on consumption, as well.

The results clearly show that the short-run profit growth does not explain investment decisions. This result, as discussed before, is compatible with the findings in the literature. However, it should also be noted that financialization, which

³Although he does not propose econometric estimations, he argues through descriptive statistics that this is the case for the US.

⁴For the sub-sample 1980-2011, two measures point to wage-led consumption and domestic demand.

Table 8.1: Synthesis of econometric findings on demand regimes of South Korea, Thailand, and China

		South Korea			Thailand			China		
		1970-2011			1970-2011			1978-2011		
Equation	Parameter	ALS_1	ALS_2	ALS_3	ALS_4	ALS_3	ALS_1	ALS_2	ALS_3	ALS_3
Consumption	e_{CW}	0.71***	0.65***	0.55***	0.49***	0.40***	0.51***	0.46***	0.44***	0.45***
	e_{CR}	0.13***	0.16***	0.17***	0.24***	0.24***	0.21***	0.30***	0.31***	0.28***
Investment	e_{IY}	2.30***	2.40***	2.12**	2.14***	2.12***	1.82***	1.79***	1.79***	1.98***
Exports	e_{IR}	-	-	-	-	-	-	-	-	-
	β_1	0.38***		0.30***				0.67***		
	β_2	0.31***		0.30***				0.61***		
	κ_1	-0.76***		-0.67***				-0.70***		
Imports	κ_2	-0.63***		-0.66***				-0.69***		
	ρ	2.27***		1.67***				2.28***		
Domestic Prices	γ	-		0.91***				-		
	η	0.94***	0.63***	0.67***	0.55***	0.60***	0.68***	0.68***	0.64***	0.64***
Export Prices	μ	-	-	0.17**	0.19***	0.18**	0.18***	0.17***	0.19***	0.19***
	τ	0.65***		0.41***				0.91***		
Demand Regime	λ	0.22***		0.31***				0.20***		
	Domestic Total	W	W	P	P	P	P	W	W	W
h_2	P	P	P	P	P	P	P	P	P	P
	h_2	-1.24	-1.98	-2.63	-1.62	-1.95	-0.13	-0.20	-0.08	-0.08
		Sub-period 1980-2011								
Domestic Total	W	W	W	P	P	P	P	P	P	P
	P	P	P	P	P	P	P	P	P	P
h_2	-1.95	-1.08	-1.11	-1.28						

***, ** and * represent 1, 5, and 10% significance levels, respectively.
 β_1 and β_2 correspond to demand elasticity of exports with two different measures of world demand. In the same equations κ_1 and κ_2 are the corresponding price elasticities of exports.
W and P stand for wage-led and profit-led, respectively.

is not taken into account in our model, plays an import role in the relation between profits and investment. Onaran, Stockhammer, and Grafl (2011), in their study on the U.S., find a positive significant effect of the former on the latter, after deducting interest and dividends from the gross operating surplus. The insignificance of the profits in the investment function is in line with the statement of Bhaduri and Marglin (1990, p. 385) that “investment, particularly in long-lived fixed capital equipment, is likely to respond more cautiously to a change in profit margin/share compared to consumption”.

Another important result is that exports is the main factor behind the profit-led regimes in these three countries. A 1% increase in relative export prices translate into a decrease in exports between 0.67 to 0.76%. China benefits from the world demand growth almost twice than South Korea and Thailand. However, imports do not respond to price changes in the same way. Imports of South Korea and China are not affected by the relative prices of domestic and imported goods, moreover, in South Korea the import prices do not influence domestic prices. This points that imported goods are not substitutable with the domestic ones in those countries. However, the question of such a difference between Thailand and the other two countries deserves further explanation and in depth research on the structure and interdependence of economies. Since aggregate quantities and prices are employed in the analyses, sectoral composition is put aside by the model. An analysis, for example, by decomposing the imports and eliminating primary goods might give different results.

8.3 Policy implications

This dissertation draws two main policy conclusions on the demand regimes in South Korea, Thailand, and China. The first conclusion is that, while holding other conditions constant, an exogenous increase in labor income share in each of these countries, in isolation, leads to a decline in total demand. The second conclusion is that if all the countries pursue pro-capital policies, given the structure and growth regimes of the economies, the race to the bottom might end up in an overall decline in labor income share in the countries without leading to increased total demand. The second conclusion depends on the relative changes in the unit labor costs, hence the labor income shares. If pro-capital policies are pursued simultaneously, it is possible that profit share might increase along with a decreasing total GDP of the countries. However, in order to give a complete and definite picture of such policies, we have to conduct an analysis like that of Onaran and Galanis (2012), which takes into account the trade among the countries. This might be a future research topic on the East and South Asian economies.

As correctly stated by Palley (1998), “[i]n the pre-globalization era it might have been possible for countries to pursue ‘go-it-alone’ national wage-led recovery and growth programmes” (p. 237). He states that the room for wage-led policies are much more limited in this era due to higher leakages stemming from imports, investment leakages due to FDI. He proposes an international reform for applicability of wage-led policies and states that the a new financial architecture is the basic element of such a reform. Our findings are in line with the points

mentioned by him, though our model does not take into account financial issues.

The post-Keynesian framework is suitable for the analysis of the developing countries, however, within the given structures of the economies, pro-labor growth policies are far from applicable in short-run. Nevertheless, regional wage coordination might change the game. Further research taking into account the multilateral trade among the countries in the region might give more information on the applicability of such a cooperation. It should be noted that a common political agenda is the prior condition to be filled for such a cooperation. Lack of such a political agenda in the European Union, which is an economic and monetary union, gives an idea about the difficulty of such a task in East and Southeast Asia.

Appendix A

Data Sources

A.1 GDP and its components

The data series and the corresponding metadata are downloaded from the World Bank's website <http://data.worldbank.org> in April 2014. The GDP and its components are in 2005 dollars. The definitions of the series are presented in Table A.1.

A.1.1 Consumption

Household final consumption expenditure (2005 US\$): Household final consumption expenditure (formerly private consumption) is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes pay-

Table A.1: Data sources of GDP and its components

Variable	Series
Consumption	Household final consumption expenditure
Investment	Gross fixed capital formation
Exports	Exports of goods and services
Imports	Imports of goods and services
GDP at Market Prices	GDP
GDP at Factor Costs	Gross value added at factor cost

ments and fees to governments to obtain permits and licenses. Here, household consumption expenditure includes the expenditures of nonprofit institutions serving households, even when reported separately by the country. This item also includes any statistical discrepancy in the use of resources relative to the supply of resources. Data are in constant 2005 U.S. dollars. Series Code: NE.CON.PRVT.KD

A.1.2 Investment

Gross fixed capital formation (2005 US\$): Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. Data are in constant 2005 U.S. dollars. Series Code: NE.GDI.FTOT.KD

A.1.3 Exports

Exports of goods and services (2005 US\$): Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in constant 2005 U.S. dollars. Series Code: NE.EXP.GNFS.KD

A.1.4 Imports

Imports of goods and services (2005 US\$): Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in constant 2005 U.S. dollars. Series Code: NE.IMP.GNFS.KD

A.1.5 GDP at market prices

GDP(2005 US\$): GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2000 official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used. Series Code: NY.GDP.MKTP.KD

A.1.6 GDP at factor cost

Gross value added at factor cost (2005 US\$): Gross value added at factor cost (formerly GDP at factor cost) is derived as the sum of the value added in the agriculture, industry and services sectors. If the value added of these sectors is calculated at purchaser values, gross value added at factor cost is derived by subtracting net product taxes from GDP. Data are in constant 2005 U.S. dollars. Series Code: NY.GDP.FCST.KD

A.2 Labor income share

Table A.2: Labor income share in GDP at factor cost in South Korea, Thailand, and China (in %)

	South Korea	Thailand				China		
		ALS_1	ALS_2	ALS_3	ALS_4	ALS_1	ALS_2	ALS_3
1970	87.91	81.37	90.99	73.12	82.05			
1971	86.53	84.10	89.75	71.75	80.75			
1972	85.90	77.87	90.03	71.56	80.79			
1973	88.64	67.55	91.16	71.88	81.52			
1974	83.06	66.49	89.78	69.19	79.48			
1975	81.01	70.19	90.51	72.43	81.47			
1976	82.94	70.10	90.22	72.44	81.33			
1977	81.54	67.93	90.63	73.56	82.09			
1978	83.51	66.22	90.78	74.31	82.54	49.70	49.70	49.70
1979	84.95	68.27	89.80	73.86	81.83	51.80	51.80	51.80
1980	88.76	74.04	89.81	75.72	82.76	51.16	51.16	51.16
1981	87.33	70.23	87.64	72.08	79.86	52.68	52.68	52.68
1982	87.96	73.68	88.42	74.45	81.43	53.57	53.57	53.57
1983	87.78	76.71	87.74	74.15	80.95	53.57	53.57	53.57
1984	81.49	75.38	86.86	72.76	79.81	53.71	53.71	53.71
1985	78.38	73.78	85.58	70.65	78.12	52.98	52.98	52.98
1986	77.46	70.29	86.13	71.22	78.67	52.85	52.85	52.85
1987	76.66	68.34	86.66	71.38	79.02	52.06	52.06	52.06
1988	78.28	64.84	85.56	68.98	77.27	51.77	51.77	51.77
1989	79.49	62.54	83.42	65.29	74.35	51.50	51.50	51.50
1990	79.88	67.22	80.83	65.06	72.95	53.42	53.42	53.42
1991	79.43	65.71	78.05	62.16	70.10	52.17	52.17	52.17
1992	79.62	65.00	77.63	61.99	69.81	50.11	50.11	50.11
1993	81.26	68.44	76.44	61.97	69.21	49.45	49.45	49.45
1994	81.04	68.29	73.88	59.53	66.70	50.34	50.34	50.34
1995	82.26	72.08	72.06	59.23	65.64	51.39	51.39	51.39
1996	84.33	72.78	71.56	58.94	65.25	51.21	51.21	51.21
1997	81.43	77.52	73.74	62.09	67.91	51.06	51.06	51.06
1998	79.58	81.66	78.62	67.78	73.20	50.82	50.82	50.82
1999	76.77	78.64	84.53	74.14	79.34	49.95	49.95	49.95
2000	76.05	78.99	81.40	70.29	75.85	48.70	48.70	48.70
2001	77.09	82.27	82.44	72.13	77.29	48.28	48.28	48.28
2002	75.86	79.16	82.72	71.93	77.32	47.77	47.77	47.77
2003	76.27	78.28	84.23	73.59	78.91	46.14	46.14	46.14
2004	75.47	73.72	84.69	73.88	79.28	47.82	49.03	50.92
2005	76.93	74.74	81.48	70.12	75.80	44.72	46.00	48.03
2006	76.78	72.20	77.74	65.28	71.51	43.44	44.78	46.90
2007	75.22	71.46	77.44	64.66	71.05	43.27	44.71	46.98
2008	74.76	71.62	78.27	65.51	71.89	47.05	48.56	50.97
2009	73.36	76.34	78.20	66.54	72.37	50.49	51.61	55.08
2010	70.06	73.95	77.63	65.38	71.50	49.12	50.07	54.02
2011	70.28	72.91	76.92	64.33	70.63	49.59	50.06	55.25

Appendix B

Unit root, Bounds, and EG cointegration tests

Table B.1: Critical value bounds of F and t statistics for unrestricted intercept and no trend for k=2 for Pesaran's Bounds test

F statistic [†]						
Sample Size	10%		5%		1%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	3.44	4.47	4.27	5.47	6.18	7.87
35	3.39	4.41	4.18	5.33	6.14	7.61
40	3.37	4.37	4.13	5.26	5.89	7.34
t statistic [‡]						
	10%		5%		1%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	-2.57	-3.21	-2.86	-3.53	-3.43	-4.10

[†]Source: Narayan (2005), page 1988.

[‡]Source: Table CII(iii) from Pesaran, Shin, and Smith (2001, p.303).

B.1 South Korea

B.1.1 Unit root tests

Table B.2: ADF test of the variables of Korea for the period (1970-2011)

Variable	Level					First Difference				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$\ln C$	C	0	-2.17	-	0.02	C + T	0	-6.05	***	0.00
$\ln I$	C	2	-3.47	***	0.07	C + T	1	-5.83	***	0.05
$\ln X$	C + T	1	-4.35	***	-0.03	C + T	0	-5.60	***	0.01
$\ln M$	C + T	0	-2.28	-	0.02	C + T	1	-5.94	***	0.07
$\ln Y$	C	0	-2.73	*	0.06	C + T	0	-5.84	***	0.00
$\ln W$	C	0	-2.38	-	0.16	C + T	0	-5.28	***	0.02
$\ln R$	C + T	3	-4.68	***	0.15	C	5	-5.18	***	0.16
$\ln ULC$	-	1	-2.68	***	0.04	-	0	-3.75	***	0.05
$\ln P$	-	0	-3.89	***	0.21	-	0	-4.04	***	0.01
$\ln P_m$	C	1	-3.34	***	0.02	C	0	-4.47	***	0.05
$\ln P_x$	C	1	-3.48	***	-0.04	C	0	-4.64	***	0.01
$\ln P_x^{comp}$	-	1	-3.10	***	0.06	C	0	-3.53	***	0.05
$\ln P_x^{rel}$	C + T	0	-3.69	***	-0.07	-	0	-7.86	***	-0.13
$\ln P/P_m$	-	0	-1.87	*	0.09	-	0	-5.66	***	0.01
$\ln M_{w1}$		0	4.854	-	0.04	C	1	-6.04	***	-0.01
$\ln M_{w2}$	C + T	0	-3.123	-		C	1	-4.97	***	0.02

(1): Deterministic Components C:Constant, C+T: Constant and trend

(2): Number of Lags

(3): ADF test Statistic

(4): Significance

(5): First Order Autocorrelation of Residuals from the ADF Regression

B.1.2 Bounds tests

In each cell the number at the first line is the corresponding coefficient, the second the standard deviation, and the third is the t-statistic.



Table B.3: Bounds tests for consumption equation of Korea (1970-2011)

	(1)	(2)	(3)	(4) ^a	(5) ^a	(6) ^a
Constant	0.30	0.30	0.27	0.23	0.22	0.21
	0.28	0.29	0.28	0.24	0.24	0.24
	1.08	1.07	0.97	0.98	0.93	0.87
$\Delta \ln C(-1)$		0.04	0.04		0.01	0.02
		0.08	0.08		0.07	0.07
		0.47	0.53		0.19	0.26
$\Delta \ln C(-2)$			0.05			0.03
			0.08			0.07
			0.64			0.49
$\Delta \ln W$	0.99	0.99	1.03	0.78	0.78	0.82
	0.09	0.09	0.09	0.09	0.09	0.10
	11.12	10.92	11.24	8.47	8.40	8.33
$\Delta \ln R$	0.16	0.16	0.16	0.13	0.13	0.13
	0.02	0.03	0.02	0.02	0.02	0.02
	6.30	6.18	6.44	5.78	5.67	5.77
$\ln C(-1)$	-0.37	-0.41	-0.47	-0.27	-0.29	-0.34
	0.13	0.14	0.14	0.11	0.12	0.13
	-2.92	-2.94	-3.28	-2.50	-2.44	-2.66
$\ln W(-1)$	0.33	0.36	0.42	0.25	0.26	0.31
	0.11	0.12	0.12	0.09	0.10	0.11
	3.03	3.03	3.39	2.64	2.56	2.78
$\ln R(-1)$	0.03	0.04	0.04	0.02	0.02	0.03
	0.02	0.02	0.02	0.02	0.02	0.02
	1.46	1.59	1.85	1.01	1.10	1.31
$D98$				-0.08	-0.08	-0.07
				0.02	0.02	0.02
				-3.99	-3.85	-3.45
Diagnostics and Tests						
R-squared	0.83	0.83	0.85	0.88	0.89	0.89
Adj. R-squared	0.81	0.80	0.82	0.86	0.86	0.86
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	9.82	9.88	12.60	7.16	6.78	8.01
Bounds t-test statistic	-2.92	-2.94	-3.28	-2.50	-2.44	-2.66

a Autocorrelation at 1st lag at 5%

Table B.4: Bounds tests for investment equation of Korea (1970-2011)

	(1) ^a	(2) ^b	(3) ^b	(4)	(5) ^b	(6) ^b
Constant	0.58	-0.76	-0.36	0.20	-0.85	-0.42
	0.75	0.73	0.91	0.68	0.66	0.82
	0.78	-1.04	-0.39	0.29	-1.28	-0.51
$\Delta \ln I(-1)$		0.26	0.26		0.21	0.22
		0.08	0.08		0.07	0.07
		3.38	3.34		3.01	3.03
$\Delta \ln I(-2)$			-0.07			-0.07
			0.09			0.08
			-0.71			-0.85
$\Delta \ln Y$	2.37	2.40	2.26	2.35	2.37	2.24
	0.26	0.22	0.25	0.23	0.20	0.23
	9.20	11.04	9.05	10.26	12.11	9.95
$\Delta \ln R$	-0.05	-0.09	-0.09	-0.04	-0.07	-0.07
	0.07	0.06	0.06	0.06	0.05	0.05
	-0.82	-1.53	-1.53	-0.64	-1.32	-1.32
$\ln I(-1)$	-0.03	-0.10	-0.10	-0.04	-0.10	-0.09
	0.05	0.04	0.05	0.04	0.04	0.05
	-0.65	-2.41	-1.90	-0.95	-2.58	-1.99
$\ln Y(-1)$	-0.07	0.12	0.09	-0.02	0.13	0.09
	0.11	0.10	0.12	0.10	0.09	0.11
	-0.65	1.18	0.71	-0.25	1.38	0.81
$\ln R(-1)$	0.08	0.00	0.02	0.05	-0.01	0.01
	0.06	0.05	0.06	0.05	0.05	0.05
	1.39	0.03	0.30	1.08	-0.12	0.21
$D78$				0.14	0.11	0.11
				0.04	0.04	0.04
				3.23	2.92	2.88
Diagnostics and Tests						
R-squared	0.81	0.87	0.88	0.85	0.90	0.90
Adj. R-squared	0.78	0.85	0.85	0.82	0.87	0.88
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	4.64	8.26	8.55	3.84	8.70	8.47
Bounds t-test statistic	-0.65	-2.41	-1.90	-0.95	-2.58	-1.99

a Autocorrelation at 3rd lag at 5%

b Autocorrelation at 2nd lag at 1% and residuals non-normal at 5%

Table B.5: Bounds tests for exports equation (as a function of M_{w_1}) of Korea (1970-2011)

	(1) ^a	(2) ^b	(3)	(4)	(5) ^c	(6)
Constant	0.45	0.66	0.89	0.59	0.82	0.89
	0.43	0.47	0.45	0.29	0.31	0.33
	1.04	1.41	1.96	2.04	2.64	2.72
$\Delta \ln X(-1)$		-0.16	-0.17		0.07	0.04
		0.19	0.17		0.14	0.13
		-0.85	-1.00		0.50	0.29
$\Delta \ln X(-2)$			-0.55			-0.26
			0.17			0.14
			-3.12			-1.91
$\Delta \ln M_{w_1}$	0.11	0.11	0.09	0.28	0.29	0.27
	0.16	0.17	0.15	0.11	0.11	0.11
	0.66	0.68	0.63	2.51	2.65	2.42
$\Delta \ln P_x^{rel}$	-0.15	-0.03	-0.62	-0.40	-0.41	-0.63
	0.45	0.47	0.47	0.31	0.31	0.33
	-0.34	-0.07	-1.32	-1.31	-1.33	-1.90
$\ln X(-1)$	0.05	0.07	0.13	0.00	0.00	0.04
	0.06	0.07	0.06	0.04	0.05	0.05
	0.84	1.07	2.00	0.09	0.00	0.79
$\ln M_{w_1}(-1)$	-0.13	-0.19	-0.31	-0.05	-0.06	-0.14
	0.10	0.11	0.11	0.08	0.08	0.09
	-1.29	-1.62	-2.73	-0.62	-0.70	-1.51
$\ln P_x^{rel}(-1)$	0.12	0.31	0.38	0.43	0.64	0.61
	0.33	0.38	0.36	0.24	0.26	0.27
	0.36	0.83	1.06	1.79	2.45	2.23
$D73$				0.25	0.22	0.20
				0.07	0.07	0.07
				3.83	3.27	2.80
$D74$				-0.25	-0.29	-0.27
				0.07	0.07	0.08
				-3.67	-3.92	-3.58
$D76$				0.24	0.25	0.19
				0.07	0.07	0.08
				3.21	3.43	2.54
Diagnostics and Tests						
R-squared	0.26	0.29	0.40	0.70	0.73	0.73
Adj. R-squared	0.16	0.16	0.27	0.63	0.65	0.64
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	6.60	9.14	14.57	7.59	9.78	9.97
Bounds t-test statistic	0.84	1.07	2.00	0.09	0.00	0.79

a Autocorrelation at 2nd lag at 1% and residuals non-normal at 5%

b Autocorrelation at 2nd lag at 5% and residuals non-normal at 5%

c Autocorrelation at 2nd lag at 5%

Table B.6: Bounds tests for exports equation (as a function of M_{w_2}) of Korea (1970-2011)

	(1) ^a	(2) ^a	(3)	(4)	(5)	(6)
Constant	0.57 0.48 1.19	0.68 0.52 1.29	0.75 0.52 1.45	0.63 -0.33 1.89	0.78 0.36 2.17	0.75 0.38 1.98
$\Delta \ln X(-1)$		-0.07 0.19 -0.37	-0.05 0.18 -0.25		0.12 0.14 0.83	0.11 0.14 0.74
$\Delta \ln X(-2)$			-0.43 0.19 -2.30			-0.16 0.14 -1.10
$\Delta \ln M_{w_2}$	0.17 0.16 1.07	0.16 0.16 0.97	0.14 0.16 0.90	0.23 0.12 2.01	0.22 0.12 1.92	0.21 0.12 1.76
$\Delta \ln P_x^{rel}$	-0.18 0.45 -0.39	-0.13 0.47 -0.27	-0.63 0.51 -1.22	-0.34 0.32 -1.07	-0.38 0.33 -1.15	-0.51 0.38 -1.35
$\ln X(-1)$	0.02 0.09 0.28	0.04 0.09 0.39	0.09 0.09 0.92	0.00 0.06 -0.01	-0.01 0.06 -0.17	0.00 0.07 0.07
$\ln M_{w_2}(-1)$	-0.07 0.12 -0.58	-0.10 0.13 -0.72	-0.18 0.14 -1.30	-0.03 0.09 -0.38	-0.03 0.09 -0.29	-0.05 0.11 -0.46
$\ln P_x^{rel}(-1)$	0.11 0.35 0.32	0.21 0.40 0.52	0.16 0.39 0.40	0.41 0.26 1.58	0.56 0.29 1.92	0.47 0.30 1.55
$D73$				0.23 0.07 3.14	0.20 0.07 2.65	0.20 0.08 2.56
$D74$				-0.23 0.07 -3.21	-0.27 0.08 -3.35	-0.24 0.09 -2.81
$D76$				0.27 0.07 3.56	0.27 0.08 3.66	0.25 0.08 3.21
Diagnostics and Tests						
R-squared	0.24	0.23	0.29	0.66	0.68	0.66
Adj. R-squared	0.13	0.10	0.12	0.58	0.58	0.54
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	4.94	4.61	6.65	6.51	6.27	
Bounds t-test statistic	0.28	0.39	0.92	-0.01	-0.17	0.07

a Autocorrelation at 2nd lag at 5%

B.1.3 Engle-Granger cointegration tests

Table B.7: Engle-Granger cointegration test for the imports equation for Korea (1970-2011)

Cointegrating Regression: $\ln M = \text{constant} + \ln Y + \ln P/P_m + u$	
Estimated value of $(a_{\frac{\pi}{\pi}} - 1)$	-0.18
Test statistic	-1.92
P-value [†]	0.77
First order autocorrelation coefficient for $e_{\frac{\pi}{\pi}}$	0.04

[‡] e is the residual series from the Dickey Fuller Test for $\hat{u}$: $\hat{u}_t - \hat{u}_{t-1} = (a - 1)\hat{u}_{t-1} + e_t$

[†]P-values are based on MacKinnon (1996).

B.2 Thailand

B.2.1 Unit root tests

Table B.8: ADF test of the variables of Thailand for the period (1970-2011)

Variable	Level					First Difference				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$\ln C$	C	1	-1.80	-	0.05	C	0	-3.89	***	0.05
$\ln I$	-	1	1.21	-	0.11	-	0	-3.44	***	0.10
$\ln X$	-	0	7.25	-	0.03	C	1	-6.15	***	-0.02
$\ln M$	-	0	3.29	-	0.10	C	0	-5.74	***	0.04
$\ln Y$	C	1	-1.80	-	0.00	C	0	3.66	***	0.00
$\ln W_1$	-	0	7.42	-	0.22	C	0	-5.00	***	0.03
$\ln W_2$	C	0	-2.12	-	-0.07	C+T	0	-6.53	***	-0.01
$\ln W_3$	C	0	-2.12	-	-0.21	C+T	0	-7.63	***	-0.04
$\ln W_4$	-	0	7.42	-	-0.02	C+T	0	-7.03	***	-0.03
$\ln R_1$	C+T	0	-2.52	-	0.10	C	0	-5.56	***	0.07
$\ln R_2$	-	1	2.11	-	0.02	C	1	-4.34	***	0.02
$\ln R_3$	C+T	1	-1.99	-	-0.03	C	0	-4.55	***	0.00
$\ln R_4$	C+T	1	-1.93	-	-0.03	C	0	-4.41	***	0.01
$\ln ULC_1$	-	1	-2.43	**	0.02	C	0	-4.27	***	0.04
$\ln ULC_2$	-	0	-3.62	***	0.22	C	0	-4.77	***	0.05
$\ln ULC_3$	-	0	-3.78	***	0.13	C	0	-5.16	***	0.03
$\ln ULC_4$	-	0	-3.73	***	0.18	C	0	-4.93	***	0.04
$\ln P$	-	1	-2.73	-	0.05	C	0	-4.01	***	0.08
$\ln P_m$	-	0	-2.65	***	0.06	C	0	-4.24	***	0.07
$\ln P_x$	C+T	1	-4.46	***	0.11	C	1	-4.90	***	-0.07
$\ln P_x^{comp}$	-	1	-3.05	***	0.02	C	0	-3.64	***	0.00
$\ln P_x^{rel}$	C+T	1	-3.61	**	0.09	C+T	4	-6.79	***	0.01
$\ln P/P_m$	-	0	-2.51	**	0.10	-	1	-5.85	***	0.07
$\ln M_{w_1}$	C+T	0	-2.41	-	0.03	C+T	1	-5.49	***	-0.04
$\ln M_{w_2}$	C+T	0	-3.12	-	0.11	C	1	-4.97	***	0.02

- (1): Deterministic Components C:Constant, C+T: Constant and trend
(2): Number of Lags
(3): ADF test Statistic
(4): Significance
(5): First Order Autocorrelation of Residuals from the ADF Regression

Table B.9: ADF test of the variables of Thailand for the period (1980-2011)

Variable	Level					First Difference				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$\ln C$	C	1	2.34	-	0.03	C	0	-3.46	**	0.04
$\ln I$	C	1	-1.87	-	0.07	-	0	-3.08	***	0.09
$\ln X$	C	0	-1.81	-	0.01	C+T	0	-5.39	***	-0.02
$\ln M$	-	0	2.81	-	0.15	C	0	-4.64	***	0.02
$\ln Y$	C	1	-1.65	-	0.00	C	0	-3.11	**	0.00
$\ln W_1$	C	0	-2.02	-	0.12	C	0	-4.78	***	0.06
$\ln W_2$	-	0	5.88	-	0.01	C	0	-5.44	***	0.00
$\ln W_3$	-	0	5.85	-	-0.14	C	0	-6.32	***	-0.01
$\ln W_4$	-	0	5.96	-	-0.05	C	0	-5.71	***	0.00
$\ln R_1$	-	0	1.69	-	0.02	C	0	-5.46	***	0.04
$\ln R_2$	-	1	1.63	-	0.03	-	0	-3.04	***	-0.01
$\ln R_3$	-	1	1.82	-	0.01	C	1	-3.87	***	0.01
$\ln R_4$	-	1	1.75	-	0.02	C	0	-3.67	***	0.05
$\ln P$	-	1	-1.06	-	0.02	-	0	-3.67	***	0.05
$\ln ULC_1$	-	0	-1.57	-	-0.01	-	0	-4.30	***	0.14
$\ln ULC_2$	-	0	-1.45	-	0.17	-	0	-4.53	***	-0.01
$\ln ULC_3$	-	0	-1.67	*	0.04	-	0	-4.99	***	-0.04
$\ln ULC_4$	-	0	-1.59	-	0.11	-	0	-5.04	***	0.04
$\ln P_m$	-	0	-1.30	-	0.12	-	0	-3.11	***	0.14
$\ln P_x$	-	1	-0.90	-	0.05	-	0	-3.37	***	0.15
$\ln P_x^{comp}$	-	1	-1.40	-	0.05	-	0	-3.25	***	0.08
$\ln P_x^{rel}$	-	0	-1.30	-	-0.11	C+T	1	-7.08	***	-0.01
$\ln P/P_m$	-	4	-1.73	*	0.04	-	0	-4.65	***	0.04
$\ln M_{w1}$	-	0	4.14	-	-0.08	C	0	-5.91	***	0.00
$\ln M_{w2}$	-	0	4.22	-	-0.04	C	0	-5.59	***	0.03

(1): Deterministic Components C:Constant, C+T: Constant +Trend

(2): Number of Lags

(3): ADF test Statistic

(4): Significance

(5): First Order Autocorrelation of Residuals from the ADF Regression

B.2.2 Bounds tests

In each cell the number at the first line is the corresponding coefficient, the second the standard deviation, and the third is the t-statistic.



Table B.10: Bounds tests for consumption equation of Thailand (1970-2011)
Panel 1/2

	ALS_1			ALS_2		
	(1) ^a	(2) ^b	(3) ^a	(1)	(2)	(3) ^c
Constant	0.75	0.79	0.76	1.11	0.83	0.86
	0.34	0.32	0.36	0.39	0.38	0.40
	2.19	2.50	2.13	2.85	2.19	2.14
$\Delta \ln C(-1)$		0.22	0.23		0.23	0.27
		0.08	0.09		0.11	0.12
		2.68	2.61		2.05	2.20
$\Delta \ln C(-2)$			-0.02			-0.07
			0.09			0.10
			-0.26			-0.72
$\Delta \ln W$	0.58	0.62	0.61	0.53	0.57	0.57
	0.08	0.07	0.08	0.08	0.08	0.08
	7.74	8.42	7.93	6.65	7.34	7.25
$\Delta \ln R$	0.15	0.14	0.14	0.15	0.11	0.11
	0.02	0.02	0.02	0.03	0.04	0.04
	7.91	7.18	6.96	4.59	2.82	2.63
$\ln C(-1)$	-0.26	-0.28	-0.26	-0.30	-0.23	-0.23
	0.12	0.11	0.13	0.10	0.10	0.11
	-2.18	-2.50	-2.10	-2.97	-2.26	-2.22
$\ln W(-1)$	0.17	0.20	0.19	0.20	0.15	0.15
	0.09	0.09	0.10	0.08	0.08	0.08
	1.82	2.40	1.92	2.50	1.89	1.78
$\ln R(-1)$	0.07	0.04	0.04	0.06	0.05	0.05
	0.02	0.02	0.02	0.02	0.02	0.02
	3.26	1.97	1.84	2.95	2.29	2.32
Diagnostics and Tests						
R-squared	0.82	0.85	0.85	0.76	0.80	0.80
Adj. R-squared	0.79	0.83	0.82	0.72	0.76	0.76
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	11.47	6.54	5.28	10.30	6.05	6.15
Bounds t-test statistic	-2.18	-2.50	-2.10	-2.97	-2.26	-2.22

a Autocorrelation at 8th lag at 5%

b Autocorrelation at 8th lag at 1%

c Autocorrelation at 2nd and 8th lags at 5%

Table B.11: Bounds tests for consumption equation of Thailand (1970-2011)
Panel 2/2

	ALS_3			ALS_4		
	(1)	(2) ^a	(3) ^a	(1)	(2) ^a	(3) ^a
Constant	1.00	0.72	0.72	1.07	0.78	0.79
	0.31	0.30	0.31	0.33	0.32	0.34
	3.25	2.43	2.36	3.24	2.39	2.32
$\Delta \ln C(-1)$		0.25	0.30		0.25	0.30
		0.10	0.11		0.10	0.12
		2.58	2.69		2.38	2.49
$\Delta \ln C(-2)$			-0.07			-0.07
			0.09			0.10
			-0.70			-0.71
$\Delta \ln W$	0.49	0.53	0.54	0.51	0.55	0.56
	0.07	0.07	0.07	0.08	0.08	0.08
	6.56	7.38	7.31	6.51	7.24	7.16
$\Delta \ln R$	0.21	0.17	0.16	0.18	0.13	0.13
	0.04	0.04	0.04	0.04	0.04	0.04
	5.82	4.17	3.80	5.07	3.22	2.91
$\ln C(-1)$	-0.33	-0.27	-0.28	-0.33	-0.27	-0.27
	0.10	0.10	0.11	0.10	0.10	0.11
	-3.18	-2.63	-2.60	-3.18	-2.56	-2.53
$\ln W(-1)$	0.19	0.17	0.17	0.20	0.17	0.17
	0.07	0.07	0.08	0.08	0.08	0.08
	2.61	2.32	2.21	2.64	2.22	2.13
$\ln R(-1)$	0.11	0.08	0.08	0.09	0.07	0.07
	0.03	0.03	0.03	0.03	0.03	0.03
	3.55	2.63	2.67	3.37	2.53	2.57
Diagnostics and Tests						
R-squared	0.77	0.81	0.82	0.77	0.81	0.81
Adj. R-squared	0.74	0.78	0.78	0.73	0.77	0.77
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	12.75	7.53	7.68	12.12	7.27	7.41
Bounds t-test statistic	-3.18	-2.63	-2.60	-3.18	-2.56	-2.53

a Autocorrelation at 8th lag at 5%

Table B.12: Bounds tests for investment equation of Thailand (1970-2011) for ALS_1

	(1)	(2)	(3)	(4) ^a	(5) ^b	(6) ^c	(7) ^b
Constant	-0.57 0.28 -2.03	-0.57 0.28 -2.04	-0.74 0.29 -2.56	-0.58 0.25 -2.29	-0.52 0.24 -2.15	-0.66 0.23 -2.85	-0.64 0.26 -2.41
$\Delta \ln I(-1)$		0.17 0.07 2.64	0.16 0.07 2.30		0.17 0.06 2.92		0.16 0.06 2.64
$\Delta \ln I(-2)$			-0.05 0.07 -0.67				-0.04 0.06 -0.71
$\Delta \ln Y$	3.27 0.30 11.05	3.09 0.30 10.27	3.13 0.31 10.22	2.77 0.31 8.90	2.66 0.30 9.01	2.67 0.28 9.53	2.71 0.31 8.68
$\Delta \ln Y(-1)$						0.74 0.21 3.61	
$\Delta \ln R$	-0.08 0.07 -1.15	-0.07 0.08 -1.00	-0.09 0.08 -1.15	-0.09 0.06 -1.38	-0.10 0.07 -1.52	-0.10 0.06 -1.65	-0.10 0.07 -1.50
$\ln I(-1)$	-0.14 0.04 -3.79	-0.15 0.04 -4.32	-0.16 0.04 -4.15	-0.08 0.04 -2.02	-0.09 0.04 -2.40	-0.10 0.04 -2.91	-0.10 0.04 -2.31
$\ln Y(-1)$	0.13 0.05 2.62	0.17 0.05 3.23	0.14 0.06 2.30	0.08 0.05 1.80	0.14 0.05 2.87	0.18 0.05 3.60	0.11 0.05 2.07
$\ln R(-1)$	0.03 0.05 0.68	-0.01 0.05 -0.10	0.04 0.06 0.73	0.02 0.04 0.37	-0.04 0.05 -0.74	-0.06 0.05 -1.23	0.00 0.06 0.02
D_{9798}				-0.15 0.05 -3.06	-0.15 0.05 -3.25	-0.14 0.04 -3.34	-0.13 0.05 -2.85
Diagnostics and Tests							
R-squared	0.89	0.91	0.92	0.91	0.93	0.94	0.94
Adj. R-squared	0.88	0.89	0.90	0.90	0.92	0.93	0.92
Sample Size	41	40	39	41	40	40	39
Bounds F-test statistic	19.95	26.29	23.15	9.66	13.69	20.31	11.16
Bounds t-test statistic	-3.79	-4.32	-4.15	-2.02	-2.40	-2.91	-2.31

a Autocorrelation at 7th lag at 5%

b Autocorrelation at 1st, 2nd and 7th lags at 5%

c Autocorrelation at 5th lag at 5%

Table B.13: Bounds tests for investment equation of Thailand (1970-2011) for ALS_2

	(1)	(2) ^a	(3) ^a	(4) ^b	(5) ^c
Constant	-0.11	0.53	0.24	-1.08	-0.46
	1.24	1.25	1.37	1.23	1.21
	-0.09	0.42	0.18	-0.88	-0.38
$\Delta \ln I(-1)$		0.15	0.16		0.16
		0.07	0.08		0.07
		2.03	1.90		2.32
$\Delta \ln I(-2)$			-0.02		
			0.07		
			-0.25		
$\Delta \ln Y$	2.72	2.67	2.71	2.43	2.37
	0.24	0.25	0.26	0.26	0.25
	11.18	10.89	10.39	9.39	9.33
$\Delta \ln R$	0.22	0.15	0.13	0.12	0.03
	0.09	0.10	0.11	0.10	0.10
	2.42	1.48	1.22	1.19	0.32
$\ln I(-1)$	-0.14	-0.19	-0.17	-0.04	-0.09
	0.07	0.07	0.08	0.07	0.07
	-2.06	-2.73	-2.24	-0.53	-1.21
$\ln Y(-1)$	0.10	0.08	0.09	0.11	0.09
	0.09	0.08	0.09	0.08	0.08
	1.12	0.92	1.00	1.39	1.21
$\ln R(-1)$	0.04	0.09	0.07	-0.04	0.01
	0.10	0.10	0.10	0.10	0.09
	0.40	0.90	0.66	-0.40	0.09
$D9798$				-0.13	-0.13
				0.05	0.05
				-2.38	-2.60
Diagnostics and Tests					
R-squared	0.90	0.91	0.91	0.92	0.93
Adj. R-squared	0.89	0.90	0.89	0.90	0.91
Sample Size	41	40	39	41	40
Bounds F-test statistic	18.52	22.74	17.41	9.07	11.08
Bounds t-test statistic	-2.06	-2.73	-2.24	-0.53	-1.21

a Autocorrelation at 5th lag at 5%.

b Autocorrelation at 2nd, 5th and 7th lag at 5%.

c Autocorrelation at 5th lag at 1% and at 7th lag at 5%.

Table B.14: Bounds tests for investment equation of Thailand (1970-2011) for ALS_3

	(1)	(2) ^a	(3) ^a	(4) ^b	(5) ^c	(6) ^d
Constant	-0.41	-0.46	-0.57	-0.62	-0.67	-0.75
	0.45	0.43	0.46	0.42	0.39	0.41
	-0.92	-1.08	-1.22	-1.49	-1.74	-1.81
$\Delta \ln I(-1)$		0.18	0.21		0.19	0.23
		0.07	0.08		0.06	0.07
		2.62	2.65		3.05	3.21
$\Delta \ln I(-2)$			-0.04			-0.06
			-0.07			-0.06
			-0.62			-1.02
$\Delta \ln Y$	2.82	2.84	2.92	2.47	2.47	2.53
	0.28	0.27	0.29	0.29	0.27	0.28
	9.97	10.46	10.12	8.48	9.11	8.91
$\Delta \ln R$	0.18	0.03	-0.01	0.08	-0.07	-0.11
	0.11	0.12	0.13	0.11	0.11	0.12
	1.57	0.27	-0.05	0.75	-0.61	-0.95
$\ln I(-1)$	-0.12	-0.16	-0.15	-0.05	-0.08	-0.06
	0.05	0.05	0.05	0.06	0.05	0.05
	-2.40	-3.11	-2.77	-0.89	-1.53	-1.19
$\ln Y(-1)$	0.08	0.12	0.12	0.07	0.12	0.11
	0.07	0.07	0.08	0.07	0.06	0.07
	1.12	1.76	1.64	1.07	1.82	1.60
$\ln R(-1)$	0.05	0.04	0.04	0.00	-0.02	-0.02
	0.10	0.09	0.09	0.09	0.08	0.08
	0.54	0.46	0.38	-0.05	-0.22	-0.25
$D9798$				-0.14	-0.15	-0.15
				0.05	0.05	0.05
				-2.70	-3.08	-3.11
Diagnostics and Tests						
R-squared	0.89	0.91	0.91	0.91	0.93	0.93
Adj. R-squared	0.87	0.89	0.89	0.89	0.91	0.91
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	13.86	21.03	16.85	6.88	11.68	9.05
Bounds t-test statistic	-2.40	-3.11	-2.77	-0.89	-1.53	-1.18

a Autocorrelation at 5th lag at 5%.

b Autocorrelation at 2nd and 5th lag at 5%, at 7th lag at 1%.

c Autocorrelation at 5th lag at 1% and 7th lag at 5%.

d Autocorrelation at 1st and 7th lag at 5% and at 5th lag at 1%.

Table B.15: Bounds tests for investment equation of Thailand (1970-2011) for ALS_4

	(1)	(2) ^a	(3) ^a	(4) ^b	(5) ^c	(6) ^d
Constant	-0.33 0.70 -0.47	-0.26 0.67 -0.38	-0.41 0.73 -0.56	-0.75 0.67 -1.12	-0.69 0.62 -1.10	-0.82 0.66 -1.24
$\Delta \ln I(-1)$		0.17 0.07 2.35	0.19 0.08 2.32	0.00	0.18 0.06 2.77	0.21 0.07 2.90
$\Delta \ln I(-2)$			-0.03 0.07 -0.48			-0.06 0.06 -0.94
$\Delta \ln Y$	2.76 0.27 10.24	2.77 0.26 10.48	2.83 0.28 10.08	2.43 0.28 8.71	2.43 0.27 9.13	2.47 0.28 8.90
$\Delta \ln R$	0.21 0.10 1.98	0.08 0.12 0.70	0.05 0.12 0.40	0.11 0.10 1.01	-0.03 0.11 -0.29	-0.07 0.12 -0.63
$\ln I(-1)$	-0.12 0.06 -2.19	-0.16 0.06 -2.85	-0.15 0.06 -2.47	-0.04 0.06 -0.70	-0.08 0.06 -1.32	-0.06 0.06 -0.93
$\ln Y(-1)$	0.09 0.08 1.18	0.11 0.08 1.49	0.12 0.08 1.46	0.09 0.07 1.23	0.11 0.07 1.63	0.11 0.07 1.50
$\ln R(-1)$	0.04 0.10 0.39	0.05 0.09 0.54	0.04 0.10 0.40	-0.02 0.09 -0.25	-0.01 0.09 -0.16	-0.03 0.09 -0.29
D_{9798}				-0.14 0.05 -2.58	-0.15 0.05 -2.95	-0.15 0.05 -2.99
Diagnostics and Tests						
R-squared	0.89	0.91	0.91	0.91	0.93	0.93
Adj. R-squared	0.88	0.89	0.89	0.89	0.91	0.91
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	15.06	20.89	16.46	7.43	11.23	8.51
Bounds t-test statistic	-2.19	-2.85	-2.47	-0.70	-1.32	-0.93

a Autocorrelation at 5th lag at 5%

b Autocorrelation at 2nd and 5th lag at 5%, at 7th lag at 1%

c Autocorrelation at 5th lag at 1% and 7th lag at 5%

d Autocorrelation at 7th lag at 5% and at 5th lag at 1%

Table B.16: Bounds tests for exports equation of Thailand (1970-2011)

	Simple Sum			Weighted Sum		
	(1)	(2)	(3)	(1)	(2)	(3)
Constant	0.00	-0.06	-0.02	0.24	0.34	1.15
	0.30	0.30	0.32	0.46	0.48	0.55
	-0.01	-0.20	-0.06	0.53	0.70	2.11
$\Delta \ln X(-1)$		-0.24	-0.23		-0.16	-0.10
		0.15	0.17		0.15	0.15
		-1.58	-1.33		-1.09	-0.70
$\Delta \ln X(-2)$			0.04			0.10
			0.18			0.15
			0.23			0.63
$\Delta \ln M_{wi}$	0.37	0.38	0.38	0.40	0.41	0.49
	0.11	0.11	0.11	0.11	0.11	0.11
	3.41	3.51	3.42	3.81	3.81	4.65
$\Delta \ln P_x^{rel}$	-0.99	-1.07	-1.04	-1.02	-0.99	-0.70
	0.25	0.28	0.29	0.25	0.29	0.29
	-3.92	-3.90	-3.56	-4.02	-3.46	-2.38
$\ln X(-1)$	-0.03	-0.03	-0.04	-0.04	-0.05	-0.15
	0.04	0.04	0.05	0.04	0.04	0.05
	-0.76	-0.71	-0.86	-1.07	-1.28	-2.77
$\ln M_{wi}(-1)$	0.05	0.05	0.07	0.07	0.09	0.20
	0.04	0.05	0.06	0.04	0.05	0.06
	1.06	1.05	1.15	1.53	1.73	3.16
$\ln P_x^{rel}(-1)$	-0.67	-0.92	-0.86	-0.61	-0.76	-0.40
	0.24	0.27	0.35	0.23	0.27	0.34
	-2.86	-3.36	-2.46	-2.59	-2.79	-1.20
Diagnostics and Tests						
R-squared	0.41	0.44	0.44	0.45	0.47	0.56
Adj. R-squared	0.32	0.34	0.31	0.37	0.38	0.46
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	8.80	11.98	8.02	11.42	13.93	18.32
Bounds t-test statistic	-0.77	-0.71	-0.86	-1.07	-1.28	-2.77

Table B.17: Bounds tests for imports equation of Thailand (1970-2011)

	(1)	(2)	(3)
Constant	-3.77	-4.35	-4.45
	1.62	1.78	1.98
	-2.32	-2.44	-2.25
$\Delta \ln M(-1)$		0.08	0.08
		0.11	0.12
		0.66	0.67
$\Delta \ln M(-2)$			-0.12
			0.11
			-1.09
$\Delta \ln Y$	1.74	1.57	1.90
	0.39	0.45	0.50
	4.52	3.47	3.82
$\Delta \ln P/Pm$	0.80	0.91	0.68
	0.24	0.28	0.31
	3.29	3.26	2.18
$\ln M(-1)$	-0.32	-0.38	-0.35
	0.11	0.13	0.15
	-2.85	-2.86	-2.34
$\ln Y(-1)$	0.46	0.54	0.52
	0.17	0.20	0.22
	2.73	2.77	2.36
$\ln P/Pm(-1)$	0.06	0.08	0.07
	0.20	0.20	0.20
	0.32	0.38	0.32
Diagnostics and Tests			
R-squared	0.72	0.70	0.73
Adj. R-squared	0.67	0.65	0.67
Sample Size	41	40	39
Bounds F-test statistic	10.91	10.43	8.95
Bounds t-test statistic	-2.85	-2.86	-2.34

Table B.18: Bounds tests for domestic price equation of Thailand (1970-2011) for ALS_1

	(1)	(2)	(3)	(4) ^a	(5)	(6)	(7)	(8)	(9)
Constant	0.10	0.13	0.12	0.10	0.12	0.10	0.07	0.08	0.06
	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	1.56	2.07	1.82	1.65	2.01	1.66	1.17	1.44	1.00
$\Delta \ln P(-1)$		0.06	0.08		0.05	0.06		-0.01	-0.01
		0.09	0.09		0.09	0.09		0.08	0.09
		0.63	0.84		0.55	0.68		-0.14	-0.07
$\Delta \ln P(-2)$			-0.10			-0.06			-0.04
			0.08			0.08			0.08
			-1.18			-0.70			-0.46
$\Delta \ln P_m$	0.25	0.29	0.29	0.18	0.23	0.24	0.19	0.24	0.27
	0.12	0.12	0.12	0.11	0.11	0.12	0.11	0.11	0.11
	2.06	2.52	2.43	1.59	1.99	2.06	1.83	2.30	2.43
$\Delta \ln ULC$	0.80	0.76	0.77	0.79	0.76	0.76	0.63	0.63	0.61
	0.11	0.10	0.10	0.09	0.10	0.10	0.11	0.11	0.11
	7.66	7.46	7.39	8.34	7.85	7.62	5.72	5.87	5.54
$\ln P(-1)$	-0.29	-0.33	-0.29	-0.29	-0.32	-0.28	-0.19	-0.20	-0.15
	0.12	0.12	0.13	0.11	0.11	0.12	0.11	0.11	0.13
	-2.49	-2.90	-2.24	-2.74	-2.95	-2.27	-1.83	-1.77	-1.19
$\ln P_m(-1)$	0.11	0.09	0.07	0.13	0.12	0.10	0.11	0.08	0.07
	0.07	0.07	0.07	0.06	0.06	0.07	0.06	0.06	-0.07
	1.62	1.40	0.92	2.19	1.82	1.44	1.95	1.31	1.11
$\ln ULC(-1)$	0.17	0.22	0.20	0.15	0.19	0.17	0.08	0.12	0.08
	0.11	0.11	0.11	0.10	0.10	0.11	0.10	0.10	0.11
	1.49	2.04	1.79	1.48	1.90	1.55	0.84	1.16	0.74
$D7374$				0.09	0.07	0.06	0.10	0.08	0.09
				0.03	0.03	0.03	0.03	0.03	0.03
				3.03	2.16	1.93	3.62	2.74	2.64
$D9798$							-0.08	-0.08	-0.08
							0.03	0.03	0.03
							-2.51	-2.40	-2.43
Diagnostics and Tests									
R-squared	0.80	0.84	0.84	0.84	0.86	0.86	0.87	0.88	0.89
Adj. R-squared	0.77	0.81	0.81	0.81	0.83	0.82	0.84	0.85	0.85
Sample Size	41	40	39	41	40	39	41	40	39
Bounds F-test statistic	6.88	10.61	6.3	8.42	9.04	5.21	5.4	3.27	2.09
Bounds t-test statistic	-2.49	-2.9	-2.24	-2.74	-2.95	-2.27	-1.83	-1.77	-1.19

a Autocorrelation at 1st lag 5% and residuals non-normal at 5%

Table B.19: Bounds tests for domestic price equation of Thailand (1970-2011) for ALS_2

	(1) ^a	(2) ^b	(3) ^b	(4)	(5)	(6)
Constant	0.09	0.06	0.07	0.07	0.04	0.03
	0.03	0.03	0.04	0.03	0.03	0.04
	3.23	1.84	1.83	2.31	1.15	0.74
$\Delta \ln P(-1)$		0.15	0.14		0.10	0.12
		0.07	0.07		0.06	0.06
		2.15	2.05		1.57	1.84
$\Delta \ln P(-2)$			-0.01			
			0.06			
			-0.18			
$\Delta \ln P_m$	0.17	0.14	0.15	0.17	0.16	0.18
	0.08	0.09	0.09	0.08	0.08	0.08
	1.98	1.61	1.63	2.21	1.95	2.19
$\Delta \ln ULC$	0.82	0.79	0.79	0.69	0.67	0.70
	0.07	0.07	0.07	0.07	0.07	0.07
	12.38	11.69	11.21	9.52	9.00	9.39
$\ln P(-1)$	-0.08	-0.08	-0.08	-0.02	-0.02	0.01
	0.08	0.07	0.08	0.07	0.08	0.08
	-1.08	-1.10	-1.09	-0.33	-0.22	0.11
$\ln P_m(-1)$	-0.04	0.00	0.00	-0.03	-0.01	-0.02
	0.05	0.05	0.05	0.05	0.05	0.05
	-0.78	0.04	-0.02	-0.65	-0.14	-0.42
$\ln ULC(1)$	0.18	0.12	0.13	0.11	0.06	0.04
	0.06	0.06	0.07	0.06	0.07	0.07
	3.24	1.83	1.82	1.90	0.88	0.55
$D7374$				0.05	0.03	
				0.02	0.02	
				2.08	1.50	
$D9798$				-0.07	-0.07	-0.06
				0.02	0.03	0.03
				-2.87	-2.57	-2.35
Diagnostics and Tests						
R-squared	0.90	0.91	0.92	0.93	0.93	0.93
Adj. R-squared	0.89	0.90	0.90	0.91	0.91	0.91
Sample Size	41	40	39	41	40	40
Bounds F-test statistic	14.18	4.42	4.09	11.68	3.44	1.75
Bounds t-test statistic	-1.08	-1.1	-1.09	-0.33	-0.22	0.11

a Autocorrelation at 1st lag at 5% and 8th lag at 1%

b Autocorrelation at 8th lag at 5%

Table B.20: Bounds tests for domestic price equation of Thailand (1970-2011) for ALS_3

	(1) ^a	(2)	(3)	(4)	(5)	(6)
Constant	0.12	0.07	0.08	0.06	0.03	0.05
	0.05	0.05	0.05	0.04	0.05	0.05
	2.53	1.35	1.50	1.41	0.60	0.98
$\Delta \ln P(-1)$		0.21	0.21		0.12	0.11
		0.08	0.09		0.07	0.08
		2.49	2.47		1.67	1.44
$\Delta \ln P(-2)$			-0.05			0.01
			0.08			0.07
			-0.61			0.15
$\Delta \ln P_m$	0.26	0.21	0.23	0.23	0.22	0.23
	0.11	0.11	0.11	0.09	0.10	0.10
	2.42	1.97	2.05	2.61	2.30	2.35
$\Delta \ln ULC$	0.75	0.71	0.71	0.58	0.56	0.57
	0.08	0.08	0.09	0.08	0.08	0.08
	9.00	8.49	8.27	7.29	6.82	6.77
$\ln P(-1)$	-0.11	-0.13	-0.12	-0.02	-0.03	-0.05
	0.09	0.08	0.09	0.08	0.08	0.08
	-1.23	-1.57	-1.37	-0.27	-0.43	-0.60
$\ln P_m(-1)$	-0.02	0.05	0.03	0.00	0.04	0.04
	0.06	0.07	0.07	0.05	0.06	0.06
	-0.32	0.74	0.44	-0.04	0.62	0.59
$\ln ULC(-1)$	0.18	0.10	0.12	0.07	0.02	0.06
	0.07	0.08	0.08	0.07	0.07	0.08
	2.49	1.31	1.46	1.02	0.30	0.69
$D7374$				0.07	0.06	0.07
				0.03	0.03	0.03
				2.72	2.10	2.33
$D9798$				-0.10	-0.10	-0.09
				0.03	0.03	0.03
				-3.80	-3.34	-3.19
Diagnostics and Tests						
R-squared	0.84	0.86	0.87	0.90	0.91	0.91
Adj. R-squared	0.81	0.84	0.84	0.88	0.88	0.88
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	7.9	3.75	3.69	7.49	3.24	4.53
Bounds t-test statistic	-1.23	-1.57	-1.37	-0.27	-0.43	0.6

^a Autocorrelation at 1st lag at 5%

Table B.21: Bounds tests for domestic price equation of Thailand (1970-2011) for ALS_4

	(1) ^a	(2) ^b	(3)	(4)	(5)	(6)
Constant	0.11	0.07	0.08	0.07	0.04	0.05
	0.04	0.04	0.04	0.04	0.04	0.05
	2.93	1.61	1.70	1.88	0.87	1.15
$\Delta \ln P(1)$		0.17	0.17		0.11	0.10
		0.07	0.08		0.07	0.07
		2.35	2.28		1.67	1.39
$\Delta \ln P(-2)$			-0.03			0.02
			0.07			0.06
			-0.40			0.29
$\Delta \ln P_m$	0.20	0.17	0.18	0.20	0.19	0.19
	0.09	0.10	0.10	0.08	0.09	0.09
	2.15	1.74	1.79	2.38	2.09	2.12
$\Delta \ln ULC$	0.80	0.76	0.76	0.64	0.63	0.63
	0.07	0.07	0.08	0.08	0.08	-0.08
	10.83	10.24	9.89	8.53	8.03	7.87
$\ln P(-1)$	-0.09	-0.10	-0.10	-0.02	-0.02	-0.04
	0.08	0.08	0.08	0.08	0.08	0.08
	-1.14	-1.29	-1.22	-0.27	-0.29	-0.51
$\ln P_m(-1)$	-0.03	0.02	0.01	-0.02	0.01	0.02
	0.05	0.06	0.06	0.05	0.05	0.06
	-0.61	0.35	0.17	-0.42	0.19	0.30
$\ln ULC(-1)$	0.19	0.11	0.13	0.10	0.04	0.07
	0.06	0.07	0.08	0.06	0.07	0.08
	2.91	1.58	1.68	1.49	0.59	0.89
$D7374$				0.06	0.04	0.06
				0.02	0.02	0.03
				2.39	1.79	2.05
$D9798$				-0.08	-0.08	-0.08
				0.03	0.03	0.03
				-3.30	-2.93	-2.81
Diagnostics and Tests						
R-squared	0.88	0.90	0.90	0.92	0.92	0.92
Adj. R-squared	0.86	0.88	0.87	0.90	0.90	0.90
Sample Size	41	40	39	41	40	39
Bounds F-test statistic	10.89	3.8	3.86	8.47	3.16	4.16
Bounds t-test statistic	-1.14	-1.29	-1.22	-0.27	-0.29	-0.51

a Autocorrelation at 1st and 8th lags at 5%

b Autocorrelation at 8th lag at 5%

Table B.22: Bounds tests for export price equation of Thailand (1970-2011)

	(1) ^a	(2)	(3)	(4)	(5)	(6)	(7) ^b	(8)
Constant	-0.01	-0.01	-0.01	0.00	0.00	0.00	-0.02	0.00
	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	-0.57	-0.94	-0.44	0.29	0.14	0.15	-1.41	-0.07
$\Delta \ln P_x(-1)$		0.18	0.26		0.03	0.01		0.03
		0.10	0.12		0.08	0.10		0.08
		1.73	2.17		0.37	0.12		0.33
$\Delta \ln P_x(-2)$			-0.17			0.05		
			0.11			0.09		
			-1.58			0.60		
$\Delta \ln P$	0.39	0.29	0.28	0.19	0.18	0.17	0.60	0.22
	0.13	0.13	0.13	0.09	0.10	0.10	0.15	0.13
	3.03	2.30	2.18	2.10	1.89	1.73	4.01	1.70
$\Delta \ln P_x^{comp}$	0.61	0.58	0.53	0.66	0.65	0.68	0.52	0.64
	0.18	0.17	0.17	0.12	0.12	0.13	0.17	0.13
	3.49	3.49	3.12	5.52	5.33	5.30	3.06	4.94
$\ln P_x(-1)$	-0.38	-0.39	-0.32	-0.39	-0.38	-0.40	-0.38	-0.38
	0.13	0.13	0.14	0.09	0.10	0.10	0.12	0.10
	-2.97	-2.94	-2.33	-4.43	-3.88	-3.83	-3.11	-3.82
$\ln P(-1)$	0.03	0.02	0.02	0.01	0.01	0.00	0.02	0.01
	0.10	0.09	0.09	0.07	0.07	0.07	0.09	0.07
	0.26	0.18	0.22	0.10	0.10	0.05	0.23	0.10
$\ln P_x^{comp}(-1)$	0.38	0.38	0.30	0.44	0.41	0.45	0.37	0.41
	0.14	0.14	0.15	0.09	0.11	0.12	0.13	0.11
	2.75	2.63	1.97	4.62	3.90	3.89	2.86	3.82
$D7374$				0.16	0.15	0.17		0.15
				0.03	0.03	0.03		0.03
				6.41	5.44	5.16		4.80
$D9798$							0.09	0.02
							0.04	0.03
							2.38	0.48
Diagnostics and Tests								
R-squared	0.72	0.76	0.77	0.87	0.87	0.88	0.76	0.87
Adj. R-squared	0.68	0.71	0.72	0.85	0.85	0.85	0.72	0.84
Sample Size	41.00	40.00	39.00	41.00	40.00	39.00	41.00	40.00
Bounds F-test statistic	9.26	9.61	6.68	28.44	18.30	17.67	10.21	17.13
Bounds t-test statistic	-2.97	-2.94	-2.33	-4.43	-3.88	-3.83	-3.11	-3.82

a Autocorrelation at 1st lag 5% and residuals non-normal at 5%

b Residuals nonnormal at 5%

Table B.23: Bounds tests for consumption equation of Thailand (1980-2011)
Panel 1/2

	ALS_1			ALS_2		
	(1)	(2)	(3)	(1)	(2) ^a	(3) ^b
Constant	0.64	0.70	0.75	0.97	0.73	0.82
	0.36	0.33	0.37	0.41	0.41	0.42
	1.76	2.08	2.04	2.35	1.77	1.95
$\Delta \ln C(-1)$		0.21	0.20		0.25	0.31
		0.09	0.09		0.13	0.14
		2.45	2.29		1.97	2.21
$\Delta \ln C(-2)$			0.04			-0.11
			0.10			0.11
			0.39			-1.01
$\Delta \ln W$	0.72	0.71	0.72	0.56	0.62	0.64
	0.09	0.08	0.09	0.09	0.09	0.09
	7.99	8.59	8.16	6.07	6.68	6.76
$\Delta \ln R$	0.14	0.13	0.13	0.17	0.11	0.10
	0.02	0.02	0.02	0.03	0.04	0.04
	6.09	6.42	6.14	4.77	2.41	2.36
$\ln C(-1)$	-0.29	-0.32	-0.35	-0.28	-0.26	-0.25
	0.14	0.13	0.15	0.12	0.12	0.12
	-2.10	-2.55	-2.38	-2.25	-2.24	-2.16
$\ln W(-1)$	0.21	0.25	0.28	0.17	0.18	0.16
	0.11	0.10	0.12	0.10	0.09	0.09
	1.93	2.52	2.31	1.77	1.94	1.72
$\ln R(-1)$	0.06	0.04	0.04	0.07	0.06	0.06
	0.02	0.02	0.02	0.02	0.02	0.02
	2.37	1.85	1.84	2.77	2.32	2.48
Diagnostics and Tests						
R-squared	0.85	0.88	0.88	0.80	0.82	0.83
Adj. R-squared	0.83	0.85	0.85	0.76	0.78	0.78
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	5.84	6.62	5.89	7.72	6.21	6.58
Bounds t-test statistic	-2.10	-2.55	-2.38	-2.25	-2.24	-2.16

a Autocorrelation at 2nd and 8th lags at 5%

b Autocorrelation at 8th lag at 5%

Table B.24: Bounds tests for consumption equation of Thailand (1980-2011)
Panel 2/2

	<i>ALS</i> ₃			<i>ALS</i> ₄		
	(1) ^a	(2) ^b	(3) ^b	(1)	(2) ^c	(3) ^b
Constant	0.75	0.49	0.52	0.85	0.57	0.63
	0.35	0.32	0.32	0.37	0.36	0.36
	2.17	1.52	1.60	2.32	1.60	1.75
$\Delta \ln C(-1)$		0.31	0.35		0.29	0.34
		0.11	0.12		0.12	0.13
		2.81	2.98		2.48	2.68
$\Delta \ln C(-2)$			-0.10			-0.11
			0.10			0.10
			-0.99			-1.03
$\Delta \ln W$	0.54	0.62	0.63	0.55	0.63	0.64
	0.09	0.09	0.09	0.09	0.09	0.09
	5.98	7.28	7.35	5.87	6.89	6.97
$\Delta \ln R$	0.23	0.16	0.16	0.20	0.13	0.13
	0.04	0.04	0.04	0.04	0.05	0.05
	5.68	3.73	3.74	5.02	2.78	2.76
$\ln C(-1)$	-0.26	-0.25	-0.23	-0.27	-0.26	-0.24
	0.13	0.11	0.12	0.13	0.12	0.12
	-2.06	-2.22	-2.01	-2.16	-2.22	-2.08
$\ln W(-1)$	0.14	0.16	0.14	0.16	0.17	0.15
	0.09	0.08	0.08	0.10	0.09	0.09
	1.57	2.00	1.64	1.67	1.97	1.67
$\ln R(-1)$	0.10	0.07	0.08	0.08	0.07	0.07
	0.04	0.03	0.03	0.03	0.03	0.03
	2.65	2.23	2.29	2.72	2.23	2.36
Diagnostics and Tests						
R-squared	0.79	0.84	0.85	0.79	0.83	0.84
Adj. R-squared	0.75	0.81	0.80	0.75	0.79	0.79
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	7.33	5.57	5.44	7.47	5.73	5.88
Bounds t-test statistic	-2.06	-2.22	-2.01	-2.16	-2.22	-2.08

a Autocorrelation at 2nd lag at 5%

b Autocorrelation at 8th lag at 5%

c Autocorrelation at 2nd lag at 5% and at 8th lag at 1%

Table B.25: Bounds tests for investment equation of Thailand (1980-2011) for ALS_1

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.60	-0.51	-0.51	-0.63	-0.54	-0.53
	0.46	0.43	0.44	0.42	0.38	0.39
	-1.32	-1.18	-1.16	-1.52	-1.40	-1.37
$\Delta \ln I(-1)$		0.15	0.16		0.15	0.16
		0.07	0.08		0.06	0.07
		2.11	2.14		2.45	2.44
$\Delta \ln I(-2)$			-0.04			-0.03
			0.07			0.07
			-0.52			-0.48
$\Delta \ln Y$	3.28	3.13	3.08	2.85	2.69	2.66
	0.35	0.34	0.35	0.36	0.34	0.35
	9.40	9.32	8.82	7.93	8.02	7.66
$\Delta \ln R$	-0.10	-0.09	-0.08	-0.13	-0.11	-0.11
	0.09	0.09	0.09	0.08	0.08	0.08
	-1.14	-1.06	-0.90	-1.51	-1.48	-1.31
$\ln I(-1)$	-0.18	-0.18	-0.17	-0.11	-0.11	-0.10
	0.04	0.04	0.04	0.05	0.04	0.05
	-4.13	-4.36	-3.85	-2.27	-2.42	-2.16
$\ln Y(-1)$	0.10	0.14	0.13	0.07	0.12	0.11
	0.06	0.06	0.07	0.05	0.05	0.06
	1.76	2.52	1.95	1.40	2.31	1.80
$\ln R(-1)$	0.10	0.05	0.05	0.06	0.00	0.01
	0.06	0.06	0.07	0.06	0.06	0.06
	1.56	0.72	0.82	0.95	0.04	0.16
$D9798$				-0.14	-0.14	-0.14
				0.05	0.05	0.05
				-2.51	-2.81	-2.74
Diagnostics and Tests						
R-squared	0.91	0.93	0.93	0.93	0.94	0.94
Adj. R-squared	0.90	0.91	0.91	0.91	0.93	0.93
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	21.26	24.44	17.83	8.58	10.80	7.90
Bounds t-test statistic	-4.13	-4.36	-3.85	-2.27	-2.42	-2.16

Table B.26: Bounds tests for investment equation of Thailand (1980-2011) for ALS_2

	(1)	(2)	(3)	(4) ^a	(5) ^b	(6) ^c
Constant	0.00	0.67	0.63	-1.68	-1.02	-1.21
	1.81	1.76	1.80	1.82	1.72	1.76
	0.00	0.38	0.35	-0.92	-0.60	-0.69
$\Delta \ln I(-1)$		0.16	0.17		0.17	0.19
		0.08	0.10		0.08	0.09
		1.92	1.80		2.19	2.24
$\Delta \ln I(-2)$			-0.02			-0.05
			0.08			0.07
			-0.24			-0.69
$\Delta \ln Y$	2.69	2.72	2.73	2.36	2.38	2.40
	0.31	0.30	0.31	0.32	0.30	0.31
	8.56	9.08	8.83	7.32	7.92	7.86
$\Delta \ln R$	0.23	0.12	0.11	0.11	-0.01	-0.04
	0.12	0.12	0.13	0.12	0.12	0.13
	2.00	0.99	0.86	0.88	-0.07	-0.29
$\ln I(-1)$	-0.14	-0.19	-0.19	0.00	-0.05	-0.03
	0.09	0.09	0.10	0.10	0.10	0.10
	-1.53	-2.13	-1.96	-0.01	-0.55	-0.32
$\ln Y(-1)$	0.09	0.08	0.08	0.14	0.13	0.13
	0.11	0.11	0.11	0.11	0.10	0.10
	0.79	0.71	0.68	1.30	1.27	1.25
$\ln R(-1)$	0.04	0.08	0.08	-0.08	-0.04	-0.05
	0.13	0.13	0.13	0.13	0.12	0.13
	0.31	0.67	0.63	-0.63	-0.33	-0.43
$D9798$				-0.14	-0.15	-0.15
				0.06	0.06	0.06
				-2.34	-2.56	-2.61
Diagnostics and Tests						
R-squared	0.91	0.92	0.92	0.93	0.94	0.94
Adj. R-squared	0.89	0.90	0.90	0.91	0.92	0.92
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	13.98	18.97	14.47	5.15	7.58	5.41
Bounds t-test statistic	-1.53	-2.13	-1.96	-0.01	-0.55	-0.32

a Autocorrelation at 2nd lag at 5% and at 7th lag at 1%

b Autocorrelation at 5th lag at 5%

c Autocorrelation at 5th lag at 5% and residuals non-normal at 5%

Table B.27: Bounds tests for investment equation of Thailand (1980-2011) for ALS_3

	(1)	(2)	(3)	(4) ^a	(5) ^b	(6) ^b
Constant	0.11	0.05	0.10	-0.49	-0.59	-0.54
	0.89	0.81	0.82	0.87	0.76	0.77
	0.13	0.06	0.12	-0.57	-0.78	-0.71
$\Delta \ln I(-1)$		0.20	0.22		0.20	0.23
		0.08	0.09		0.07	0.08
		2.54	2.55		2.97	3.02
$\Delta \ln I(-2)$			-0.05			-0.06
			0.08			0.07
			-0.66			-0.85
$\Delta \ln Y$	2.78	2.88	2.90	2.41	2.50	2.52
	0.35	0.32	0.33	0.36	0.32	0.32
	7.84	8.87	8.79	6.62	7.82	7.81
$\Delta \ln R$	0.20	0.02	0.00	0.11	-0.09	-0.11
	0.14	0.14	0.15	0.13	0.13	0.14
	1.49	0.11	-0.02	0.80	-0.69	-0.84
$\ln I(-1)$	-0.16	-0.19	-0.19	-0.05	-0.08	-0.07
	0.07	0.07	0.07	0.08	0.07	0.07
	-2.16	-2.79	-2.67	-0.66	-1.12	-1.01
$\ln Y(-1)$	0.03	0.09	0.07	0.06	0.12	0.10
	0.10	0.09	0.10	0.09	0.08	0.09
	0.34	0.94	0.74	0.61	1.36	1.10
$\ln R(-1)$	0.12	0.09	0.10	0.01	-0.02	-0.01
	0.13	0.12	0.12	0.13	0.12	0.12
	0.86	0.75	0.82	0.08	-0.16	-0.07
$D9798$				-0.14	-0.15	-0.15
				0.06	0.05	0.05
				-2.30	-2.75	-2.77
Diagnostics and Tests						
R-squared	0.90	0.92	0.92	0.92	0.94	0.94
Adj. R-squared	0.88	0.90	0.90	0.90	0.92	0.92
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	11.02	18.95	14.93	3.23	8.14	5.89
Bounds t-test statistic	-2.16	-2.79	-2.67	-0.66	-1.12	-1.01

a Autocorrelation at 2nd and 5th lags at 5% and at 7th lag at 1%

b Autocorrelation at 5th lag at 5%

Table B.28: Bounds tests for investment equation of Thailand (1980-2011) for ALS_4

	(1)	(2)	(3)	(4) ^a	(5) ^b	(6)
Constant	0.21	0.35	0.37	-0.80	-0.70	-0.69
	1.25	1.16	1.18	1.24	1.11	1.12
	0.17	0.30	0.32	-0.64	-0.63	-0.62
$\Delta \ln I(-1)$		0.19	0.21		0.19	0.22
		0.08	0.09		0.07	0.08
		2.32	2.26		2.70	2.74
$\Delta \ln I(-2)$			-0.04			-0.05
			0.08			0.07
			-0.50			-0.78
$\Delta \ln Y$	2.72	2.80	2.82	2.38	2.45	2.47
	0.34	0.32	0.33	0.35	0.31	0.32
	7.98	8.82	8.69	6.80	7.80	7.78
$\Delta \ln R$	0.23	0.07	0.05	0.12	-0.06	-0.08
	0.13	0.14	0.14	0.13	0.13	0.14
	1.80	0.47	0.34	0.93	-0.44	-0.62
$\ln I(-1)$	-0.15	-0.19	-0.19	-0.03	-0.07	-0.06
	0.08	0.08	0.08	0.09	0.08	0.09
	-1.86	-2.48	-2.35	-0.36	-0.85	-0.71
$\ln Y(-1)$	0.05	0.08	0.07	0.09	0.12	0.11
	0.11	0.10	0.11	0.10	0.09	0.10
	0.48	0.76	0.65	0.86	1.26	1.11
$\ln R(-1)$	0.09	0.10	0.10	-0.03	-0.03	-0.02
	0.14	0.13	0.13	0.14	0.12	0.12
	0.63	0.75	0.76	-0.22	-0.22	-0.20
$D9798$				-0.14	-0.15	-0.15
				0.06	0.06	0.06
				-2.30	-2.68	-2.71
Diagnostics and Tests						
R-squared	0.90	0.92	0.92	0.92	0.94	0.92
Adj. R-squared	0.88	0.90	0.90	0.90	0.92	0.90
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	11.68	18.58	14.45	3.64	7.73	5.50
Bounds t-test statistic	-1.86	-2.48	-2.35	-0.36	-0.85	-0.71

a Autocorrelation at 2nd and 5th lags at 5% and at 7th lag at 1%

b Autocorrelation at 5th lag at 5%

Table B.29: Bounds tests for exports equation of Thailand (1980-2011)

	(1)	(2)	(3)	(1)	(2)	(3)
Constant	0.98 0.66 1.48	0.32 0.44 0.74	0.38 0.46 0.83	0.98 0.66 1.48	1.06 0.67 1.58	1.08 0.68 1.58
$\Delta \ln X(-1)$		-0.11 0.16 -0.66	-0.08 0.17 -0.46		-0.14 0.15 -0.94	-0.11 0.16 -0.73
$\Delta \ln X(-2)$			0.08 0.18 0.48			0.07 0.16 0.45
$\Delta \ln M_{wi}$	0.41 0.11 3.59	0.41 0.12 3.60	0.41 0.12 3.47	0.53 0.11 4.99	0.54 0.11 5.05	0.54 0.11 4.90
$\Delta \ln P_x^{rel}$	-0.85 0.45 -1.89	-0.91 0.46 -1.96	-0.87 0.48 -1.83	-1.17 0.36 -3.22	-1.22 0.37 -3.32	-1.19 0.38 -3.14
$\ln X(-1)$	0.00 0.05 0.05	0.00 0.05 0.03	0.00 0.05 0.00	-0.19 0.10 -1.94	-0.21 0.10 -2.10	-0.21 0.10 -2.05
$\ln M_{wi}(-1)$	-0.03 0.08 -0.32	-0.02 0.08 -0.25	-0.02 0.08 -0.27	0.29 0.14 2.04	0.33 0.15 2.21	0.32 0.15 2.13
$\ln P_x^{rel}(-1)$	-0.36 0.47 -0.76	-0.52 0.53 -0.97	-0.36 0.63 -0.58	-0.93 0.34 -2.78	-1.14 0.40 -2.84	-1.01 0.50 -2.03
Diagnostics and Tests						
R-squared	0.54	0.55	0.56	0.64	0.65	0.65
Adj. R-squared	0.46	0.44	0.43	0.57	0.57	0.55
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	8.17	7.97	4.57	11.96	11.44	7.05
Bounds t-test statistic	0.05	0.03	0.00	-1.94	-2.10	-2.05

Table B.30: Bounds tests for imports equation of Thailand (1980-2011)

	(1)	(2)	(3)
Constant	-7.41	-9.17	-8.77
	2.05	2.18	2.68
	-3.61	-4.21	-3.27
$\Delta \ln M(-1)$		0.21	0.20
		0.11	0.13
		1.86	1.52
$\Delta \ln M(-2)$			-0.04
			0.13
			-0.27
$\Delta \ln Y$	2.09	1.76	1.84
	0.41	0.43	0.52
	5.08	4.09	3.50
$\Delta \ln P/P_m$	0.61	0.72	0.68
	0.29	0.28	0.33
	2.12	2.56	2.08
$\ln M(-1)$	-0.50	-0.65	-0.62
	0.13	0.15	0.19
	-3.82	-4.38	-3.17
$\ln Y(-1)$	0.78	0.99	0.95
	0.21	0.23	0.29
	3.82	4.39	3.24
$\ln P/P_m(-1)$	-0.01	0.00	0.00
	0.19	0.18	0.19
	-0.04	0.02	-0.02
Diagnostics and Tests			
R-squared	0.77	0.80	0.80
Adj. R-squared	0.73	0.75	0.74
Sample Size	32	32	32
Bounds F-test statistic	17.76	22.45	13.42
Bounds t-test statistic	-3.82	-4.38	-3.17

Table B.31: Bounds tests for domestic prices equation of Thailand (1980-2011)
for ALS_1

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.07	0.08	0.07	0.04	0.04	0.03
	0.06	0.06	0.07	0.06	0.06	0.06
	1.15	1.18	1.09	0.63	0.61	0.55
$\Delta \ln P(-1)$		0.08	0.09		0.00	0.01
		0.09	0.09		0.09	0.09
		0.87	0.96		0.02	0.12
$\Delta \ln P(-2)$			0.06			0.04
			-0.09			-0.08
			-0.64			-0.50
$\Delta \ln P_m$	0.32	0.30	0.31	0.34	0.34	0.35
	0.13	0.13	0.14	0.12	0.12	0.13
	2.39	2.22	2.27	2.86	2.75	2.75
$\Delta \ln ULC$	0.77	0.74	0.74	0.58	0.58	0.58
	0.10	0.10	0.10	0.11	0.11	0.12
	7.86	7.26	7.16	5.21	5.10	5.03
$\ln P(-1)$	-0.22	-0.25	-0.22	-0.11	-0.12	-0.10
	0.12	0.12	0.13	0.11	0.12	0.13
	-1.87	-2.02	-1.70	-1.03	-0.94	-0.77
$\ln P_m(-1)$	0.10	0.11	0.10	0.09	0.09	0.08
	0.07	0.07	0.08	0.06	0.07	0.07
	1.36	1.54	1.28	1.46	1.37	1.17
$\ln ULC(-1)$	0.12	0.12	0.12	0.04	0.04	0.04
	0.11	0.11	0.11	0.10	0.11	0.11
	1.10	1.14	1.04	0.39	0.38	0.33
$D9798$				-0.08	-0.08	-0.08
				0.03	0.03	0.03
				-2.73	-2.50	-2.41
Diagnostics and Tests						
R-squared	0.85	0.85	0.85	0.88	0.88	0.88
Adj. R-squared	0.82	0.82	0.81	0.85	0.85	0.84
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	3.82	4.5	3.05	2.58	2.37	1.89
Bounds t-test statistic	-1.87	-2.02	-1.70	-1.03	-0.94	-0.77

Table B.32: Bounds tests for domestic prices equation of Thailand (1980-2011)
for ALS_2

	(1) ^a	(2)	(3)	(4)	(5)	(6)
Constant	0.12	0.07	0.06	0.07	0.04	0.02
	0.04	0.05	0.05	0.04	0.05	0.05
	2.96	1.34	1.08	1.72	0.77	0.42
$\Delta \ln P(-1)$		0.17	0.17		0.12	0.13
		0.09	0.09		0.08	0.09
		1.87	1.86		1.48	1.47
$\Delta \ln P(-2)$			0.03			0.06
			0.08			0.08
			0.41			0.75
$\Delta \ln P_m$	0.16	0.11	0.10	0.21	0.17	0.15
	0.12	0.12	0.13	0.11	0.11	0.12
	1.30	0.97	0.80	1.86	1.51	1.27
$\Delta \ln ULC$	0.78	0.78	0.79	0.65	0.67	0.68
	0.09	0.09	0.09	0.10	0.09	0.10
	8.75	9.22	8.88	6.75	7.05	7.02
$\ln P(-1)$	-0.14	-0.09	-0.08	-0.03	-0.01	0.00
	0.10	0.10	0.10	0.10	0.10	0.10
	-1.36	-0.87	-0.82	-0.33	-0.09	0.00
$\ln P_m(-1)$	-0.01	0.00	0.00	-0.02	-0.01	-0.01
	0.07	0.07	0.07	0.06	0.06	0.06
	-0.09	-0.04	0.00	-0.25	-0.19	-0.11
$\ln ULC(-1)$	0.23	0.13	0.11	0.12	0.06	0.03
	0.08	0.09	0.10	0.08	0.09	0.10
	3.02	1.38	1.13	1.46	0.61	0.28
$D9798$				-0.07	-0.06	-0.07
				0.03	0.03	0.03
				-2.56	-2.23	-2.29
Diagnostics and Tests						
R-squared	0.89	0.90	0.90	0.91	0.92	0.92
Adj. R-squared	0.86	0.88	0.87	0.89	0.89	0.89
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	10.34	2.21	1.68	5.31	0.86	0.27
Bounds t-test statistic	-1.36	-0.87	-0.82	-0.33	-0.09	0.00

a Autocorrelation at 1st lag at 5

Table B.33: Bounds tests for domestic prices equation of Thailand (1980-2011)
for ALS_3

	(1) ^a	(2)	(3)	(4)	(5)	(6)
Constant	0.16	0.07	0.07	0.07	0.02	0.01
	0.06	0.07	0.07	0.06	0.06	0.07
	2.61	1.05	0.99	1.10	0.30	0.20
$\Delta \ln P(-1)$		0.25	0.25		0.17	0.17
		0.10	0.10		0.09	0.10
		2.46	2.40		1.82	1.74
$\Delta \ln P(-2)$			0.01			0.03
			0.09			0.08
			0.11			0.42
$\Delta \ln P_m$	0.25	0.16	0.16	0.29	0.23	0.22
	0.15	0.14	0.15	0.13	0.13	0.13
	1.67	1.15	1.07	2.31	1.79	1.63
$\Delta \ln ULC$	0.71	0.72	0.72	0.53	0.57	0.57
	0.11	0.10	0.10	0.10	0.10	0.10
	6.60	7.32	7.11	5.16	5.64	5.56
$\ln P(-1)$	-0.15	-0.12	-0.12	-0.02	-0.02	-0.02
	0.11	0.10	0.10	0.10	0.09	0.09
	-1.42	-1.25	-1.23	-0.18	-0.20	-0.24
$\ln P_m(-1)$	0.00	0.04	0.04	0.01	0.03	0.03
	0.08	0.08	0.08	0.07	0.07	0.07
	0.03	0.46	0.46	0.08	0.40	0.48
$\ln ULC(-1)$	0.24	0.11	0.10	0.07	0.01	0.00
	0.09	0.10	0.10	0.09	0.09	0.10
	2.58	1.06	1.00	0.82	0.11	0.02
$D9798$				-0.11	-0.09	-0.09
				0.03	0.03	0.03
				-3.46	-2.91	-2.89
Diagnostics and Tests						
R-squared	0.82	0.86	0.86	0.88	0.89	0.89
Adj. R-squared	0.79	0.82	0.81	0.85	0.86	0.86
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	6.79	2.00	1.94	2.96	0.45	0.43
Bounds t-test statistic	-1.42	-1.25	-1.23	-0.18	-0.20	-0.24

a Autocorrelation at 1st, 7th and 8th lags lag at 5%

Table B.34: Bounds tests for domestic prices equation of Thailand (1980-2011)
for ALS_4

	(1) ^a	(2)	(3)	(4)	(5)	(6)
Constant	0.15	0.07	0.06	0.07	0.03	0.02
	0.05	0.06	0.06	0.05	0.06	0.06
	2.86	1.19	1.04	1.44	0.51	0.29
$\Delta \ln P(-1)$		0.21	0.21		0.15	0.15
		0.09	0.10		0.09	0.09
		2.18	2.14		1.71	1.66
$\Delta \ln P(-2)$			0.02			0.05
			0.09			0.08
			0.28			0.62
$\Delta \ln P_m$	0.19	0.13	0.12	0.24	0.19	0.17
	0.13	0.13	0.13	0.12	0.12	0.12
	1.42	1.00	0.88	2.04	1.60	1.40
$\Delta \ln ULC$	0.76	0.77	0.77	0.60	0.63	0.64
	0.10	0.09	0.09	0.10	0.10	0.10
	7.80	8.43	8.16	6.05	6.47	6.42
$\ln P(-1)$	-0.14	-0.10	-0.10	-0.02	-0.01	-0.01
	0.10	0.10	0.10	0.10	0.10	0.10
	-1.41	-1.01	-0.99	-0.25	-0.09	-0.07
$\ln P_m(-1)$	0.00	0.01	0.01	-0.01	0.00	0.01
	0.08	0.07	0.07	0.07	0.06	0.07
	-0.07	0.14	0.19	-0.15	0.03	0.14
$\ln ULC(-1)$	0.24	0.12	0.11	0.10	0.03	0.01
	0.08	0.10	0.10	0.09	0.09	0.10
	2.87	1.21	1.07	1.18	0.34	0.14
$D9798$				-0.09	-0.08	-0.08
				0.03	0.03	0.03
				-2.95	-2.54	-2.56
Diagnostics and Tests						
R-squared	0.86	0.88	0.88	0.90	0.91	0.91
Adj. R-squared	0.83	0.86	0.85	0.87	0.88	0.88
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	8.73	1.86	1.69	4.00	0.41	0.20
Bounds t-test statistic	-1.41	-1.01	-0.99	-0.25	-0.09	-0.07

a Autocorrelation at 1st lag at 5% and at 8th lag at 1%

Table B.35: Bounds tests for export prices equation of Thailand (1980-2011)

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.01	0.00	0.00	0.01	0.01	0.01
	0.01	0.01	0.01	0.01	0.01	0.01
	0.61	0.49	0.48	0.61	0.52	0.50
$\Delta \ln P_x(-1)$		0.05	0.05		0.05	0.05
		0.10	0.12		0.10	0.13
		0.47	0.41		0.48	0.39
$\Delta \ln P_x(-2)$			0.00			0.00
			0.11			0.11
			-0.03			0.00
$\Delta \ln P$	0.10	0.09	0.09	0.08	0.07	0.07
	0.09	0.09	0.09	0.13	0.13	0.14
	1.09	1.00	0.97	0.64	0.55	0.53
$\Delta \ln P_x^{comp}$	0.81	0.79	0.79	0.82	0.80	0.80
	0.13	0.14	0.14	0.14	0.14	0.15
	6.31	5.80	5.60	5.98	5.54	5.31
$\ln P_x(-1)$	-0.30	-0.30	-0.30	-0.31	-0.30	-0.30
	0.14	0.14	0.15	0.14	0.15	0.15
	-2.15	-2.07	-2.03	-2.12	-2.04	-2.00
$\ln P(-1)$	0.01	0.00	0.00	0.01	0.00	0.00
	0.06	0.06	0.06	0.06	0.06	0.06
	0.12	0.07	0.07	0.11	0.07	0.07
$\ln P_x^{comp}(-1)$	0.37	0.36	0.36	0.37	0.37	0.37
	0.17	0.17	0.17	0.17	0.17	0.18
	2.20	2.12	2.08	2.16	2.09	2.04
$D9798$				-0.01	-0.01	-0.01
				0.03	0.03	0.03
				-0.17	-0.20	-0.19
Diagnostics and Tests						
R-squared	0.80	0.80	0.80	0.80	0.80	0.80
Adj. R-squared	0.76	0.76	0.75	0.75	0.75	0.74
Sample Size	32	32	32	32	32	32
Bounds F-test statistic	5.81	5.19	4.96	5.08	4.94	4.72
Bounds t-test statistic	-2.15	-2.07	-2.03	-2.12	2.04	-2.00

B.2.3 Engle-Granger cointegration tests

Table B.36: Engle-Granger cointegration tests for the consumption and investment equations for Thailand (1970-2011)

Cointegrating Regression: $\ln C = \text{constant} + e_{CW} \ln W_i + e_{CR} \ln R_i + u$				
	$i=1$	$i=2$	$i=3$	$i=4$
Estimated value of $a_{\ddagger}^*-1$	-0.30	-0.24	-0.27	-0.26
Test statistic	-2.60	-2.55	-2.64	-2.62
P-value [†]	0.45	0.48	0.43	0.44
First order autocorrelation coefficient for $e_{\ddagger}^*$	0.09	0.14	0.13	0.14
Cointegrating Regression: $\ln I = \text{constant} + e_{IY} \ln Y + e_{IR} \ln R_i + u$				
	$i=1$	$i=2$	$i=3$	$i=4$
Estimated value of $a_{\ddagger}^*-1$	-0.13	-0.42	-0.21	-0.28
Test statistic	-1.63	-3.15	-1.96	-2.36
P-value [†]	0.87	0.22	0.76	0.57
First order autocorrelation coefficient for $e_{\ddagger}^*$	0.42	0.05	0.01	0.00

[‡] e is the residual series from the Dickey Fuller Test for $\hat{u}$: $\hat{u}_t - u_{t-1} = (a - 1)u_{t-1} + e_t$

[†]P-values are based on MacKinnon (1996).

Table B.37: Engle-Granger cointegration tests of all the model equations for Thailand (1980-2011)

Cointegrating Regression: $\ln C = \text{constant} + e_{CW} \ln W_i + e_{CR} \ln R_i + u$				
	$i=1$	$i=2$	$i=3$	$i=4$
Estimated value of $(a_{\ddagger} - 1)$	-0.25	-0.26	-0.23	-0.24
Test statistic	-1.92	-2.22	-1.94	-2.03
P-value [†]	0.77	0.64	0.76	0.72
First order autocorrelation coefficient for $e_{\ddagger}$	0.08	0.22	0.21	0.21
Cointegrating Regression: $\ln I = \text{constant} + e_{IY} \ln Y + e_{IR} \ln R_i + u$				
	$i=1$	$i=2$	$i=3$	$i=4$
Estimated value of $(a_{\ddagger} - 1)$	-0.14	-0.52	-0.35	-0.45
Test statistic	-1.44	-3.21	-2.34	-2.79
P-value [†]	0.91	0.21	0.58	0.37
First order autocorrelation coefficient for $e_{\ddagger}$	0.32	0.07	0.01	0.03
Cointegrating Regression: $\ln X = \text{constant} + \ln P_x^{rel} + \ln M_{wj} + u$				
	$j=1$	$j=2$		
Estimated value of $(a_{\ddagger} - 1)$	-0.24	-0.52		
Test statistic	-2.11	-3.03		
P-value [†]	0.69	0.27		
First order autocorrelation coefficient for $e_{\ddagger}$	0.00	0.10		
Cointegrating Regression: $\ln M = \text{constant} + \ln Y + \ln P/P_m + u$				
Estimated value of $(a_{\ddagger} - 1)$	-0.52			
Test statistic	-3.42			
P-value [†]	0.15			
First order autocorrelation coefficient for $e_{\ddagger}$	0.10			
Cointegrating Regression: $\ln P = \text{constant} + \ln P_m + \ln ULC + u$				
	$i=1$	$i=2$	$i=3$	$i=4$
Estimated value of $(a_{\ddagger} - 1)$	-0.19	-0.17	-0.17	-0.17
Test statistic	-1.75	-1.64	-1.66	-1.64
P-value [†]	0.83	0.86	0.86	0.86
First order autocorrelation coefficient for $e_{\ddagger}$	-0.05	0.41	0.35	0.39
Cointegrating Regression: $\ln P_x = \text{constant} + \ln P_x^{comp} + \ln P + u$				
Estimated value of $(a_{\ddagger} - 1)$	-0.43			
Test statistic	-2.94			
P-value [†]	0.31			
First order autocorrelation coefficient for $e_{\ddagger}$	0.00			

$\ddagger e$ is the residual series from the Dickey Fuller Test for $\hat{u}$: $\hat{u}_t - u_{t-1} = (a - 1)u_{t-1} + e_t$

[†]P-values are based on MacKinnon (1996).

B.2.4 Estimations of the model equations for the subsample 1980-2011



Table B.38: Consumption Equation Estimations for Thailand (1980-2011)

Dependent variable: $\Delta \ln C$		ALS_1		ALS_2		ALS_3		ALS_4	
Regressors		Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant		0.00	-0.33	0.00	0.71	0.00	0.52	0.00	0.66
$\Delta \ln W_i$		0.78***	9.84	0.56***	5.84	0.55***	5.77	0.55***	5.65
$\Delta \ln R_i$		0.13***	5.89	0.18***	5.90	0.26***	6.80	0.22***	6.18
Diagnostics									
R-Squared		0.83		0.74		0.74		0.73	
Adjusted R-Squared		0.82		0.72		0.72		0.71	
DW statistic		2.11		1.62		1.61		1.63	
White's test [‡]		0.83		0.20		0.95		0.76	
ARCH test (1 lag) [‡]		0.94		0.22		0.27		0.23	
Normality test [‡]		0.10		0.92		0.80		0.83	
F-test [‡]		0.00		0.00		0.00		0.00	
RESET test [‡]		0.23		0.22		0.23		0.23	
CUSUM test [‡]		0.81		0.60		0.90		0.78	
Highest VIF		1.01		1.01		1.00		1.01	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[‡]The autoregression parameter of the PW Method.

[†]Probability values of the corresponding tests.

Table B.39: Investment equation estimations for Thailand (1980-2011)

Dependent variable: $\Delta \ln I$								
ALS_1					ALS_2			
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-0.11	-5.12	-0.06	-3.57	-0.11	-5.94	-0.06	-3.52
$\Delta \ln Y$	3.08***	8.78	2.42***	8.42	2.64***	8.32	2.03***	6.69
$\Delta \ln R_i$	-0.05	-0.51	-0.10	-1.24	0.18*	1.77	0.14	1.58
$D9798$			-0.22***	-4.43			-0.19***	-3.88
$\rho_{\ddagger}^{\dagger}$	0.33				0.22			
Diagnostics								
R-Squared	0.85		0.91		0.87		0.91	
Adjusted R-Squared	0.84		0.90		0.86		0.90	
DW statistic	1.77		1.68		1.79		1.78	
White's test [†]			0.04				0.67	
ARCH test (1 lag) [†]	0.87		0.64		0.31		0.44	
Normality test [†]	0.37		0.73		0.66		0.62	
F-test [†]	0.00		0.00		0.00		0.00	
RESET test [†]			0.09				0.08	
CUSUM test [†]			0.48				0.51	
Highest VIF	1.70		2.20		2.01		2.54	
ALS_3					ALS_4			
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-0.11	-5.80	-0.06	-3.45	-0.11	-5.87	-0.06	-3.48
$\Delta \ln Y$	2.65***	7.64	2.10***	6.57	2.63***	7.82	2.06***	6.56
$\Delta \ln R_i$	0.19	1.43	0.12	1.00	0.20	1.61	0.14	1.26
$D9798$			-0.19***	-3.75			-0.19***	-3.78
$\rho_{\ddagger}^{\dagger}$	0.20				0.20			
Diagnostics								
R-Squared	0.86		0.91		0.86		0.91	
Adjusted R-Squared	0.85		0.90		0.85		0.90	
DW statistic	1.79		1.81		1.79		1.80	
White's test [†]			0.13				0.34	
ARCH test (1 lag) [†]	0.27		0.44		0.25		0.42	
Normality test [†]	0.63		0.57		0.65		0.58	
F-test [†]	0.00		0.00		0.00		0.00	
RESET test [†]			0.09				0.09	
CUSUM test [†]			0.55				0.54	
Highest VIF	2.28		2.68		2.20		2.65	

*** ** and * represent 1, 5, and 10% significance levels, respectively.

[‡]The autoregression parameter of the PW Method.[†]Probability values of the corresponding tests.

Table B.40: Exports equation estimations for Thailand (1980-2011)

Dependent variable: $\Delta \ln X$		j=1		j=2	
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	
Constant	0.07***	4.85	0.07***	3.76	
$\Delta \ln M_{w,j}$	0.44***	3.80	0.40***	3.37	
$\Delta \ln P_x^{rel}$	-0.94**	-2.34	-0.78*	-1.95	
$\rho^{\ddagger}$			0.30		
Diagnostics					
R-Squared	0.48		0.46		
Adjusted R-Squared	0.44		0.42		
DW statistic	1.60		2.12		
White's test $\dagger$	0.19				
ARCH test (1 lag) $\dagger$	0.75		0.74		
Normality test $\dagger$	0.84		0.63		
F-test $\dagger$	0.00		0.00		
RESET test $\dagger$	0.64				
CUSUM test $\dagger$	0.46				
Highest VIF	1.07		1.14		

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[‡]The autoregression parameter of the PW Method.

[†]Probability values of the corresponding tests.

Table B.41: Imports equation estimations via ECM for Thailand (1980-2011)

Dependent variable	lnM		$\Delta \ln M$	
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-14.45***	-15.56	-0.03	-1.21
lnY	1.54***	42.49		
lnP/ P_m	0.43*	1.97		
$\Delta \ln Y$			2.01***	5.53
$\Delta \ln P/P_m$			0.78***	2.96
EC			-0.56***	-3.91
Diagnostics				
R-Squared	0.99		0.76	
Adjusted R-Squared	0.98		0.73	
DW statistic	0.96		2.02	
F-test [†]	0.00		0.00	
White's test [†]	0.09		0.45	
Normality test [†]	0.29		0.54	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

[†]Probability values of the corresponding tests.

Table B.42: Imports equation in first differences of the variables for Thailand (1980-2011)

Dependent variable: $\Delta \ln M$		
Regressors	Coefficient	t-ratio
Constant	-0.02	-0.60
$\Delta \ln Y$	1.79***	4.06
$\Delta \ln P/P_m$	0.82**	2.53
Diagnostics		
R-Squared	0.62	
Adjusted R-Squared	0.60	
DW statistic	2.11	
White's test†	0.71	
ARCH test (1 lag)†	0.69	
Normality test†	0.85	
F-test†	0.00	
RESET test†	0.12	
CUSUM test†	0.98	
Highest VIF	1.38	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

Table B.43: Domestic prices equation estimations for Thailand (1980-2011)

Dependent variable: $\Delta \ln P$								
ALS_1					ALS_2			
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.00	-0.88	0.00	0.70	0.01	0.58	0.01	1.58
$\Delta \ln ULC_i$	0.85***	11.08	0.70***	8.59	0.73***	10.54	0.61***	7.71
$\Delta \ln P_m$	0.37***	3.56	0.35***	4.01	0.20	1.52	0.24**	2.02
$D9798$			-0.06***	-2.93			-0.08***	-2.97
$\rho_{\ddagger}^{\dagger}$	-0.25		-0.33		0.46		0.32	
Diagnostics								
R-Squared	0.87		0.90		0.87		0.90	
Adjusted R-Squared	0.86		0.89		0.86		0.89	
DW statistic	2.02		2.16		1.77		1.93	
White's test [†]								
ARCH test (1 lag) [†]	0.35		0.33		0.44		0.30	
Normality test [†]	0.30		0.07		0.70		0.87	
F-test [†]	0.00		0.00		0.00		0.00	
RESET test [†]								
CUSUM test [†]								
Highest VIF	1.27		1.99		1.39		1.94	
ALS_3					ALS_4			
Regressors	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.01	0.50	0.01*	2.05	0.01	0.56	0.01*	1.72
$\Delta \ln ULC_i$	0.68***	7.71	0.54***	5.92	0.72***	9.24	0.58***	6.92
$\Delta \ln P_m$	0.27*	1.70	0.31**	2.53	0.22	1.55	0.26**	2.12
$D9798$			-0.11***	-4.16			-0.09***	-3.37
$\rho_{\ddagger}^{\dagger}$	0.37				0.42		0.25	
Diagnostics								
R-Squared	0.80		0.86		0.84		0.88	
Adjusted R-Squared	0.79		0.84		0.83		0.87	
DW statistic	1.89		1.67		1.83		1.96	
White's test [†]			0.36					
ARCH test (1 lag) [†]	0.26		0.15		0.27		0.27	
Normality test [†]	0.58		0.34		0.66		0.75	
F-test [†]	0.00		0.00		0.00		0.00	
RESET test [†]			0.10					
CUSUM test [†]			0.79					
Highest VIF	1.33		1.68		1.37		1.82	

*** ** and * represent 1, 5, and 10% significance levels, respectively.

‡The autoregression parameter of the PW Method.

†Probability values of the corresponding tests.

Table B.44: Export prices equation estimations for Thailand (1980-2011)

Dependent variable: $\Delta \ln P_x$				
Regressors	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.01	1.27	0.01	1.05
$\Delta \ln P$	0.12***	3.16	0.13	1.11
$\Delta \ln P_x^{comp}$	0.72***	6.89	0.71***	5.43
D9798			0.01	0.19
Diagnostics				
R-Squared	0.75		0.75	
Adjusted R-Squared	0.73		0.72	
DW statistic	2.24		2.26	
White's test†	0.16		0.33	
ARCH test (1 lag)†	0.83		0.86	
Normality test†	0.00		0.00	
F-test†	0.00		0.00	
RESET test†	0.40		0.40	
CUSUM test†	0.03		0.06	
Highest VIF	1.90		3.47	

***, ** and * represent 1, 5, and 10% significance levels, respectively.

†Probability values of the corresponding tests.

B.3 China

B.3.1 Unit root tests

Table B.45: ADF test of the variables of China for the period (1978-2011)

Variable	Level					First Difference				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$\ln C$	C+T	0	-3.00	-	-0.02	C	0	-4.61	***	0.05
$\ln I_t$	C+T	1	-4.17	***	-0.18	C	0	-3.91	***	0.08
$\ln I_p$	C+T	0	-2.07	-	0.15	C	0	-5.17	***	0.04
$\ln X$	C+T	0	-1.99	-	0.06	C	0	-5.69	***	0.00
$\ln M$	C+T	1	-2.85	-	0.00	C	0	-4.06	***	0.10
$\ln Y$	C+T	1	-4.81	***	0.00	C	1	-4.19	***	-0.03
$\ln W_1$	C+T	1	-2.49	-	-0.11	C	0	-3.83	***	0.04
$\ln W_2$	C+T	1	-2.46	-	-0.09	C	0	-4.16	***	0.03
$\ln W_3$	-	0	15.26	-	0.17	C	0	-4.51	***	0.00
$\ln R_1$	C+T	1	-3.96	***	-0.12	C	0	-4.24	***	0.08
$\ln R_2$	C+T	1	-4.12	***	-0.13	C	0	-4.49	***	0.07
$\ln R_3$	C+T	1	-2.94	-	-0.09	C	0	-4.72	***	0.03
$\ln ULC_1$	-	0	-0.71	-	0.23	C+T	0	-5.64	***	-0.13
$\ln ULC_2$	-	0	-0.71	-	0.22	C+T	0	-5.71	***	-0.13
$\ln ULC_3$	-	0	-0.75	-	0.23	C+T	0	-5.74	***	-0.14
$\ln P$	-	0	-0.16	-	0.19	C+T	0	-5.92	***	-0.15
$\ln P_m$	C+T	1	-3.73	***	-0.06	-	0	-4.38	***	-0.13
$\ln P_x$	C+T	1	-3.99	***	-0.10	-	0	-4.18	***	-0.11
$\ln P_x^{comp}$	C+T	1	-2.22	-	0.01	-	0	-2.85	***	0.05
$\ln P_x^{el}$	-	1	-2.47	***	-0.27	-	0	-4.62	***	-0.28
$\ln P/P_m$	-	0	-2.78	***	0.03	C+T	0	-6.55	***	-0.02
$\ln M_{w1}$	C+T	0	-2.38	-	0.18	C	0	-5.27	***	-0.12
$\ln M_{w2}$	C+T	0	-2.74	-	0.18	C	0	-5.49	***	-0.06

(1): Deterministic Components C:Constant, C+T: Constant and trend

(2): Number of Lags

(3): ADF test Statistic

(4): Significance

(5): First Order Autocorrelation of Residuals from the ADF Regression

B.3.2 Bounds tests

In each cell the number at the first line is the corresponding coefficient, the second the standard deviation, and the third is the t-statistic.

Table B.46: Bounds tests for consumption equation of China (1978-2011)

	ALS_1			ALS_2			ALS_3		
	(1)	(2)	(3)	(1) ^a	(2)	(3)	(1) ^a	(2) ^a	(3)
Constant	2.53	2.75	2.26	2.50	2.72	2.32	2.36	2.58	2.33
	0.91	0.98	1.11	0.90	0.96	1.09	0.90	0.95	1.05
	2.78	2.79	2.03	2.79	2.83	2.13	2.63	2.71	2.22
$\Delta \ln C(-1)$		0.06	0.08		0.07	0.08		0.05	0.07
		0.13	0.13		0.13	0.13		0.13	0.13
		0.50	0.60		0.53	0.64		0.42	0.55
$\Delta \ln C(-2)$			-0.15			-0.14			-0.14
			0.13			0.13			0.13
			-1.14			-1.07			-1.07
$\Delta \ln W$	0.50	0.47	0.53	0.48	0.46	0.50	0.45	0.44	0.46
	0.11	0.12	0.13	0.11	0.12	0.13	0.10	0.11	0.11
	4.48	3.88	3.94	4.38	3.83	3.85	4.46	4.03	4.02
$\Delta \ln R$	0.30	0.29	0.26	0.29	0.28	0.26	0.28	0.27	0.25
	0.06	0.06	0.07	0.06	0.06	0.07	0.06	0.06	0.06
	5.00	4.60	3.95	4.86	4.48	3.87	4.78	4.35	3.83
$\ln C(-1)$	-0.47	-0.50	-0.42	-0.45	-0.48	-0.42	-0.41	-0.44	-0.40
	0.15	0.16	0.18	0.15	0.16	0.17	0.15	0.16	0.17
	-3.09	-3.04	-2.34	-3.07	-3.06	-2.42	-2.76	-2.80	-2.33
$\ln W(-1)$	0.33	0.33	0.31	0.33	0.34	0.32	0.29	0.29	0.28
	0.09	0.09	0.10	0.09	0.09	0.10	0.08	0.08	0.09
	3.73	3.54	3.16	3.79	3.63	3.32	3.54	3.49	3.11
$\ln R(-1)$	0.04	0.06	0.03	0.03	0.04	0.02	0.03	0.05	0.03
	0.06	0.06	0.07	0.06	0.06	0.07	0.06	0.06	0.06
	0.75	0.97	0.39	0.46	0.70	0.24	0.59	0.80	0.51
Diagnostics and Tests									
R-squared	0.67	0.67	0.69	0.67	0.66	0.68	0.64	0.65	0.66
Adj. R-squared	0.61	0.59	0.59	0.61	0.58	0.59	0.58	0.56	0.56
Sample Size	33	32	31	33	32	31	33	32	31
Bounds F-test statistic	14.23	12.53	10.81	14.62	13.15	11.61	13.48	12.64	10.96
Bounds t-test statistic	-3.09	-3.04	-2.34	-3.07	-3.06	-2.42	-2.76	-2.80	-2.33

^a Autocorrelation at 6th lag at 5

Table B.47: Bounds tests for investment equation of China (1978-2011) for ALS_1

	(1)	(2)	(3)	(4) ^a	(5) ^a	(6)
Constant	-3.16	-3.51	-4.71	-2.72	-3.32	-4.76
	0.82	1.04	1.19	0.68	0.82	0.89
	-3.86	-3.39	-3.95	-3.97	-4.05	-5.34
$\Delta \ln I^t(-1)$		0.07	0.13		0.19	0.24
		0.15	0.14		0.12	0.11
		0.50	0.93		1.56	2.25
$\Delta \ln I^t(-2)$			0.12			0.19
			0.12			0.09
			0.96			1.97
$\Delta \ln Y$	2.84	2.72	2.81	2.27	1.85	1.83
	0.46	0.56	0.54	0.41	0.49	0.46
	6.12	4.87	5.19	5.51	3.76	3.96
$\Delta \ln R$	-0.20	-0.19	-0.25	-0.08	-0.05	-0.05
	0.21	0.22	0.22	0.18	0.18	0.17
	-0.93	-0.86	-1.15	-0.44	-0.28	-0.32
$\ln I^t(-1)$	-0.38	-0.42	-0.55	-0.33	-0.43	-0.60
	0.11	0.15	0.17	0.09	0.12	0.13
	-3.32	-2.89	-3.26	-3.52	-3.75	-4.80
$\ln Y(-1)$	0.73	0.79	1.05	0.64	0.73	1.02
	0.20	0.23	0.25	0.16	0.18	0.19
	3.68	3.43	4.16	3.87	3.99	5.43
$\ln R(-1)$	-0.27	-0.27	-0.37	-0.23	-0.20	-0.29
	0.16	0.17	0.16	0.13	0.14	0.12
	-1.63	-1.55	-2.27	-1.72	-1.44	-2.29
$D1989$				-0.14	-0.15	-0.15
				0.04	0.04	0.03
				-3.74	-4.01	-4.40
Diagnostics and Tests						
R-squared	0.76	0.76	0.81	0.85	0.86	0.90
Adj. R-squared	0.72	0.70	0.76	0.81	0.81	0.87
Sample Size	33	32	31	33	32	31
Bounds F-test statistic	16.00	12.68	17.42	17.95	18.96	30.97
Bounds t-test statistic	-3.32	-2.89	-3.26	-3.52	-3.75	-4.80

^a Residuals non-normal at 1

Table B.48: Bounds tests for investment equation of China (1978-2011) for ALS_2

	(1)	(2)	(3)	(4)a	(5)b	(6)
Constant	-3.09 0.82 -3.77	-3.45 1.04 -3.32	-4.65 1.21 -3.86	-2.64 0.68 -3.87	-3.27 0.82 -4.00	-4.70 0.89 -5.26
$\Delta \ln I^t(-1)$		0.08 0.15 0.55	0.14 0.14 0.99		0.20 0.12 1.61	0.25 0.11 2.32
$\Delta \ln I^t(-2)$			0.13 0.13 1.01			0.19 0.09 2.01
$\Delta \ln Y$	2.80 0.47 6.02	2.66 0.56 4.78	2.73 0.54 5.06	2.23 0.41 5.42	1.80 0.49 3.69	1.76 0.46 3.88
$\Delta \ln R$	-0.18 0.22 -0.85	-0.17 0.22 -0.78	-0.23 0.22 -1.06	-0.06 0.18 -0.36	-0.04 0.18 -0.20	-0.04 0.17 -0.26
$\ln I^t(-1)$	-0.38 0.11 -3.28	-0.43 0.15 -2.90	-0.56 0.17 -3.28	-0.33 0.09 -3.48	-0.43 0.12 -3.76	-0.61 0.13 -4.81
$\ln Y(-1)$	0.73 0.21 3.51	0.79 0.24 3.30	1.05 0.26 4.00	0.63 0.17 3.69	0.73 0.19 3.86	1.03 0.20 5.25
$\ln R(-1)$	-0.27 0.18 -1.50	-0.27 0.19 -1.43	-0.37 0.18 -2.07	-0.23 0.15 -1.59	-0.20 0.15 -1.36	-0.29 0.13 -2.15
$D1989$				-0.14 0.04 -3.75	-0.16 0.04 -4.05	-0.15 0.03 -4.45
Diagnostics and Tests						
R-squared	0.76	0.76	0.81	0.84	0.86	0.90
Adj. R-squared	0.72	0.70	0.75	0.81	0.81	0.86
Sample Size	33	32	31	33	32	31
Bounds F-test statistic	15.37	12.19	16.36	17.19	18.58	29.91
Bounds t-test statistic	-3.28	-2.90	-3.28	-3.48	-3.76	-4.81

a Residuals non-normal at 1

b Residuals non-normal at 5

Table B.49: Bounds tests for investment equation of China (1978-2011) for ALS_3

	(1)	(2)	(3) ^a	(4) ^a	(5)	(6)
Constant	-2.93	-3.28	-4.26	-2.52	-3.16	-4.42
	0.83	1.05	1.27	0.69	0.83	0.95
	-3.55	-3.11	-3.37	-3.64	-3.80	-4.63
$\Delta \ln I^t(-1)$		0.09	0.14		0.20	0.26
		0.15	0.15		0.12	0.12
		0.60	0.97		1.65	2.23
$\Delta \ln I^t(-2)$			0.11			0.18
			0.13			0.10
			0.85			1.75
$\Delta \ln Y$	2.67	2.51	2.45	2.16	1.73	1.59
	0.41	0.50	0.50	0.37	0.44	0.43
	6.50	4.98	4.88	5.85	3.90	3.72
$\Delta \ln R$	-0.13	-0.12	-0.11	-0.04	-0.03	0.01
	0.17	0.18	0.18	0.15	0.14	0.14
	-0.73	-0.68	-0.64	-0.28	-0.20	0.06
$\ln I^t(-1)$	-0.40	-0.45	-0.57	-0.35	-0.45	-0.62
	0.12	0.15	0.18	0.10	0.12	0.14
	-3.45	-3.02	-3.19	-3.62	-3.85	-4.58
$\ln Y(-1)$	0.61	0.67	0.85	0.54	0.65	0.88
	0.18	0.22	0.25	0.15	0.17	0.19
	3.34	3.09	3.35	3.53	3.78	4.62
$\ln R(-1)$	-0.13	-0.13	-0.15	-0.12	-0.11	-0.13
	0.14	0.14	0.14	0.11	0.11	0.10
	-0.98	-0.93	-1.13	-1.07	-0.97	-1.30
$D1989$				-0.14	-0.16	-0.16
				0.04	0.04	0.04
				-3.64	-4.01	-4.32
Diagnostics and Tests						
R-squared	0.75	0.75	0.79	0.84	0.85	0.88
Adj. R-squared	0.71	0.69	0.72	0.80	0.80	0.84
Sample Size	33	32	31	33	32	31
Bounds F-test statistic	13.80	10.68	11.69	15.32	17.02	23.02
Bounds t-test statistic	-3.45	-3.02	-3.19	-3.62	-3.85	-4.58

^a Residuals non-normal at 5

Table B.50: Bounds tests for exports equation (as a function of M_{w_1}) of China (1978-2011)

	(1) ^a	(2) ^a	(3) ^a	(1)	(2)	(3)
Constant	-0.23 0.40 -0.58	-0.47 0.46 -1.03	-0.72 0.52 -1.37	-0.32 0.30 -1.08	-0.56 0.33 -1.68	-0.66 0.39 -1.71
$\Delta \ln X(-1)$		0.03 0.17 0.18	0.07 0.18 0.40		0.04 0.13 0.30	0.05 0.14 0.39
$\Delta \ln X(-2)$			-0.01 0.17 -0.04			-0.02 0.13 -0.18
$\Delta \ln M_{w_2}$	0.89 0.29 3.05	0.94 0.30 3.11	1.00 0.31 3.17	0.80 0.22 3.69	0.85 0.22 3.87	0.88 0.23 3.75
$\Delta \ln P_x^{rel}$	-0.68 0.45 -1.50	-0.75 0.47 -1.59	-1.28 0.72 -1.78	-0.38 0.34 -1.12	-0.46 0.35 -1.31	-0.69 0.55 -1.25
$\ln X(-1)$	-0.12 0.06 -2.05	-0.17 0.07 -2.35	-0.21 0.08 -2.55	-0.08 0.04 -1.86	-0.13 0.05 -2.44	-0.15 0.06 -2.41
$\ln M_{w_2}(-1)$	0.27 0.13 2.14	0.38 0.16 2.42	0.48 0.18 2.60	0.20 0.10 2.11	0.31 0.12 2.67	0.36 0.14 2.57
$\ln P_x^{rel}(-1)$	0.07 0.35 0.21	0.31 0.41 0.76	0.40 0.43 0.93	0.29 0.26 1.11	0.53 0.30 1.74	0.56 0.32 1.75
$D1994$				0.45 0.09 4.77	0.45 0.09 4.82	0.44 0.10 4.48
Diagnostics and Tests						
R-squared	0.34	0.38	0.40	0.65	0.68	0.69
Adj. R-squared	0.22	0.23	0.22	0.57	0.59	0.57
Sample Size	33	32	31	33	32	31
Bounds F-test statistic	5.27	6.50	7.29	5.01	7.72	6.99
Bounds t-test statistic	-2.05	-2.35	-2.55	-1.86	-2.44	-2.41

a Residuals non-normal at 1

Table B.51: Bounds tests for exports equation (as a function of M_{w_2}) of China (1978-2011)

	(1) ^a	(2) ^b	(3) ^b	(1)	(2)	(3)
Constant	1.13	1.48	1.57	1.22	1.50	1.66
	1.08	1.22	1.34	0.81	0.90	0.98
	1.04	1.21	1.18	1.51	1.66	1.70
$\Delta \ln X(-1)$		-0.15	-0.16		-0.15	-0.17
		0.20	0.21		0.14	0.15
		-0.77	-0.77		-1.02	-1.13
$\Delta \ln X(-2)$			-0.04			-0.08
			0.20			0.14
			-0.22			-0.56
$\Delta \ln M_{w_1}$	0.58	0.55	0.53	0.46	0.43	0.40
	0.29	0.30	0.32	0.21	0.22	0.24
	2.02	1.87	1.68	2.14	1.98	1.72
$\Delta \ln P_x^{rel}$	-1.03	-0.94	-0.89	-0.61	-0.56	-0.31
	0.46	0.50	0.77	0.36	0.38	0.58
	-2.22	-1.87	-1.15	-1.71	-1.46	-0.53
$\ln X(-1)$	0.04	0.07	0.07	0.07	0.10	0.11
	0.09	0.10	0.11	0.07	0.08	0.08
	0.42	0.66	0.66	1.03	1.28	1.29
$\ln M_{w_1}(-1)$	-0.13	-0.20	-0.22	-0.19	-0.25	-0.28
	0.22	0.24	0.26	0.16	0.18	0.19
	-0.60	-0.83	-0.82	-1.18	-1.40	-1.41
$\ln P_x^{rel}(-1)$	-0.27	-0.35	-0.36	0.01	-0.05	-0.05
	0.33	0.36	0.38	0.25	0.27	0.29
	-0.82	-0.96	-0.94	0.02	-0.17	-0.17
$D1994$				0.47	0.47	0.48
				0.10	0.10	0.11
				4.74	4.66	4.55
Diagnostics and Tests						
R-squared	0.28	0.29	0.28	0.61	0.63	0.63
Adj. R-squared	0.14	0.12	0.06	0.52	0.52	0.50
Sample Size	33	32	31	33	32	31
Bounds F-test statistic	1.99	4.99	2.02	2.20	2.51	2.70
Bounds t-test statistic	0.42	0.66	0.66	1.03	1.28	1.29

a Residuals non-normal at 1

b Residuals non-normal at 1

Table B.52: Bounds tests for imports equation of China (1978-2011)

	(1)	(2)	(3)
Constant	-3.73	-7.40	-4.94
	3.25	3.40	4.35
	-1.15	-2.18	-1.14
$\Delta \ln M(-1)$		0.26	0.25
		0.16	0.17
		1.55	1.51
$\Delta \ln M(-2)$			-0.16
			0.19
			-0.85
$\Delta \ln Y$	3.58	3.26	3.33
	0.96	0.95	0.98
	3.71	3.45	3.41
$\Delta \ln P/Pm$	-0.31	-0.40	-0.45
	0.29	0.28	0.29
	-1.09	-1.42	-1.52
$\ln M(-1)$	-0.18	-0.32	-0.22
	0.13	0.13	0.17
	-1.42	-2.40	-1.31
$\ln Y(-1)$	0.30	0.56	0.38
	0.23	0.24	0.31
	1.27	2.28	1.21
$\ln P/Pm(-1)$	-0.11	-0.21	-0.19
	0.11	0.12	0.14
	-0.96	-1.78	-1.37
Diagnostics and Tests			
R-squared	0.41	0.52	0.52
Adj. R-squared	0.30	0.41	0.38
Sample Size	33	32	31
Bounds F-test statistic	3.06	7.19	3.22
Bounds t-test statistic	-1.42	-2.40	-1.31

Table B.53: Bounds tests for domestic price equation of China (1978-2011)

	ALS_1			ALS_2			ALS_3		
	(1) ^a	(2) ^b	(3) ^a	(1) ^a	(2) ^a	(3) ^c	(1) ^a	(2) ^a	(3) ^a
Constant	0.10	0.08	0.06	0.16	0.15	0.12	0.19	0.19	0.17
	0.09	0.11	0.11	0.10	0.11	0.11	0.09	0.10	0.11
	1.06	0.76	0.57	1.59	1.33	1.04	2.07	1.88	1.55
$\Delta \ln P(-1)$		-0.02	-0.07		-0.02	-0.06		0.01	-0.04
		0.06	0.07		0.07	0.08		0.07	0.08
		-0.38	-0.92		-0.24	-0.82		0.11	-0.45
$\Delta \ln P(-2)$			-0.08			-0.08			-0.05
			0.07			0.07			0.07
			-1.15			-1.12			-0.76
$\Delta \ln P_m$	0.14	0.14	0.12	0.14	0.14	0.12	0.14	0.14	0.12
	0.08	0.09	0.09	0.08	0.09	0.09	0.08	0.08	0.09
	1.80	1.57	1.27	1.82	1.67	1.32	1.82	1.67	1.30
$\Delta \ln ULC$	0.88	0.89	0.85	0.89	0.89	0.85	0.88	0.88	0.84
	0.06	0.07	0.08	0.06	0.07	0.08	0.06	0.07	0.08
	14.52	12.43	10.96	14.45	12.27	10.79	14.15	11.86	10.26
$\ln P(-1)$	-0.18	-0.15	-0.11	-0.26	-0.25	-0.20	-0.35	-0.36	-0.31
	0.13	0.15	0.15	0.14	0.17	0.17	0.14	0.17	0.18
	-1.40	-1.01	-0.74	-1.85	-1.51	-1.14	-2.42	-2.14	-1.72
$\ln P_m(-1)$	0.05	0.05	0.09	0.06	0.06	0.11	0.04	0.04	0.09
	0.04	0.06	0.07	0.04	0.05	0.07	0.03	0.05	0.07
	1.33	0.80	1.35	1.61	1.13	1.64	1.13	0.77	1.26
$\ln ULC(-1)$	0.13	0.11	0.07	0.22	0.21	0.15	0.28	0.29	0.24
	0.13	0.15	0.15	0.14	0.16	0.16	0.14	0.15	0.16
	1.04	0.74	0.46	1.57	1.31	0.92	2.09	1.90	1.46
Diagnostics and Tests									
R-squared	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92
Adj. R-squared	0.92	0.91	0.91	0.92	0.91	0.91	0.91	0.90	0.90
Sample Size	33	32	31	33	32	31	33	32	31
Bounds F-test statistic	6.17	3.34	3.40	6.44	3.77	3.96	9.23	6.54	5.74
Bounds t-test statistic	-1.40	-1.01	-0.74	-1.85	-1.51	-1.14	-2.42	-2.14	-1.72

a Autocorrelation at 4th lag at 5

b Autocorrelation at 2nd and 4th lags at 5

c Autocorrelation at 4th lag at 1

Table B.54: Bounds tests for export prices equation of China (1978-2011)

	Export Prices		
	(1)	(2)	(3) ^a
Constant	-0.03	-0.04	-0.03
	0.01	0.01	0.01
	-3.19	-3.87	-2.29
$\Delta \ln P_x(-1)$		0.18	0.04
		0.09	0.09
		2.09	0.42
$\Delta \ln P_x(-2)$			0.10
			0.09
			1.14
$\Delta \ln P$	0.31	0.30	0.19
	0.09	0.09	0.09
	3.51	3.29	2.14
$\Delta \ln P_x^{comp}$	0.84	0.75	0.92
	0.15	0.15	0.15
	5.51	5.00	6.27
$\ln P_x(-1)$	-0.40	-0.56	-0.24
	0.12	0.15	0.19
	-3.48	-3.80	-1.30
$\ln P(-1)$	0.07	0.09	-0.01
	0.04	0.04	0.05
	1.85	2.15	-0.24
$\ln P_x^{comp}(-1)$	0.23	0.35	0.17
	0.11	0.12	0.14
	2.03	2.81	1.21
Diagnostics and Tests			
R-squared	0.80	0.81	0.80
Adj. R-squared	0.76	0.76	0.74
Sample Size	33	32	31
Bounds F-test statistic	25.87	21.29	7.68
Bounds t-test statistic	-3.48	-3.80	-1.30

a Residuals non-normal at 1

B.3.3 Engle-Granger cointegration tests

Table B.55: Engle-Granger cointegration test for the consumption equation for China (1978-2011)

Cointegrating Regression: $\ln C = \text{constant} + \ln W_3 + \ln R_3 + u$	
Estimated value of $(a - 1)$	-0.41
Test statistic	-2.80
P-value [†]	0.36
First order autocorrelation coefficient for e_t [‡]	0.08

[‡] e is the residual series from the Dickey Fuller Test for $\hat{u}_t$: $\hat{u}_t - \hat{u}_{t-1} = (a - 1)\hat{u}_{t-1} + e_t$

[†]P-values are based on MacKinnon (1996).

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Les Modèles Postkeynésiens de Croissance et Répartition : Applications aux Pays en Développement

Résumé : Le but de cette thèse est d'analyser les effets de court terme de la répartition fonctionnelle des revenus sur la demande agrégée et ses composants en Corée du Sud, Thaïlande et la Chine dans un cadre postkeynésien. Dans ce but un modèle est proposé et ses paramètres sont estimés pour caractériser les régimes de croissance de demande dans ces pays. L'analyse économétrique montre que les demandes domestiques de ces pays sont tirées par les salaires, sauf Thaïlande dans lequel certaines mesures de la répartition des revenus indiquent que l'économie domestique est tirée par les profits, pendant que les économies ouvertes sont tirées par les profits. Les résultats décrivent que des politiques de croissance pro-travailleurs ne sont pas viables au court terme dans ces pays. Cette thèse comprend une revue de la littérature sur les théories de répartition des revenus et de croissance, présente une revue de la littérature sur les travaux empiriques de modèles postkeynésiens de croissance et répartition, expose un modèle théorique, elle comprend également une analyse du régime de croissance de demande en Corée du Sud, Thaïlande et la Chine, respectivement. Dernièrement, la thèse discute les défauts du modèle, résume ses résultats et arrive à des conclusions politiques impliquées par le modèle.

Mots-clés: Répartition des revenus, Croissance, l'économie postkeynésienne, Corée du Sud, Thaïlande, Chine

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Post-Keynesian Models of Income Distribution and Growth: Applications to Developing Countries

Abstract: The aim of this PhD dissertation is to analyze the short-term impact of functional income distribution on aggregate demand and its components in South Korea, Thailand, and China within a post-Keynesian framework. For this purpose, the dissertation proposes a theoretical model, and estimates its parameters for characterizing demand regimes in these countries. Econometric analysis shows that domestic economies of the countries are wage-led except for Thailand, in which some measures of income distribution point to a profit-led domestic demand regime, while total economies are profit-led. The results indicate that pro-labor growth policies are not viable in the short run in these countries. The dissertation reviews the theories of income distribution and growth, offers a survey of the empirical literature on the post-Keynesian models of income distribution and growth, presents the theoretical model proposed, and undertakes an analysis of demand regimes in South Korea, Thailand, and China. Finally, the dissertation addresses the shortcomings of the model, summarizes its findings discusses the implied policy conclusions.

Keywords: Income distribution, growth, post-Keynesian economics, South Korea, Thailand, China