SOME ASPECTS OF STABILIZATION PROGRAMMES FOR INDIA: A MACRO-THEORETIC ANALYSIS

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Debashree Chakraborty

Department of Economics

Jadavpur University

Kolkata

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Certified that the Thesis entitled

Some Aspects of Stabilization Programmes for India: A Macro-Theoretic Analysis submitted by me for the award of the degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my own work carried out under the supervision of Dr. Ambar Nath Ghosh, Professor, Department of Economics, Jadavpur University. And that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere/elsewhere.

Countersigned by the Supervisor(s)

Prof. Ambar Nath Ghosh
Dept. of Economics
Jadavpur University
Dated:

Candidate: Debashree Chakraborty

Dated:

"Statement of Originality"

I, ***Debashree Chakraborty***, registered on ***27th November, 2017*** do hereby declare that this thesis entitled ***"*Some Aspects of Stabilization Programmes for India: A Macro-Theoretic Analysis*"*** contains literature survey and original research work done by the undersigned candidate as part of Doctoral studies.

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Dedicated to,

The emancipation of the working class.

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Debashree Chakraborty

Department of Economics

Jadavpur University

Kolkata.

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Chapter 1

Introduction

Abstract

This chapter introduces the main themes of the thesis. The thesis focuses on the following questions: how to finance public expenditure on imports in India, what costs inflation inflicts on the people in India and how these costs are affected in the presence of the fiscal deficit target and inflation target and, finally, what policy should be followed regarding the pricing of oil in India. This chapter explains the relevance of these questions, points to the gaps in the literature and, thereby, brings out clearly the importance of the contribution made by the thesis. This chapter also briefly presents the theoretical frameworks used to accomplish the objectives of the thesis. The thesis uses macro-theoretic frameworks developed on the lines suggested by Keynes (1936) and Kalecki (1954). These theoretical frameworks are modified versions of the one developed in Ghosh and Ghosh (2016). These frameworks include all the relevant salient features of the Indian economy. This chapter also gives a brief summary of the major results of the thesis.

1.1 The Objectives and the Plan of the Thesis

India gave up the Nehru-Mahlanobis Strategy and adopted the New Economic Policy (NEP) in July 1991. The objective of the NEP is to establish a free market economy by removing all kinds of restrictions of the Nehru-Mahalanobis era on production, pricing, investment, export, import, trade, hiring and firing of workers, work conditions etc. and transferring the ownership of all public sector enterprises set up during the Mahalanobis era and natural resources to private corporations. To minimize government's command over resources, the NEP has drastically reduced direct tax rates and imposed a cap on fiscal deficit, which stands for government borrowing. As a result, the government has to take recourse to indirect taxes to meet its essential expenditures fulfilling the fiscal deficit target so much so that at the present the major part of the government's tax revenue comes from indirect taxes. To meet the fiscal deficit target, it also has to reduce its subsidies or raise its profit by hiking up the prices of the essential intermediate inputs that it still produces. Examples of these inputs are railway services, coal, power, oil etc. Under the NEP, the RBI has made inflation control one of the most important objectives of monetary policy. It has set an inflation target and whenever inflation rate goes above this target, the RBI raises interest rates to bring inflation down to the target level. Under the Nehru-Mahalanobis Strategy the government administered prices of petroleum and petroleum products (henceforth referred to as oil) much below their international

prices. The NEP deregulated oil prices so that they become equal to their international prices. The objective of this thesis is to focus on some of the short-run implications

of the fiscal deficit target, inflation target, emergence of indirect taxes and profit of the public sector enterprises as the major instrument for financing public expenditure and deregulation of oil prices using macro-theoretic frameworks suitable for India. The thesis consists of three core chapters: Chapter 2, Chapter 3 and Chapter 4. Government expenditure on imported goods has always been important in India. The present government also devotes a substantial part of its expenditure on imported armaments and imported infrastructure items such as bullet train. The objective of Chapter 2 is to identify the best method of financing public expenditures on imports. It also examines the role of the fiscal deficit target in aggravating or mitigating the adverse effects of different modes of financing considered here. Chapter 3 focuses on inflation in India. It seeks to identify the costs that inflation inflicts on the people of India. It also inquires into how inflation and its costs are affected by the inflation target and the fiscal deficit target when the government uses its own consumption expenditure, public sector enterprises' profit and indirect taxes for meeting the fiscal deficit target. Chapter 4 examines the impact of deregulation of the price of oil. As we have already mentioned, under the Nehru-Mahalanobis era, price of oil was administered by the government much below its international price. Under the NEP, oil price has been deregulated so that it has become equal to its international price. Chapter 4 compares the macroeconomic effects of the policy of price deregulation and the policy of the administered price when the subsidy that the latter policy involves is financed by taxing the rich and also when it is financed by indirect taxes. The analysis of this chapter applies not only to oil but also to all other imported essential intermediate inputs. In what follows we present the contents of these three chapters in greater detail.

1.2 Chapter 2: Financing Public Expenditure on Imports under the New Economic Policy

We summarize the study carried out in Chapter 2 below.

1.2.1 Introduction

Government of India has been following the New Economic Policy (NEP) since 1991. The NEP has drastically reduced direct tax rates. As a result, indirect taxes have emerged as the major means of financing government expenditure. It has also imposed a fiscal deficit target, which constitutes a cap on government's borrowing. In this chapter, we have sought to make an assessment of these aspects of the fiscal policy of the NEP taking the case of government's expenditure on imports. Quite a large part of government's expenditure in India is spent on imports. We have considered the case where the government raises its expenditure on imported goods and finances it by resorting to four different means of financing namely external borrowing, internal borrowing, taxation of capitalists' income and indirect taxation. We have examined the short term macroeconomic impacts of all these four policies both in the presence of the fiscal deficit target and in its absence. We have done this in order to identify the best policy of financing an increase in government expenditure on imported goods and also to assess

whether the fiscal deficit target aggravates the adverse effects of these policies or weakens them. This endeavour is worthwhile because in the literature there is no study that has examined this issue.

1.2.2 The Macro-Theoretic Framework

We have developed in the chapter a short-period model for a small open economy based on the lines suggested by Keynes (1936) and Kalecki (1954). Thus, in this model, aggregate output of goods and services is determined by aggregate final demand for goods and services and the price is set by applying a fixed mark-up to the average variable cost of production. Participants in production are divided into two classes: workers and capitalists. The latter earn profit, while the former supply labour. Workers are much poorer than the capitalists. Hence, workers' marginal propensity to consume out of their income is much higher than that of the capitalists. For simplicity, the amount of labour employed in production is assumed to be fixed. Thus, labour is treated as a fixed input here. This does not affect our results qualitatively. (Even though this is a simplifying assumption that does not affect the results of the paper qualitatively, it can be justified in Indian context. In India, about half of the GDP is produced in the organized sector. However, it employs less than six percent of the work force and the number of workers employed in this sector has been more or less stagnant in the post-reform period. This was the case even though its output grew at the rate of around six percent per year on the average in the post-reform period. In the unorganized sector, the major part of production is carried out in family firms and the family members earn profit, which is, however, a negligible part of the total profit. The profit earned by the small family firms is negligible relative to the total profit because they sell their produce to the capitalists. The small producers are numerous, while the capitalists are just a few in number and the bargaining strength of the small producers is virtually nil vis-à-vis the capitalists. The small producers have to sell their produce to the capitalists at the lowest possible price, which is set by the capitalists. The capitalists in turn sell the produce of the small producers to the consumers at the highest possible price. Hence, almost all the profit that production and sale of the produce of the small producers generates is reaped by the capitalists.)We have incorporated in this model the relevant salient features of the Indian economy. India's production is highly import intensive. (We have substantiated this claim with data in Chapter 2). It has to import petroleum and petroleum products, fertilizer, electronic goods and components on a large scale to sustain its production. Hence, in our model, imported intermediate inputs are used in production. Imported intermediate inputs are the only variable input in production in this model. Again, on the basis of the recent quarterly date of exchange rates for several years, we have deduced that India has a flexible exchange rate regime. Moreover, since India does not have any independent technological or knowledge base, we have assumed that investment in India is highly import intensive. This is corroborated using the example of import intensity of studying economics in India. In the area of teaching and learning economics in India, almost all the text books used are foreign, almost all the journals referred to are imported, all the computers and software students, teachers and researchers use for empirical analysis are imported. This is true of all other subjects. Thus, to set up a college

or university, all the knowledge inputs and high-tech inputs have to be imported. This is true of not only educational institutes but also all other production facilities. Therefore, if the exchange rate goes up or the price of foreign non-oil goods rises, cost of investment in India goes up substantially. This, given investors' expectations, reduces investment on a large scale. Thus, Investment in our model is a decreasing function not only of interest rate but also of exchange rate, given the world prices of non-oil foreign goods in foreign currency. Again, since India does not have any independent base of knowledge and technology, close substitutes of almost all the goods it produces are available everywhere else. Accordingly, export demand for its products and demand for non-oil imports are likely to be highly price elastic. We have incorporated this feature also. Using this framework, we have sought to accomplish the objective of this paper. The two key endogenous variables of the model are the GDP and the exchange rate.

1.2.3 The Major Findings of Our Study

The major finding of our study in this chapter is that the best way of financing an increase in government's expenditure on imports is by taxing the capitalists' income in the presence of the fiscal deficit target. It also shows that the fiscal deficit target plays a highly destabilizing role in the short run. This raises the question whether a cap on fiscal deficit is really necessary. We plan to take up this issue in our future research programme.

1.3 Chapter 3: Inflation and Stabilization Policies in India

We present a summary of the content of Chapter 3 below.

1.3.1 Introduction

This chapter focuses on inflation. It seeks to identify the major costs that inflation inflicts on the people in India and shows how fiscal and monetary policies enshrined in the NEP aggravate these costs manifold. We pointed out in Chapter 2 that fiscal deficit target is an integral part of the fiscal policy of the NEP. It imposes a ceiling on the fiscal deficit (government's borrowing) as a proportion of GDP. Here we will point to an aspect that the existing literature on fiscal deficit target has largely overlooked. We will show here that the fiscal deficit target magnifies manifold the adverse effects of inflation.

The kind of monetary policy being pursued these days all across the capitalist world including India is also a matter of grave concern for the poor toiling masses who are net lenders to the capitalists. This monetary policy consists in reducing drastically interest rates as soon as a recession strikes an economy and raising it in times of inflation to weaken inflationary forces. All the major capitalist countries have been in the grip of recession for a long period of time. Japan, US and most of the countries in Europe have been in recession since 1992, 2001 and 2008 respectively (see Table 3.1). Interest rates in all these countries were reduced to the minimum possible level immediately following the onset of recession much to the detriment of the interest of the workers who are net lenders to the capitalists. However, this policy failed

to make any impact on recession, which continued unabated (see Tables 3.2 and 3.3). It should be noted here that, even though risk-free interest rates dropped to the minimum possible levels in these countries, loans were available at these low interest rates only to the giant corporations or giant capitalists, whom Bernake, Gertler and Gilchrist (1996) calls quality borrowers. In fact, with the onset of the 'Great Recession' in the US and the cut in the Fed rate to zero in 2008, interest rates for the giant corporation dropped to the minimum possible level but interest rates rose steeply for the small and medium enterprises eroding substantially their competitive strength (see Mishkin (2011) in this context) vis-a-vis the giant corporations. We seek to show in this chapter that if interest rates are raised in times of inflation to tackle it, it will significantly strengthen inflationary forces and magnify manifold the adverse effects of inflation causing grievous harm to the toiling masses.

Inflation is a matter of grave concern to the people and the government. It inflicts enormous costs on the society. The objective of this chapter is to develop a suitable macro model for India to study how inflation harms the economy. It does so to examine how the costs of inflation are affected in the presence of the fiscal deficit target and inflation target. Even though Patnaik (2006) and Kaldor (1976) warn of the costs of inflation getting aggravated by fiscal deficit target and inflation target, respectively, they have not used any model to rigorously establish their claims. We consider it worthwhile to go into the issues in greater detail and capture the destabilizing effects of fiscal deficit target and inflation target rigorously within the framework of a macro-theoretic model suitable for India. We consider our endeavour necessary in view of the Government of India's fiscal and monetary policy stance. In pursuance of the FRBM Act 2003, the Government of India (GoI) adheres to a strict fiscal deficit target. Following the recommendation of the Urjit Patel Committee Report (RBI 2014), the GoI seeks to restrict fiscal deficit to around 3 percent of GDP. The same committee recommended that inflation should be the nominal anchor for monetary policy framework. Following this recommendation, the RBI has set 4 percent as the inflation rate target (RBI 2016). If inflation rate exceeds 4 percent, the RBI raises its policy rates to bring down the inflation rate to its target level. If the inflation rate is less than 4 percent, the RBI lowers its policy rates to give a boost to growth, if it is below the desired or potential level. It is important to know whether these policies, contrary to the policy makers' beliefs, act as automatic destabilizers and aggravate the costs of inflation as suggested by the writers mentioned above.

The chapter shows that the fiscal deficit target substantially reinforces adverse effects of inflation, if the government seeks to keep fiscal deficit under control by adjusting government consumption or administered prices of essential inputs such as services of railways, electricity, coal etc. or by raising indirect tax rates. We have not considered direct taxes here since direct tax rates have been reduced drastically since the adoption of the NEP and the government does not hike direct tax rates to meet its fiscal deficit target. It also shows that the inflation target also reinforces inflationary forces and magnifies manifold the costs that an exogenous increase in the inflation rate inflicts on a society.

1.3.2 The Theoretical Framework

In this chapter, we have used the model of a small open economy developed in chapter 2. However, we have modified it slightly so that we can capture the major costs of inflation and the effects of fiscal deficit target and inflation target on them with ease. The model, as was the case with the earlier one, consists of a real sector and a financial sector. We consider the real sector first. As before, in the real sector, aggregate output is demand determined and the price is set on the basis of the average variable cost of production. However, we have treated labour as a variable input here. We have also replaced the rigid mark-up pricing rule of Chapter 2 with a more general one, where the domestic price is just an increasing function of the average variable cost of production. The major determinants of the average variable cost of production that we have considered here are the exchange rate, government administered prices of essential intermediate inputs produced in the public sector such as railway fares, coal prices, power tariffs etc., the indirect tax rate and the interest rate, which is a policy variable of the RBI. A number of essential intermediate inputs such as the ones mentioned above are produced in the public sector and their prices are administered by the government. These essential intermediate inputs enter into the production of all goods and services directly or indirectly. Clearly, the administered prices of these intermediate inputs are an important determinant of the average variable cost of production and, thereby, that of the domestic price level. As we have pointed out in Chapter 2, under the NEP, direct tax rates have been slashed drastically and indirect tax rates are being raised continuously to raise revenue. Obviously, indirect tax rates are also important determinants of the average variable cost of production and, thereby, that of the domestic price level. Finally, following Kalecki (1954), we have assumed that besides the average variable cost of production, domestic price level also depends upon the degree of monopoly power of the firms. We have taken this as exogenously given.

Let us now consider the financial sector. The RBI in India takes measures so that the interest rates remain at target levels. One of the major objectives of RBI's monetary policy is to keep inflation below a target level, which is 4 percent at the present. If the inflation rates go above the target level, the RBI takes steps to raise the interest rates. Now, the firms take loans not only to finance their investment but also to pay for intermediate inputs and factor services. A part of the interest charges on loans, therefore, is included in the average variable cost of production. An increase in the interest rate will, therefore, raise the average variable cost of production and, thereby, the domestic price level. As before, the two key endogenous variables in this model are the domestic GDP and the exchange rate.

Note that the theoretical framework used here considers an economy in a given period of time. In the given period of time, the price of the preceding period is given. Hence an increase in the domestic price in the given period implies an increase in the rate of inflation.

1.3.3 Major Results

We have used the framework described above to examine first how the welfare of the people is affected by an increase in the domestic price level following an exogenous increase in the degree of monopoly power of the firms. We have found that it will bring about a very large contraction in domestic GDP and employment. The increase in the domestic price level brings about a redistribution of income from the workers to the capitalists. Thus, workers will be very badly affected. It also shows that both inflation target and fiscal deficit target aggravate the adverse effects of an exogenous increase in the inflation rate manifold, when the instruments the government uses to meet the fiscal deficit target are its consumption expenditure, administered prices of essential intermediate inputs and indirect taxes.

Our study in the chapter shows that both fiscal deficit target and inflation target exacerbate substantially the adverse effects of inflation, given the ways the government and the central bank seek to achieve these targets. Thereby, it behoves us to consider the following issues. Fiscal deficit leads to an increase in government's debt service charges in future. This is considered bad by neoclassical economics. This view of fiscal deficit has to be subjected to close scrutiny. Moreover, the instruments that the government uses in India to keep the fiscal deficit under control, as we have shown here, magnifies manifold the adverse effects of an exogenous increase in the inflation rate. This chapter also shows that hiking interest rates to control inflation may reinforce inflationary forces and make the adverse effects of inflation much more pronounced. Given all these findings and observations, it is important to carefully study the following. First, whether a cap on fiscal deficit is warranted or not? Second, what is the best way of keeping the fiscal deficit under control, if such control is found to be necessary? Third, how the policy makers should keep inflation under control? We will take up these issues in our future research programme.

1.4 Chapter 4: The Appropriate Oil Price Policy for India – A Macro-Theoretic Study

We summarize the content of Chapter 4 below:

1.4.1 Introduction

India is a large importer of petroleum and petroleum products, which we will refer to as oil. Oil is an essential intermediate input of production in India. An increase in the international price of oil is a major cause of inflation in India in the post-reform period. In the pre-reform period in 1975, an administered price setting mechanism with regard to oil was put in place to safeguard the people in India from the onerous effects of oil price hikes in the world market. Under this mechanism, the government administered the domestic price of oil for the people of India much below the world price of oil and kept it fixed there so that the Indians had access

to the basic necessities of life at low and stable prices. With the beginning of Economic Reforms in India since July 1991, the administered price mechanism was being gradually dismantled with a view to making domestic price of oil equal to its international price. Government's rationale of linking the domestic price of oil to its international price is the following. If the domestic price of oil rises when its international price goes up, consumers get the signal that oil is scarcer and they get induced to economize on the use of oil. Similarly, the domestic producers of oil get the signal that oil is scarcer and they find it profitable and also get the resources to invest in the oil sector to increase its production. However, this argument for doing away with the administered price of oil is completely flawed for the following reason. Rationing a scarce good through a rise in its price is the cruelest means of rationing since it forces the poorer people out of the market of the scarce good, while the rich are hardly affected. For example, in India, if the price of oil rises, small farmers who own more than 85 percent of agricultural land will be forced to reduce their purchase of oil. It will lower food output. Food price will accordingly rise. This will force the poor to reduce their food consumption, while the rich will hardly be affected. Thus, the brunt of rationing through price increase is borne by the poor who are very badly and cruelly affected when they are forced to lower the consumption of an essential scarce good. In contrast, if the domestic price of oil is administered below the international price of oil at a low level so that the poor have access to all the basic necessities of life on an adequate scale, and the subsidy on the consumption of oil is financed by taxing the rich, then the brunt of rationing will be borne by rich, who make all the non-essential uses of oil. Obviously, this rationing scheme is fully just. The producers are not harmed in any manner as they receive the international price of oil. The objective of this chapter is to develop this argument in a macro-theoretic framework suitable for India. The study undertaken in this chapter is worthwhile, since no other theoretical study in the relevant literature has sought to accomplish the objective noted above.

1.4.2 The Macro-Theoretic Framework

Here we use the short-period model for a small open economy developed in Chapter 2. We repeat the main features of this framework to brush up our memory. Thus, in this model, aggregate output of goods and services is determined by aggregate final demand for goods and services and the price is set by applying a fixed mark-up to the average variable cost of production. Participants in production are divided into two classes: workers and capitalists. The latter earn profit, while the former supply labour. Workers are much poorer than the capitalists. Hence, workers' marginal propensity to consume out of their income is much higher than that of the capitalist. Besides labour, imported oil is used as an input in production. We have incorporated in this model the relevant salient features of the Indian economy. Thus, on the basis of recent quarterly date of exchange for several years, we have deduced that India has a flexible exchange rate regime. Again, since India does not have any independent technological or knowledge base, we have assumed that investment in India is highly import intensive. This is corroborated using the example of import intensity of studying economics in India. In the area of teaching and learning economics in India, almost all the text books used are foreign, almost all the journals referred to are imported, all the computers and software students use for

empirical analysis are imported. This is true of all other subjects. Thus, to set up a college or university, all the knowledge inputs and high-tech inputs have to be imported. This is true of not only educational institutes but also all other production facilities. Therefore, if the exchange rate goes up or the price of foreign non-oil goods rises, cost of investment in India will go up substantially. This will, given investors' expectations, reduce investment on a large scale. Thus, Investment in our model is a decreasing function not only of interest rate but also of exchange rate, given the world prices of non-oil foreign goods in foreign currency. Again, since India does not have any independent base of knowledge and technology, close substitutes of almost all the goods it produces are available everywhere else. Accordingly, export demand for its products and demand for non-oil imports are likely to be highly price elastic. We have incorporated this feature also. Using this framework, we have sought to examine how a rise in the international price of oil is likely to affect aggregate output, employment and workers' economic well-being under free market conditions. We have also examined the impact of an increase in the international price of oil when the domestic price of oil is administered by the government below its international price and the subsidy is financed by taxing capitalists' income.

In the post-reform period, the government has cut direct tax rates drastically. It keeps direct tax rates unchanged but hikes indirect tax rates quite often to increase its revenue. As a result, at the present, the major part of government's tax revenue comes from indirect taxes (see Ghosh and Ghosh (2019) in this context). We have, therefore, also considered the case where the government finances the subsidy in the administered price regime by hiking indirect tax rates.

1.4.3 The Major Findings

The conclusion of this chapter is that the government should fix the domestic price of oil much below the international price of oil so that the poor workers in India have adequate access to the basic necessities of life. It should finance the subsidy on the use of oil by taxing the capitalists on an appropriate scale. This will protect the workers' jobs and incomes in the face of increases in the international price of oil, tax away a part of the surplus income of the capitalists and cut down their non-essential uses of oil.

The results that apply to oil also apply to all other essential imported intermediate inputs.

1.5 Conclusion

The thesis shows that the best mode of financing public expenditure on imported goods is by taxing the capitalists' income in the presence of a fiscal deficit target. It may benefit the workers. Even if it harms them, the harm done to the workers will be the least compared to what happens under the other modes of financing, namely, external borrowing, internal borrowing and indirect taxation. It also shows that the best policy regarding the pricing of oil or other essential imported intermediate inputs is to administer their prices below their

international prices so that the poor have adequate access to the basic necessities of life in adequate quantities and finance the subsidy by taxing the capitalists. It also shows that the fiscal deficit target and inflation target produce strong destabilizing effects following an increase in the inflation rate for exogenous reasons. Hence, the rationale of the fiscal deficit target should be subjected to close scrutiny. Efforts should be made to identify the best methods of controlling inflation. We would take up these issues in our future research programme.

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Chapter 2

Financing Public Expenditure on Imports under the New Economic Policy

Abstract

Government of India has been following the New Economic Policy (NEP) since 1991. The NEP has drastically reduced direct tax rates. As a result, indirect taxes have emerged as the major means of financing government expenditure. It has also imposed a fiscal deficit target, which constitutes a cap on government's borrowing. In this chapter, we have sought to make an assessment of these aspects of the fiscal policy of the NEP taking the case government's expenditure on import. The Government of India has always been devoting quite a substantial part of its spending to imported goods. We have tried to identify the best way of financing government's expenditure on imports and, thereby, assess the above mentioned features of the NEP. We have considered the case where the government raises its expenditure on imported goods and finances it by resorting to four different means of financing namely external borrowing, internal borrowing, taxation of capitalists' income and indirect taxation. We have examined the short term macroeconomic impacts of all these four policies both in the presence of the fiscal deficit target and in its absence. We have found that the best way of financing the increase in the government's expenditure on imported goods is by taxing the capitalists' income in the presence of the fiscal deficit target. We have also found that the fiscal deficit target produces strong recessionary effects in the cases of internal and external borrowings. It acts as an automatic destabilizer in the cases of direct and indirect taxation. This chapter, therefore, builds a strong critique of the fiscal policy of the NEP.

2.1 Introduction

The objective of this chapter is to make an assessment of the fiscal policy being currently pursued by the Government of India. Since fiscal policy is a part of the broad development strategy being followed by the Government of India, it will help us motivate our endeavor if we briefly recount what the current development strategy is and how it has come into being. Until 1991, India followed the Nehru-Mahalanobis strategy of development, which was inspired by the policy of planned economic development of the Soviet Union. Indian Constitution also proclaims that the prime objective of the policy makers of India is to develop her into a sovereign socialist republic. Preamble of Indian Constitution reads as follows: "WE, THE PEOPLE OF **INDIA**, having solemnly resolved to constitute **India** into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political; LIBERTY of thought, expression, belief, faith and worship; EQUALITY of status and of opportunity; ……..” . More than seventy years have gone by after Independence. Today, India is treading a path, which is just the opposite of what is enshrined in the preamble. We have given up our efforts at establishing socialism, ushered in capitalism and are trying to expand it as fast as possible destroying all the vestiges of socialism. India, in reality, is far from being a sovereign state. It is hopelessly dependent on the capitalist powers for knowledge and technology. Foreign lenders to India, through the IMF, have forced India to give up its strategy of planned economic development and to tread the path of capitalism. They have thrust on India the New Economic Policy (NEP), whose objective is to shape India on the lines of the advanced capitalist countries. To gain an understanding of the NEP, which the Government of India is currently following, we have to first briefly delineate the major features of the Nehru Mahalanobis Strategy and why India had to replace it with the NEP.

2.2 The Nehru-Mahalanobis Strategy

Under the Nehru-Mahalanobis Strategy, planners imposed stringent restrictions on all kinds of economic activities such as production, investment, consumption, export, import, cross-border capital flows etc. Through these restrictions, planners determined the allocation of resources, i.e., the planners decided which commodities were to be produced and in what quantities. The objective of the planners was to achieve self-reliance and to provide the masses with the basic necessities of life at affordable prices. With this end in view, planners utilized India's resources to set up basic and heavy industries, invest on a large scale in irrigation, flood control facilities and agricultural R&D to develop agriculture, invest substantially in education and health care to provide the masses with these services free of cost and, finally, develop a public distribution system to provide the masses with food and other necessities of life at affordable prices. Restrictions were imposed on all kinds of economic activities to prevent leakage of scarce productive resources into the production of non-essential items of consumption and investment. These restrictions were necessary to maximize the production of those goods, which were necessary to achieve the plan objectives of self-reliance and providing the masses with the basic necessities of life at low prices and building a system of universal healthcare and education to provide the people with these services free of cost or at negligible prices.

During the Nehru-Mahalanobis era India was heavily dependent on imported capital and intermediate goods. India did not have the technology to set up the heavy and basic industries. It had to import the technology in the form of capital goods. However, inexplicably, it did not make any effort at imbibing the technology and building on it. During this era, the sources of instability were all on the supply side. Adverse natural factors led to poor performance of the agricultural sector giving rise to food deficit necessitating food imports. This reduced other

kinds of essential imports slowing down the rates of capital formation and growth. Similarly, external shocks such as a slow-down in the global economy or an increase in the prices of essential imported goods caused recession by cutting down India's import capacity. Obviously, conventional fiscal and monetary policies were of no use in tackling these problems. The instability stemmed from the underdevelopment of India, which made it dependent on foreign countries. The solution lay in developing its own technology and infrastructure to eliminate its vulnerability to natural calamities and dependence on imported inputs. However, under Nehru-Mahalanobis strategy, no effort was made to gain independence in the sphere of knowledge and technology and, hence, India's dependence on imported capital goods and intermediate inputs persisted.

Until the beginning of the 1980s, India lived within its means. It did not allow the value of its imports to exceed its receipts from exports and foreign transfers. However, from the beginning of the 1980s, it threw all caution to the wind and began to borrow on a large scale to sustain a high growth of imports and a high growth rate of GDP. However, no effort was made to develop indigenous technology. Hence, India's dependence on imported capital and intermediate goods continued unabated. Large scale borrowing from foreigners led to accumulation of large amount of external debt and external debt service charges by the end of the eighties. In 1990, the Gulf War broke out, which led to a steep increase in the price of oil. Being a large importer of oil, India's import bill increased sharply and exports went down on account of the War bringing about a very large current account deficit. India needed large amounts of loans to meet this deficit. However, suddenly, foreign investors woke up to the risk of lending to India. They decided not to extend any more loans to India. In fact, NRIs began to withdraw their deposits on a large scale aggravating the crisis. India found that it was not in a position to honour its debt service commitments and meet its import bills. India had to seek IMF's assistance to avoid defaulting on its foreign loans and collapse of its imports and the economy. IMF provided assistance, but in exchange it forced India to give up its Nehru-Mahalanobis Strategy and adopt in its place the NEP. Pumping of large amounts of loans into a country and sudden stoppage of loan inflows in times of BOP difficulties is a favourite strategy that the foreign lenders or foreign capitalists employ to bring the aberrant countries (countries that deviate from their desired path of capitalist development) under their control. The latest example of such conquest is Greece. (For details about the Nehru-Mahalanobis Strategy and the crisis that brought it to its end, one may go through Ghosh and Ghosh (2016). To learn the details of the Greek crisis, one may go through Ghosh and Ghosh (2019)). We will now briefly specify the main features of the NEP and show how it contrasts with the Nehru-Mahalanobis Strategy.

2.3 The New Economic Policy (NEP)

The NEP consists in removing all controls over the economic activities such as production, investment, consumption, export, import and cross-border capital flows of the Mahalanobis era. The objective is obviously to allow the market forces a free play in the allocation of scarce productive resources. What is the motivation of this policy? The motivation is quite simple. If free market forces determine allocation of resources, people with purchasing power, i.e., the rich, will secure most of the resources, while the poor will have to make do with very little. Under capitalism, everything including education, healthcare and justice are bought and sold. Quality is scarce and, therefore, pricey under capitalism. Hence, in such societies, quality health care, education and justice and all other necessities are available only to the rich. Thus, capitalism fosters, perpetuates and deepens inequality. In fact, inequality has grown phenomenally all across the capitalist world including India (see in this context Stiglitz (2012), Picketty (2014) and Ghosh and Ghosh (2016)). The capitalist powers, through the IMF, have thrust on India the NEP to spread capitalism in India destroying all vestiges of socialism. The reason why India could not follow its chosen path was because its chosen Nehru-Mahalanobis strategy could not make India self-reliant, even though achieving self-reliance was its major goal. The key to achieving self-reliance is to gain independence in the sphere of knowledge and technology. Development of an independent and indigenous base of knowledge and technology capable of producing the state of the art technology and keeping pace with the technological developments abroad is crucial for achieving self-reliance. Socialist states such as the Soviet Union and People's Republic of China realized this from their very birth and achieved independence in the areas of knowledge and technology. However, surprisingly, India never made any such effort. Nehru-Mahalanobis strategy erroneously equated self-reliance with setting up of heavy and basic industries with foreign technology, which it never tried to imbibe and build on. As a result, it is still dependent on foreign technology, and foreign intermediate inputs. To illustrate how much dependent India is on Western Europe and the USA for knowledge and technology, take the case of teaching and learning economics in India. All the text books and journals teachers refer to are foreign, all the computers and software that the teachers, students and researchers use for empirical analysis are foreign. This is true not only of economics but also of all other subjects. Thus, to set up a college or a university in India, all the knowledge inputs and high-tech inputs have to be imported. This is true not only of educational institutes but also of all modern production facilities. Thus, for example, to set up a bank in India, all the computers, software and high-tech machines have to be imported. Therefore, both investment and production are highly import-intensive in India. On the other hand, as it does not have technology of its own and has to make do with imported technology, which is never state of the art, its export potential is extremely limited. Hence, to sustain even

a modest growth rate, India needs considerable capital inflows. For this reason, India has lost its policy making autonomy to the foreign investors. It has to abide by the dictates of the foreign investors at every step. Let us now focus on the fiscal policy of the NEP. One of its major features consists in stringent restrictions on the size of the fiscal deficit (which stands for government's borrowing) as a proportion of GDP. Foreign investors put great emphasis on it. Restrictions on fiscal deficit as a proportion of GDP restrict government's command over GDP. Let us now focus on taxes. We consider direct taxes first. The NEP has reduced drastically income tax rates on the rich. Now, the marginal income tax rate is capped at 30 percent (see Table 2.2). From an annual income of Rs.2.5 lakh to that of Rs.10 lakh, the marginal income tax rate has increased by 30 percent, i.e., it has increased on the average at the rate of 4 percent for every additional annual income of Rs. 1 lakh. Shockingly, the increase in the marginal tax rate has stopped at the annual income of Rs.10 lakh. It has not increased any further. Thus, the incomes of the richest of the Indians who have in their command most of India's GDP are taxed at the minimum possible rate. Moreover, the rich through their hold over the government evade taxes on a large scale so much so that around 70 percent of India's direct tax collection comes from the salaried people (Government of India (2018)). Hence, India's direct tax collection under NEP is quite poor. The government in India, therefore, takes recourse mainly to indirect taxes to finance its expenditure. As a result the share of indirect tax revenue in total tax revenue has increased steadily under the NEP and at the present major part of India's tax revenue comes from indirect taxes, which are highly regressive and unjust (see Table 2.3). We will make an assessment of these features of the fiscal policy under the NEP taking an example. The example that we consider is the following. Government of India devotes a substantial part of its spending to imported goods such as armaments, capital goods etc. We will try to identify the best way of financing government expenditure on imports and, thereby, assess the above-mentioned features of fiscal policy under the NEP. For this purpose, we will examine how an increase in public expenditure on imported goods is likely to affect India's GDP and well-being of the people under different modes of financing in the presence of the fiscal deficit target as well as in the case where the fiscal deficit target is absent. The modes of financing that we have considered are external borrowing, internal borrowing, taxation of capitalists' income and indirect taxation. Through these exercises, we have sought to identify the best mode of financing government's expenditure on imports and to examine whether the effects of the policies mentioned above become better or worse in the presence of the fiscal deficit target. Since India's export potential for reasons we have already explained, is quite limited, government expenditure on imports creates BOP difficulties and, thereby, produce

destabilizing effects. Hence, it is important to know how the government should finance its expenditure on imports so that these destabilizing effects are minimized or neutralized.

To accomplish the tasks mentioned above, following Ghosh and Ghosh (2016), we will develop a model that we hope captures the salient features of the Indian economy.

2.4 The Model

The model is developed on the lines suggested by Keynes (1936) and Kalecki (1954). The model consists of a real sector and a financial sector. Following Keynes, we assume that aggregate output or GDP of the economy is demand determined. The goods market equilibrium condition is given by

$$Y = c_w.\left(\frac{W}{P}\right) + c_c.(1-t).\left(Y - \frac{W}{P}\right) + G + I(r,e) + X\left(\frac{P^*e}{P}; Y^*\right) - \frac{P^*e}{P}\left[M_G + m.c_c.(1-t).\left(Y - \frac{W}{P}\right) + m_I.I(r,e) + m_Y Y\right] \quad (2.1)$$

where $Y \equiv$ GDP, $c_w \equiv$ average and marginal consumption propensity of the workers, $c_c \equiv$ average and marginal consumption propensity of the capitalists, $W \equiv$ aggregate given money income of the workers, $P \equiv$ domestic price level, $G \equiv$ government consumption, $I \equiv$ aggregate gross investment, $r \equiv$ domestic interest rate, $e \equiv$ nominal exchange rate, $X \equiv$ export, $P^* \equiv$ foreign price level in foreign currency, $Y^* \equiv$ foreign GDP, $M_G \equiv$ the part of G that represents demand for final foreign goods, $m \equiv$ the fraction of capitalists' consumption expenditure that is spent on final foreign goods, $m_I \equiv$ the fraction of aggregate investment expenditure spent on final foreign goods and $m_Y \equiv$ imported intermediate input requirement per unit of Y. Final foreign goods mean those foreign goods that are imported but not used as intermediate inputs in domestic production. We regard India to be a small open economy so that P^* and Y^* are given to India.

Let us explain the RHS of (2.1). The first and the second term give workers' and capitalists' consumption demand, respectively. We assume for simplicity and without any loss of generality that the amount of labour employed in production is fixed and the only variable input of production is the imported intermediate goods used in production. This assumption is also justified in Indian context for the following reasons. The major part of India's GDP is produced in the organized sector in India. Its output has been growing in the post-reform period in India at an average annual rate of about 6 percent. But employment in the organized sector has virtually been stagnant (see Table 2.1). In the unorganized sector, quite a large part of the output is produced in family firms and the family members get the profit as their remuneration. Thus, the assumption that labour is a fixed input makes sense in Indian context. This model is a short

run model and the money wage rate is assumed to be fixed. Workers also earn interest income in the given period on their savings, which they lent out in the past periods at interest rates that prevailed in the past periods. Thus, workers' interest income in the given period is also given. The total given money income of the workers in the given period is denoted by *W*.

Aggregate gross investment demand is, as standard, a decreasing function of *r*. It is also assumed to be a decreasing function of the nominal exchange rate. This assumption may be explained as follows. India, as we have already mentioned, is dependent on imported technology. Technology is imported in the form of machinery and equipment. An increase in the exchange rate, given P^*, makes imported capital goods costlier in terms of domestic currency. This, given investors' expectations regarding future, discourages investment. Again, India is crucially dependent on imported intermediate inputs. An increase in *e* makes imported intermediate inputs costlier in terms of domestic currency. Indian firms also have large amounts of external debt denominated in foreign currency. An increase in *e* makes external debt service charges larger in terms of domestic currency. All these adverse supply shocks depress investor sentiments and, thereby, dampen investment demand. There is prima facie empirical evidence in support of this assumption in Indian context (see Ghosh and Ghosh (2016), Chapter 8).

The export function is standard. The import function is self-explanatory. For simplicity, we have taken *m*, m_I and m_Y to be fixed instead of making them functions of the real exchange rate.

Following Kalecki (1954), we assume that *P* is set by applying a fixed mark-up, denoted $\bar{\gamma}$, to the average variable cost of production.

$$P = \bar{\gamma} m_Y P^* e \equiv \gamma P^* e \quad ; \ \bar{\gamma} > 1 \qquad (2.2)$$

BOP Equilibrium

In India, data on exchange rate show that it is highly flexible. So, we assume a flexible exchange rate regime. We also assume for simplicity and without any loss of generality that the net inflow of capital is exogenously given and it is denoted by $\bar{K}$. Hence, the BOP equilibrium condition may be written as

$$X\left(\frac{P^* e}{P}; Y^*\right) - \frac{P^* e}{P}\left[M_G + m.c_c(1-t)\left(Y - \frac{W}{P}\right) + m_I.I(r,e) + m_Y Y\right] + \bar{K} = 0 \qquad (2.3)$$

Substituting (2.2) into (2.3), we rewrite it as follows:

$$X\left(\frac{1}{\gamma}, Y^*\right) - \frac{1}{\gamma}\left[M_G + mc_c(1-t)\left\{Y - \frac{W}{\gamma P^* e}\right\} + m_I I(r.e) + m_Y Y\right] + \bar{K} = 0 \qquad (2.4)$$

The Financial Sector

The RBI seeks to keep interest rate at a target level through its liquidity adjustment facility (LAF) and open market operations. Hence, we shall regard *r* as a policy variable of the RBI and take it as exogenously given. Thus, we write

$$r = \bar{r} \qquad (2.5)$$

Government's Budget Constraint

Given the fiscal deficit target, government's budget deficit cannot exceed a fixed fraction, *a*, of GDP. We assume government's expenditure to consist of two components, namely, government's expenditure on domestic goods (denoted G_D) and government's expenditure on imported goods (denoted M_G). Government's budget constraint is, therefore, written as

$$G = G_D + \frac{P^* e}{P} M_G = t\left(Y - \frac{W}{P}\right) + aY \qquad (2.6)$$

Substituting (2.5) into (2.4), we rewrite it as follows:

$$X\left(\frac{1}{\gamma}, Y^*\right) - \frac{1}{\gamma}\left[M_G + mc_c(1-t)\left\{Y - \frac{W}{\gamma P^* e}\right\} + m_I I(\bar{r}, e) + m_Y Y\right] + \bar{K} = 0 \qquad (2.7)$$

Substituting (2.2), (2.5), (2.6) and (2.7) into (2.1), we rewrite it as

$$Y = c_w.\left(\frac{W}{\gamma P^* e}\right) + c_c.(1-t).\left(Y - \frac{W}{\gamma P^* e}\right) + t(Y - \frac{W}{\gamma P^* e}) + aY + I(\bar{r}, e) - \bar{K} \qquad (2.8)$$

The specification of the model is now complete in the fiscal deficit target case. It is given by the two key equations, (2.7) and (2.8), in two endogenous variables *Y* and *e*. We can solve (2.7) and (2.8) for *Y* and *e* in the fiscal deficit target case.

No Fiscal Deficit Target Case

When there is no fiscal deficit target, *G* is autonomous and not fettered by the budget constraint (2.6). In this case, we substitute (2.2), (2.5) and (2.7) into (2.1) and rewrite it as

$$Y = c_w.\left(\frac{W}{\gamma P^* e}\right) + c_c.(1-t).\left(Y - \frac{W}{\gamma P^* e}\right) + I(\bar{r}, e) + G - \bar{K} \qquad (2.9)$$

We can solve (2.7) and (2.9) for the equilibrium values of *Y* and *e*.

2.5 An Increase in Government's Expenditure on Imported Goods

As we have pointed out in the introduction, government expenditure has always been highly import-intensive. This is true in the current scenario as well. It is, therefore, highly important to know how the government should finance its expenditure on imports. To identify the best way of financing government's expenditure on imports, we will examine what kind of impact is it likely to produce on GDP under different modes of financing in the presence of the fiscal deficit target as well as in its absence? We shall use the model developed above to answer this question. An increase in M_G may be financed by external borrowing, internal borrowing, direct taxation and indirect taxation. We will explore all these four cases here.

2.5.1 An Increase in Government's Expenditure on Imported Goods Financed by External Borrowing

If an increase in M_G is financed by external borrowing, $\overline{K}$ rises so that $d\left(\frac{P^*e}{P}M_G\right) = d\left(\frac{1}{\gamma}M_G\right) = d\overline{K} = A$, where A is fixed. We will examine the impact of this increase in government expenditure on imported goods in both the cases of fiscal deficit target and no fiscal deficit target. We take up the fiscal deficit target case first.

The Case of the Fiscal Deficit Target

To derive the impact of the increase in government consumption mentioned above, we take total differential of (2.7) and (2.8) treating all exogenous variables other than $\overline{K}$ as fixed, set $d\left(\frac{1}{\gamma}M_G\right) = d\overline{K} = A$ and, then, solve them for dY and de. Taking total differential of (2.7), setting $d\left(\frac{1}{\gamma}M_G\right) = d\overline{K} = A$, and solving for *de*, we get

$$de = \theta dY, \text{ where } \theta \equiv \frac{\left[m.c_c.(1-t). + m_Y\right]}{\left[m_I(-I_e) - mc_c.(1-t).\frac{W}{\gamma P^* e^2}\right]} > 0 \qquad (2.10)$$

The sign of θ follows from our assumption that the denominator of the expression on the RHS of (2.10) is positive. This means that an increase in the exchange rate improves BOP. This assumption is needed for reasons of stability (see (a.2.8) in Appendix 2). Let us now explain (2.10). Following an increase in $\overline{K}$ and $\left(\frac{1}{\gamma}M_G\right)$ by $d\overline{K}$, BOP remains in equilibrium at the initial equilibrium (Y,e) - see (2.7). Hence, *e* will change if and only if *Y* changes. Per unit increase in *Y*, given the exchange rate, total import will increase for two reasons: First, the amount of imported intermediate inputs will increase by m_Y. Second, capitalists' disposable profit will go up by $(1-t)$and this will raise capitalists' demand for imported consumption

goods by $(1-t)mc_c$. Hence, per unit increase in *Y*, net export and, therefore, BOP at the initial equilibrium exchange rate goes down by the numerator. Therefore, to equilibrate the foreign exchange market, *e* has to rise so that BOP rises by the value of the numerator. Per unit increase in *e*, BOP rises by the amount given by the denominator. Per unit increase in *e* investment falls by $(-I_e)$ lowering import by $m_I(-I_e)$. On the other hand, per unit increase in *e* price level rises raising profit by $(1-t)\frac{W}{\gamma P^* e^2}$. Hence, import of consumption goods rises by $mc_c(1-t)\frac{W}{\gamma P^* e^2}$. In the net, therefore, net export and BOP goes up by the amount given by the denominator per unit increase in *e*. This explains the value of θ.

Again, taking total differential of (2.8), and substituting (2.10) into it and, then, solving for *dY*, we get

$$dY = -\frac{A}{1-\left[\left\{c_c(1-t)+(t+a)+t\frac{W}{\gamma P^* e^2}\theta\right\}-\left\{(c_w-c_c(1-t))\frac{W}{\gamma P^* e^2}+(-I_e)\right\}\theta\right]} < 0 \qquad (2.11)$$

Let us explain (2.11). In the present case, aggregate government expenditure equals, as follows from (2.6), $\left(aY+t\left(Y-\frac{W}{P}\right)\right)$ of which $\frac{1}{\gamma}M_G$ is spent on foreign goods. Following an increase in this component of government expenditure by $d\overline{K}=A$, government expenditure on domestic goods goes down by the same amount at the initial equilibrium (*Y*, *e*), while BOP remains in equilibrium since government expenditure on imported goods and $\overline{K}$ rise by the same amount. All other components of expenditure on domestic goods remain unaffected. Thus, at the initial equilibrium *Y* and *e*, there emerges an excess supply of *Y* by the amount A. Producers reduce *Y* to remove this excess supply. Per unit fall in *Y*, aggregate planned demand for domestic goods in the flexible exchange rate regime falls not only by the aggregate personal marginal consumption propensity given by $c_c(1-t)$ but also by the government's marginal spending propensity $(a+t)$. The latter, which is due to the fiscal deficit target, makes the fall in aggregate demand per unit decline in *Y* substantially larger. This fall in aggregate demand is somewhat cushioned by the rise in consumption and investment demand by $(c_w-c_c(1-t))\frac{W}{\gamma P^* e^2}\theta$ and $(-I_e\theta)$, respectively, due to the fall in *e* induced by the unit decline in *Y*. Let us explain. Per unit fall in *e*, price goes down redistributing income from the capitalists to the workers by the amount $\frac{W}{\gamma P^* e^2}$. This raises aggregate personal consumption demand by $(c_w-c_c(1-t))\frac{W}{\gamma P^* e^2}$. Per unit fall in *Y*, *e* falls by θ. Hence, aggregate personal consumption

demand rises by $(c_w - c_c(1-t))\frac{W}{\gamma P^* e^2}\theta$ per unit fall in *Y*. However, the fall in profit lowers tax revenue and, therefore, government's consumption by $t.\frac{W}{\gamma P^* e^2}\theta$. Finally, investment goes up by $(-I_e)\theta$. Therefore, per unit fall in in *Y*, the reduction in excess supply is given by the denominator of the expression on the RHS of (2.11), which has to be positive for reasons of stability (see (a.2.12) in Appendix 2). Clearly, the multiplier is much larger because of the government's *e*-adjustment augmented marginal propensity to spend $(a+t)+t.\frac{W}{\gamma P^* e^2}\theta$, which is due to the fiscal deficit target. This yields the following proposition:

Proposition 2.1: When the government raises its expenditure on imported goods and finances it by borrowing externally, GDP will contract in the presence of a fiscal deficit target.

Note that the contraction in GDP hurts the poor people engaged in production in the unorganized sector by reducing their income, which they earn principally in the form of profit.

The Case of No Fiscal Deficit Target

Let us now focus on the case where there is no fiscal deficit target. In this case also $d\left(\frac{1}{\gamma}M_G\right) = d\overline{K} = dG = A$. Taking total differential of (2.7), setting $d\left(\frac{1}{\gamma}M_G\right) = d\overline{K} = A$, and, then, solving for de, we get (2.10) as in the earlier case. Taking total differential of (2.9) treating all exogenous variables other than G and $\overline{K}$ as fixed, setting $dG = d\overline{K} = A$, substituting (2.10) for *de* and, then, solving for *dY*, we get

$$dY = 0 \qquad (2.12)$$

Substituting (2.12) into (2.10), we get

$$de = 0 \qquad (2.13)$$

Let us explain (2.12) and (2.13). In the absence of fiscal deficit target, an increase in $\frac{1}{\gamma}M_G$ by $dG = A$ financed by an equal increase in $\overline{K}$ keeps BOP in equilibrium at the initial equilibrium (Y,e) and leaves aggregate private and public spending on domestic goods at the initial equilibrium (Y,e) unaffected. Hence, both domestic GDP and exchange rate remain unaffected.

The above analysis yields the following proposition.

Proposition 2.2: An increase in government expenditure on imported goods financed by external borrowing leaves GDP unaffected in the absence of a fiscal deficit target.

However, it brings about a large cumulative fall in GDP in the presence of the fiscal deficit target.

2.5.2 Increase in Government Expenditure on Imported Goods Financed by Internal Borrowing

We now consider the case where the government raises its expenditure on imported goods by a given amount $A = d\left(\frac{1}{\gamma}M_G\right)$ and finances it by internal borrowing.

Fiscal Deficit Target

We first focus on the case of the fiscal deficit target, where the equilibrium values of Y and e are yielded by (2.7) and (2.8). To derive the impact of the change noted above on GDP, we first take total differential of (2.7) treating all exogenous variables as fixed, set $d\left(\frac{1}{\gamma}M_G\right) = A$ and, then, solve for de. The solution is given by

$$de = \frac{A}{\bar{\theta}} + \theta dY \qquad \bar{\theta} = \frac{1}{\gamma}\left[m_I(-I_e) - mc_c.(1-t).\frac{W}{\gamma P^* e^2}\right] > 0$$ (for reasons of stability – see (a.2.8) in Appendix 2) and

$$\theta \equiv \frac{(mc_c(1-t)+m_Y)}{m_I(-I_e) - mc_c(1-t)\frac{W}{\gamma P^* e^2}} > 0 \qquad (2.14)$$

Taking total differential of (2.8) treating all exogenous variables as fixed, substituting (2.14) for *de* and, then, solving for *dY*, we get

$$dY = -\frac{\left[\{c_w - c_c(1-t) - t\}\frac{1}{\gamma P^* e^2} + (-I_e)\right]\frac{A}{\bar{\theta}}}{1 - \left[\left\{c_c(1-t) + (a+t) + t.\frac{W}{\gamma P^* e^2}\theta\right\} - \left\{(c_w - c_c(1-t))\frac{W}{\gamma P^* e^2} + (-I_e)\right\}\theta\right]} < 0 \qquad (2.15)$$

(2.15) may be explained as follows. In the present case, total government expenditure equals $\left(aY + t\left(Y - \frac{W}{P}\right)\right)$ of which $\frac{1}{\gamma}M_G$ represents expenditure on imported products. An increase `in $\frac{1}{\gamma}M_G$ by $d\left(\frac{1}{\gamma}M_G\right) = A$ reduces government's expenditure on domestic goods by the same amount at the initial equilibrium (*Y*, *e*). However, this is neutralized by an equal increase in net export net of government's imports due to the BOP deficit induced increase in *e* by $\frac{A}{\bar{\theta}}$ at the initial equilibrium *Y*. Hence aggregate planned spending on domestic goods remains the same

as before at the initial equilibrium *Y*. However, the increase in *e* reduces investment demand by $(-I_e)\frac{A}{\bar{\theta}}$. Besides this, the increase in *e* will raise domestic price level and this will redistribute income from the workers to the capitalists. The increase in profit will raise tax collection and, thereby government's consumption. Thus aggregate personal and public consumption will fall by $\left(c_w-\left(c_c(1-t)+t\right)\right)\frac{W}{\gamma P^* e^2}\frac{A}{\bar{\theta}}$. Since c_c and *t* are very small relative to c_w, the expression $\left(c_w-\left(c_c(1-t)+t\right)\right)\frac{W}{\gamma P^* e^2}\frac{A}{\bar{\theta}}$ is highly likely to be positive. Moreover, since import intensity of *I* is quite high in India, $(-I_e)$ is likely to be quite large. Hence, the numerator of the expression on the RHS of (2.15) without the minus sign can be safely taken to be positive. Therefore, the numerator of the expression on the RHS of (2.15) (without the minus sign) gives the excess supply of goods and services that emerges at the initial equilibrium *Y* following the increase in government expenditure on imports financed by internal borrowing in the presence of a fiscal deficit target. The denominator, as we have already explained in the context of (2.11), measures the fall in excess supply per unit decline in *Y* when *e* adjusts along with the fall in *Y* to keep the BOP in equilibrium. Let us briefly explain the process of contraction. Following the emergence of excess supply at the initial equilibrium *Y*, producers in the first round lower *Y* by $\left[\left(c_w-\left(c_c(1-t)+t\right)\right)\frac{W}{\gamma P^* e^2}+(-I_e)\right]\frac{A}{\bar{\theta}}=dY_1$. This fall in *Y* will lower the exchange rate by θdY_1. These two together will lower aggregate demand for domestic goods by μdY_1, where μ denotes the expression within third brackets in the denominator of (2.15). In the second round, therefore, *Y* will fall by $dY_2=\mu dY_1$. Similarly, in the third round, *Y* will fall by $dY_3=\mu dY_2=\mu^2 dY_1$. This is how the process of contraction will continue until the fall in demand that takes place in each successive round eventually falls to zero. Thus, the total fall in *Y* is given by

$$dY=-dY_1-\mu dY_1-\mu^2 dY_1-\ldots\ldots\ldots=-\frac{1}{1-\mu}dY_1 \qquad (2.16)$$

(2.16) explains (2.15). Given the very wide income disparity between the workers and the capitalists and the low level of *t*, $\left(c_w-\left(c_c(1-t)+t\right)\right)\frac{W}{\gamma P^* e^2}$ is highly likely to be positive. Again, given the very high degree of import intensity of investment, India being completely dependent on foreign technology for reasons we have explained earlier, $(-I_e)$ is likely to be quite large. For all these reasons, following an increase in government expenditure financed by internal borrowing, there is likely to be a large and cumulative decline in *Y* in the presence of a fiscal deficit target. This yields the following proposition:

Proposition 2.3: Following an increase in government expenditure on imported goods financed by internal borrowing, one can almost safely say that there will be a large and cumulative decline in *Y* in India in the presence of a fiscal deficit target.

No Fiscal Deficit Target Case

We now focus on the no fiscal deficit target case, where we get *Y* and *e* by solving (2.7) and (2.9). To derive the impact of an increase in $\frac{1}{\gamma}M_G$ by $dG = d\left(\frac{1}{\gamma}M_G\right) = A$ on *Y*, we first take total differential of (2.7) treating all exogenous variables as fixed, set $d\left(\frac{1}{\gamma}M_G\right) = dG = A$ and, then, solve for *de*. This gives us

$$de = \frac{dG}{\bar{\theta}} + \theta dY = \frac{A}{\bar{\theta}} + \theta dY \text{ (see (2.14))} \qquad (2.17)$$

Now, taking total differential of (2.9) treating all exogenous variables other than G as fixed, substituting (2.17) for *de* and, then, solving for *dY*, we get

$$dY = \frac{A\left[1 - \left\{\left(c_w - c_c(1-t)\right)\frac{W}{\gamma P^* e^2} + \left(-I_e\right)\right\}\frac{1}{\bar{\theta}}\right]}{1 - \left[c_c(1-t) - \left\{\left(c_w - c_c(1-t)\right)\frac{W}{\gamma P^* e^2} + \left(-I_e\right)\right\}\theta\right]} \qquad (2.18)$$

Comparing the expressions on the RHSs of (2.15) and (2.18), we find that the numerator in (2.18) is highly likely to be much larger. It may be positive as well. The denominator, on the other hand, is also much larger in (2.18) because of the absence of the term $(a+t)+t\frac{W}{\gamma P^* e^2}$. Both of these make the contraction in *Y* much smaller in the present case. *Y* may even expand. We may explain the difference in the following manner. When the government takes recourse to internal borrowing and uses the loan raised to spend on imported goods, both *G* and $\frac{1}{\gamma}M_G$ increase by the same amount and aggregate planned demand for domestic goods at the initial equilibrium (Y, e) remains unaffected. However, the increase in demand for imports and the consequent BOP deficit induces an increase in the exchange rate, which raises net export by $d\left(\frac{1}{\gamma}M_G\right) = dG = A$ so that the BOP deficit is removed. Therefore, at the initial equilibrium *Y*, aggregate planned demand for domestic goods rises by $dG = A$. This increase in the aggregate demand for domestic goods at the initial equilibrium *Y* did not occur in the presence of the fiscal deficit target. The increase in the exchange rate, however, lowers investment demand and aggregate consumption demand by $-I_e\frac{1}{\bar{\theta}}A$ and $\left(c_w - c_c(1-t)\right)\frac{W}{\gamma P^* e^2}$, respectively. In the

presence of the fiscal deficit target, the fall in aggregate consumption demand is less because of the increase in public consumption due to the additional tax collection from the additional profit caused by the increase in the domestic price level induced by the rise in the exchange rate. This difference is, however, negligible because the tax rate on profit is effectively likely to be quite small in India. In the net, therefore, there may emerge excess demand or excess supply at the initial equilibrium *Y*. Even if there emerges an excess supply, its amount is likely to be substantially less than that in the fiscal deficit target case. The denominator, which measures the amount of fall in excess supply per unit decline in Y, is also much larger in the present case, as the shrinkage in *Y* does not reduce government expenditure. The above analysis yields the following proposition:

Proposition 2.4: Following an increase in government spending on imported goods financed by internal borrowing, GDP may increase in the absence of the fiscal deficit target. Even if it contracts, its contraction is highly likely to be substantially less than that in the presence of the fiscal deficit target.

2.5.3 An Increase in Government Expenditure on Imported Goods Financed by Additional Tax Collection from the Rich

Here we consider the case where the government raises its expenditure in terms of domestic goods on imported goods by a given amount *A* and finances it by taxing capitalists' income at a higher rate so that $A = d\left(\frac{1}{\gamma}M_G\right) = d\left[t\left(Y - \frac{W}{P}\right)\right]$. We first focus on the fiscal deficit target case and then on the one where there is no fiscal deficit target.

Fiscal Deficit Target Case

In this case, *Y* and *e* are given by (2.7) and (2.8). Taking total differential of (2.7), setting $d\left(\frac{1}{\gamma}M_G\right) = d\left[t\left(Y - \frac{W}{P}\right)\right] = A$ and, then, solving for *de*, we get

$$de = \theta_A A + \theta_Y dY; \quad \theta_A \equiv \frac{\left(1 - \frac{1}{\gamma}mc_c\right)}{\frac{1}{\gamma}\left[m_I(-I_e) - mc_c\left(\frac{W}{\gamma P^* e^2}\right)\right]} \text{ and } \theta_Y \equiv \frac{mc_c + m_Y}{\left[m_I(-I_e) - mc_c\left(\frac{W}{\gamma P^* e^2}\right)\right]} \tag{2.19}$$

Let us explain (2.19). Following the increase in government spending in terms of domestic goods on imported goods by *A* and additional tax collection from the capitalists by the same amount, net export at the initial equilibrium (Y, e) falls by $\left(1 - \frac{1}{\gamma}mc_c\right)A > 0$. Therefore, with *Y* remaining unchanged at its initial equilibrium value, *e* rises to raise net export by the same amount to restore equilibrium in the foreign currency market. Per unit increase in *e*, net export

rises by $\frac{1}{\gamma}\left[m_I(-I_e)-mc_c\left(\frac{W}{\gamma P^* e^2}\right)\right]>0$ (For reasons of stability – see (a.2.8) in Appendix 2). Hence, at the initial equilibrium *Y*, *e* goes up by $\theta_A A$. Following the government's adoption of the policy noted here, *Y* is likely to change. If it goes up by *dY*, with *e* remaining unchanged, import will go up and net export will fall by $\frac{1}{\gamma}(mc_c+m_Y)dY$. Hence, *e* will rise to raise net export by the same amount and, thereby, restore equilibrium in the foreign currency market. Since per unit increase in *e* net export rises by $\frac{1}{\gamma}\left[m_I(-I_e)-mc_c\left(\frac{W}{\gamma P^* e^2}\right)\right]>0$, *e* will go up by $\theta_Y dY$. This explains (2.19).

Now, taking total differential of (2.8), setting $d\left[t\left(Y-\frac{W}{P}\right)\right]=A$, substituting (2.19) for *de* and solving for dY, we get

$$dY=\frac{\left[(1-c_c)-\left\{(c_w-c_c)\frac{W}{\gamma P^* e^2}+(-I_e)\right\}\theta_A\right]A}{1-\left[(c_c+a)-\left\{(c_w-c_c)\frac{1}{\gamma P^* e^2}+(-I_e)\right\}\theta_Y\right]} \qquad (2.20)$$

Let us now explain (2.20). Following the government's adoption of the policy considered here, at the initial equilibrium (Y,e), government's consumption expenditure rises by *A*, while capitalists' consumption and, thereby, aggregate consumption falls by $c_c A$. Thus, in the net aggregate demand for domestic goods goes up by $(1-c_c)A$ at the initial equilibrium (Y,e). Since c_c is quite small, $(1-c_c)A$ is substantially large. However, the policy considered here creates BOP deficit at the initial equilibrium (Y,e) raising *e* by $\theta_A A$. The increase in *e* lowers aggregate demand for *Y* in two ways. First, investment demand goes down by $(-I_e)\theta_A A$. Second, the increase in *e* raises domestic price redistributing income from the workers to the capitalists. This lowers aggregate consumption demand by $(c_w-c_c)\frac{1}{\gamma P^* e^2}\theta_A A$. In the net, therefore, aggregate demand for domestic goods changes by the amount given by the numerator at the initial equilibrium *Y*. Since c_c is quite small, $(1-c_c)$ is quite large and, therefore, there is a chance for the numerator to be positive. The denominator has to be positive for stability (one can easily derive this condition following the line suggested in Appendix 2). It gives the amount of fall in excess demand (excess supply) per unit increase (decrease) in *Y*, when *e* adjusts along with *Y* to keep BOP in equilibrium. Per unit increase (decrease) in *Y*, supply goes up (down) by 1 unit. However, aggregate demand for domestic goods also rises (falls). With *e* remaining unchanged, aggregate personal and public consumption demand increases (decreases) by

$(c_c + a)$. However, *e* does not remain unchanged. Per unit increase (decrease) in *Y*, there takes place an increase (decrease) in *e* by θ_Y. This lowers (raises) aggregate investment and consumption demand by $\left[(c_w - c_c)\frac{1}{\gamma P^* e^2} + (-I_e)\theta_Y\right]$. Hence, in the net, aggregate demand for domestic goods rises (falls) by the term within third brackets in the denominator of the expression on the RHS of (2.19) per unit increase (decrease) in *Y*. This explains (2.19). Since the sign of the numerator is ambiguous, we get the following proposition:

Proposition 2.5: Following a given increase in government expenditure on imported goods financed by additional tax collection from capitalists' income, GDP may expand in the presence of a fiscal deficit target. It may decrease also.

We will now compare the present case to those of external and internal borrowing in the presence of the fiscal deficit target.

Comparison to the Case of External Borrowing

If we compare the present case to that of external borrowing, we find that in the present case, there is a chance for the GDP to increase, but in the latter case GDP unambiguously falls – see (2.11). Let us explain this difference. In the latter case, as the government raises its spending on imported goods by *A*, it has to lower its spending on domestic goods by the same amount at the initial equilibrium (Y, e) because of the fiscal deficit target. Since the increase in government spending on imports is financed by external borrowing, BOP remains in equilibrium at the initial equilibrium (Y, e). Thus, at the initial equilibrium (Y, e), there emerges an excess supply of domestic goods by the amount *A*. Hence, *Y* and along with it *e* have to fall to remove the excess supply. In the present case, the increased public spending on imports is financed by raising additional tax revenue of *A* from the capitalists. Hence, despite the fiscal deficit target, the government need not lower its spending on domestic goods at the initial equilibrium (Y, e). However, the additional tax collection lowers capitalists' consumption demand by $c_c A$. Since, c_c is quite small, there emerges substantial excess demand for domestic goods of $(1 - c_c)A$ at the initial equilibrium (Y, e). However, unlike in the latter case, in the present case, there will emerge a BOP deficit of $(1 - mc_c)A$ at the initial equilibrium (Y, e). This will raise *e* lowering aggregate demand for domestic goods. Thus, at the initial equilibrium *Y*, one cannot say a priori whether there will emerge excess demand for or excess supply of domestic goods. However, even if *Y* contracts in the present case, its contraction is likely to be less than that in the case of external borrowing. This yields the following proposition:

Proposition 2.6: In the presence of the fiscal deficit target, if an increase in government expenditure on imported goods is financed by external borrowing, GDP will fall

unambiguously. However, if it is financed by taxing capitalists' income, GDP may even rise. Even if it contracts, its contraction is likely to be less.

We will now consider the case of internal borrowing.

Comparison to the Case of Internal Borrowing

Let us now compare the present case to that of internal borrowing. In the latter case, the increase in government spending on imported goods by a given amount *A* in the presence of the fiscal deficit target is matched by an equal fall in government's spending on domestic goods so that aggregate demand for domestic goods at the initial equilibrium (Y,e) falls by the given amount *A*. However, the BOP deficit of *A* that the increased public spending on imported goods creates raises *e*, which raises net export net of government's imports by *A* so that aggregate demand for domestic goods is restored to its initial equilibrium value. However, the increase in *e* lowers aggregate consumption and investment demand creating an excess supply at the initial equilibrium *Y* (see (2.15). In the present case, however, aggregate demand for domestic goods instead of remaining unchanged rises by $(1-c_c)A$ at the initial equilibrium *Y* disregarding the fall in aggregate demand for domestic goods due to the BOP deficit induced rise in *e*. The BOP deficit that is created at the initial equilibrium (Y,e) is $(1-mc_c)A < A$, Hence, the rise in *e* and, therefore, the fall in aggregate demand for domestic goods due to the rise in *e* will be less. Therefore, in the present case, the contraction in *Y* is likely to be much less. *Y* may expand also. This observation can be most clearly perceived by comparing (2.20) and (2.15) taking the initial value of *t* to be zero. The above discussion yields the following proposition:

Proposition 2.7: In the presence of the fiscal deficit target, an increase in government expenditure on imported goods financed by internal borrowing is highly likely to bring about a large and cumulative fall in GDP. However, if the increase in government expenditure on imported goods is financed by taxing capitalists' income, the contraction in GDP is likely to be much less. It may even expand.

No Fiscal Deficit Target

In this case, equilibrium values of *Y* and *e* are given by (2.7) and (2.9). Taking total differential of (2.7), setting $d\left(\frac{1}{\gamma}M_G\right) = d\left[t\left(Y-\frac{W}{P}\right)\right] = A$ and, then, solving for *de*, we get (2.19) as in the earlier case. Again, taking total differential of (2.9) treating all exogenous variables other than *G* as fixed, substituting (2.19) for *de* into it and, then, solving for *dY*, we get

$$dY = \frac{\left[\left(1-c_c\right)-\left\{\left(c_w-c_c\right)\frac{W}{\gamma P^* e^2}+\left(-I_e\right)\right\}\theta_A\right]A}{1-\left[\left(c_c\right)-\left\{\left(c_w-c_c\right)\frac{1}{\gamma P^* e^2}+\left(-I_e\right)\right\}\theta_Y\right]} \tag{2.21}$$

(2.21) is smaller than (2.20) because of the absence of the term *a* from the denominator of the expression on the RHS of (2.21). Thus, in this case, the expansion (or contraction) in *Y* will be smaller than that in the presence of the fiscal deficit target. This yields the following proposition:

Proposition 2.8: If the government raises its expenditure on imported goods and finances it by additional tax revenue collected from the capitalists, GDP may expand or contract in both the cases of fiscal deficit target and no fiscal deficit target. However, in the former case, the expansion or contraction in GDP will be larger.

2.5.4 Increase in Government Expenditure on Imported Goods Financed through Hikes in Indirect Tax Rates

We now consider the case where the government raises its expenditure on imported goods and finances it by raising additional indirect tax revenue. Denoting the indirect tax rate by τ, market price in the domestic economy may be written as

$$P' = P(1+\tau) = \gamma P^* e(1+\tau) \text{ (using (2.2))} \tag{2.22}$$

where *P* is the price received by the producers. Workers' real income in this scenario is given by $\left[\frac{W}{P(1+\tau)}\right]$. Total nominal profit earned by the capitalists is $PY-W$. However, as buyers they face the price $P(1+\tau)$. Hence, their real profit is given by $\left[\frac{PY}{P(1+\tau)}-\frac{W}{P(1+\tau)}\right]=\frac{Y}{(1+\tau)}-\frac{W}{P(1+\tau)}$. Finally, indirect tax revenue of the government in nominal terms is given by $P\tau Y$. As a buyer, government faces the price $P(1+\tau)$. Therefore, government's indirect tax revenue in real terms is given by $\frac{\tau}{1+\tau}Y$. We shall henceforth denote $\frac{\tau}{1+\tau}$ by *v*. Adding up the three real incomes, we get real GDP. In what follows, for simplicity, we shall ignore the direct tax on capitalists' income. Since both domestic and foreign buyers of domestic goods pay the price $P(1+\tau)$, using (2.22) we have to rewrite (2.7) as

$$X\left(\frac{1}{\gamma}(1-v);Y^*\right)-\frac{1}{\gamma}(1-v)\left[M_G+mc_c\left(Y-\frac{W}{\gamma P^* e}\right)(1-v)+m_I I(\bar{r},e)+m_Y Y\right]+\bar{\bar{K}}=0 \tag{2.23}$$

Fiscal Deficit Target Case

We first focus on the fiscal deficit target case where government's total consumption expenditure is given by

$$G = G_D + \frac{1}{\gamma}(1-v)M_G = (v+a)Y \quad \text{(see (2.6)} \tag{2.24}$$

In (2.24), G_D denotes government expenditure on domestic goods.

Incorporating the changes noted above, and (2.22) and (2.24) into (2.8), we rewrite it as

$$Y = c_w.\left(\frac{W}{\gamma P^* e}\right).(1-v) + c_c.\left(Y - \frac{W}{\gamma P^* e}\right)(1-v) + I(\bar{r}, e) + (v+a)Y - \bar{K} \tag{2.25}$$

In the present case, the government raises its expenditure on imported goods by a given amount A and finances it by raising indirect tax collection so that

$$A = d\left(\frac{1}{\gamma}(1-v)M_G\right) = d(vY) \tag{2.26}$$

From (2.26) it follows that

$$dv = \frac{A - v\,dY}{Y} \tag{2.27}$$

To ascertain the impact of an increase in government expenditure on imported goods by a given amount A financed by indirect taxes in the presence of a fiscal deficit target, we take total differential of (2.23) and (2.25) treating all exogenous variables other than v and $p'M_G$ as fixed (where $p' \equiv \frac{1}{\gamma}(1-v)$) and set $d(vY) = A = d\left(\frac{1}{\gamma}(1-v)M_G\right)$. Taking total differential of (2.23), we get

$$\theta_e de + \theta_v dv + \theta_Y dY - A = 0 \tag{2.28}$$

Where

$$\theta_e \equiv \left[m_I(-I_e) - \left\{m.c_c.\frac{W}{\gamma P^* e^2}\right\}(1-v)\right]\frac{1}{\gamma}(1-v) \tag{2.29}$$

Note that θ_e measures the amount of increase in net export and BOP per unit increase in e ceteris paribus. This is assumed to be positive for reasons of stability. (This stability condition can be easily derived following the line suggested in Appendix 2.)

$$\theta_v \equiv -X_{p'}.\frac{1}{\gamma} + \frac{1}{\gamma}.\left[m.c_c.\left\{Y - \left(\frac{W}{P}\right)\right\}(1-v) + m_I I(\bar{r}, e) + m_Y Y\right] + \frac{1}{\gamma}.(1-v).m.c_c.\left(Y - \left(\frac{W}{P}\right)\right)$$

(2.30)

θ_v measures the change in net export per unit increase in *v* ceteris paribus. A unit increase in *v* ceteris paribus affects net export by raising the domestic price level. This produces three effects on net export. First, it raises net export by lowering the value of imports in terms of domestic goods. This is given by the second term of the expression on the RHS of (2.30). Second, a part of the additional indirect tax revenue is paid by the capitalists. Hence, their import of consumption goods goes down raising net export. This increase in net export is given by the third term of the expression on the RHS of (2.30). Finally, the rise in the domestic price level brought about by the rise in the indirect tax rate will very substantially lower net exports. This happens because India lacks any Indigenous technology or knowledge. Hence, close substitutes of all the goods and services that India produces are also available in all other countries of the world. Therefore, even a slight increase in the price of Indian goods relative to foreign prices will induce Indians and foreigners to substitute foreign goods for Indian goods on a very large scale. This will lower net export very substantially. This is captured by the first term of the expression on the RHS of (2.30). This effect is likely to dominate by far the first two effects. Hence, in Indian conditions, θ_v is likely to be negative and its absolute value is likely to be substantially large. (Since, for simplicity, we have assumed import intensities of investment and capitalists' consumption to be fixed, we have not been able to capture this effect fully here).

$$\theta_Y \equiv -p'.[m.c_c.(1-v)+m_Y] \tag{2.31}$$

(2.31) gives the amount of fall in net export per unit increase in *Y* ceteris paribus. A unit increase in *Y* ceteris paribus raises import of intermediate inputs by $p'm_Y$ and capitalists' profit by $(1-v)$. The latter raises capitalists' consumption demand for imported goods and, thereby, lowers net export by $p'mc_c(1-v)$. This explains (2.31).

Finally, note that net export changes on account of changes not only in *e*, *v* and *Y* but also in the value of government imports by *A*. The given increase in the value of government imports lowers net export by –*A*. The total change in net export from the initial equilibrium to the new equilibrium is given by the LHS of (2.28) and it should be equal to zero. This explains (2.28).

Substituting (2.27) into (2.28) and solving for *de*, we get

$$de = \left(\frac{1+\frac{-\theta_v}{Y}}{\theta_e}\right)A + \left(\frac{(-\theta_Y)+\theta_v\frac{v}{Y}}{\theta_e}\right)dY \tag{2.32}$$

Let us now explain (2.32). Focus on the expression on the RHS of (2.32). The first term gives the increase in *e* that takes place at the initial equilibrium *Y* following the increase in government spending on imported goods by *A* and its financing by means of additional indirect tax collection. An increase in the indirect tax collection by *A* at the initial equilibrium *Y* will

raise v by (A/Y). This will lower net export and BOP by $\frac{-\theta_v}{Y}A$ at the initial equilibrium (Y, e). The increase in government's spending on imported goods by A also lowers net export and BOP by A at the initial equilibrium (Y, e). To equilibrate the foreign currency market, e has to rise so that BOP at the initial equilibrium Y rises by the numerator of the first term of the expression on the RHS of (2.32). Net export and, therefore, BOP rises by θ_e per unit increase in e, with Y remaining unchanged at the initial equilibrium Y. Hence, e rises by the amount given by the first term of the expression on the RHS of (2.32) at the initial equilibrium Y and equilibrates the foreign currency market.

Let us now focus on the second term of the expression on the RHS of (2.32). It gives us the amount of change in e that occurs when Y changes from its initial equilibrium value by dY. Let us explain. When Y rises from its initial equilibrium value by dY, with e remaining unchanged, net export changes for two reasons. First, capitalists' income and, therefore, their consumption demand for imported goods and import of intermediate inputs together increases by $-\theta_Y dY$. Second, v falls by $\frac{v}{Y}dY$ lowering domestic price level. This will raise net export by $-\theta_v \frac{vdY}{Y}$. This is likely to be positive and quite large in India because of the likely very high price elasticity of India's net export for reasons we have already explained. The second effect is highly likely to dominate the first one and it may be safe to make that assumption. Hence, at the given e, net export will rise by $-\theta_v \frac{vdY}{Y} - (-\theta_Y)dY$. As a result, e will fall to equilibrate the foreign currency market by lowering net export by $\left[-\theta_v \frac{v}{Y} - (-\theta_Y)\right]dY$. Per unit fall in e, with Y remaining unchanged at its higher value, net export and BOP will fall by θ_e. Hence, e will fall by $-\frac{\left[\theta_v \frac{v}{Y} + (-\theta_Y)\right]dY}{\theta_e}$. The total change in e will, therefore, be given by $\left(\frac{1+\frac{-\theta_v}{Y}}{\theta_e}\right)A - \left\{-\left(\frac{(-\theta_Y)+\theta_v\frac{v}{Y}}{\theta_e}\right)\right\}dY = \left(\frac{1+\frac{-\theta_v}{Y}}{\theta_e}\right)A + \left\{\left(\frac{(-\theta_Y)+\theta_v\frac{v}{Y}}{\theta_e}\right)\right\}dY$. This explains (2.32).

Finally, taking total differential of (2.25) treating all exogenous variables other than G, v and M_G as fixed, substituting (2.27) and (2.32) into it and, then, solving for dY, we get

$$dY = \frac{\left[1-\left\{c_w.\left(\frac{W}{PY}\right)+c_c.\left(1-\frac{W}{PY}\right)\right\}-\left\{\left(-I_e+(c_w-c_c)(1-v)\frac{W}{\gamma P^* e^2}\right)\left(\frac{1-\frac{\theta_v}{Y}}{\theta_e}\right)\right\}\right]A}{1-\left[(c_c.(1-v)+a)+c'+\left\{\left\{(c_w-c_c)(1-v)\frac{W}{\gamma P^* e^2}+(-I_e)\right\}.\left(\frac{-\theta_v\frac{v}{Y}-(-\theta_Y)}{\theta_e}\right)\right\}\right]} \quad (2.33)$$

Where $c' \equiv (c_w - c_c)\frac{W}{\gamma P^* e}.\frac{v}{Y}$

Let us explain (2.33). We first focus on the numerator of the expression on the RHS of (2.33). It gives the excess supply or excess demand that emerges at the initial equilibrium *Y* following the adoption of the policy considered here by the government. Following the increase in government expenditure in terms of domestic goods by the amount *A* on imported goods financed by additional indirect tax collection, government's consumption expenditure goes up by *A*. This is the first term. However, this increase in the aggregate demand for domestic goods is offset by two factors. First, the additional indirect tax collection of *A* comes from the workers and the capitalists. As *v* at the initial equilibrium (Y,e) goes up by $\frac{A}{Y}$, their consumption demand falls by $\left\{c_w.\left(\frac{W}{PY}\right)+c_c.\left(1-\frac{W}{PY}\right)\right\}A$. This is the second term of the numerator. Finally, this policy is very much likely to create a very large BOP deficit at the initial equilibrium (Y,e) for two main reasons. First, the increased government's expenditure on imported goods by the amount *A* creates that much BOP deficit. Second, the increase in the domestic price level is very much likely to substantially reduce net export in India for reasons we have already explained. Hence, *e* will rise by a large amount lowering substantially investment and consumption demand. This is given by the third term in the numerator. (Aggregate consumption demand falls because of the increase in the domestic price level that the increase in e leads to. The rise in the domestic price level redistributes income from the workers to the capitalists lowering aggregate consumption demand since marginal propensity to consume of the workers is likely to be substantially larger than that of the capitalists.) In all likelihood, the last two terms will dominate the first term creating an excess supply at the initial equilibrium *Y*.

Let us now consider the denominator. It has to be positive for reasons of stability. (This stability condition can be deduced easily following the line suggested in Appendix 2). It gives the fall in excess supply per unit decrease in *Y*, when *e* adjusts along with the fall in *Y* to keep the BOP in equilibrium. Per unit fall in *Y*, with *e* remaining unchanged, supply decreases by 1 unit. However, it reduces demand also. With *e* remaining unchanged, aggregate personal and public consumption demand go down by $[c_c(1-v)+a]$. The unit fall in *Y* also raises *v*

equiproportionately by (v/Y). This lowers aggregate consumption expenditure by c'. However, a unit fall in Y is highly likely to create a BOP deficit raising e by $\left[\frac{-\theta_2\frac{v}{Y}-(-\theta_3)}{\theta_1}\right]$. It will lower consumption and investment demand by $\left((c_w-c_c)\frac{W}{\gamma P^* e^2}+(-I_e)\right)\left(\frac{-\theta_2\frac{v}{Y}-(-\theta_3)}{\theta_1}\right)$. (A unit fall in Y is highly likely to create a BOP deficit for the following reasons. A unit decline in Y lowers import of intermediate inputs as well as capitalists' consumption demand for imports. However, the indirect tax rate rises and the rise in the domestic price level that it induces is likely to bring about a very substantial contraction in net export for reasons we have already explained. This fall in net export is highly likely to dominate bringing about a BOP deficit in the net.) Therefore, aggregate demand for domestic goods will fall by the term given within third brackets in the denominator per unit fall in Y, when e adjusts along with the fall in Y to keep the BOP in equilibrium. Therefore, the denominator gives the fall in excess supply of domestic goods per unit fall in Y when e adjusts along with it to keep the BOP in equilibrium.

The adjustment process may be described as follows. We denote the absolute value of the numerator of the expression on the RHS of (2.33) by N and the term within third brackets of the denominator by ϕ. Following the increase in government expenditure on imported goods by A and its financing by means of additional indirect tax collection of the same amount, there is a very high chance in India that there will emerge an excess supply of N at the initial equilibrium Y. Producers in the first round will, therefore, reduce Y by $dY_1 = N$. This fall in Y will, again, lower aggregate planned demand for domestic goods by ϕN. In the second round, therefore, producers will reduce Y by $dY_2 = \phi N$. This fall in Y will, lower aggregate planned demand for domestic goods again by $\phi.(\phi N)$. Hence, in the third round Y will fall by $dY_3 = \phi^2 N$. This process of contraction will continue until the fall in demand that takes place in each successive round eventually falls to zero. Thus, the total fall in Y is given by

$$dY = -dY_1 - dY_2 - dY_3 - \ldots\ldots\ldots = -\left(N + \phi N + \phi^2 N + \phi^3 N + \ldots\ldots\ldots..\right) = -\frac{N}{1-\phi} \qquad (2.34)$$

The domestic price level faced by the buyers is highly likely to rise too. This is because of the rise in the indirect tax rate and the rise in the exchange rate.

The above discussion yields the following proposition:

Proposition 2.9: If the government raises its expenditure on imported goods and finances it by raising indirect tax rates, there is a very high chance in India that it will lead to a

large and cumulative fall in GDP in the presence of a fiscal deficit target. The workers are hurt because of the contraction in GDP and the rise in the domestic price level.

We will now compare the present case to that of taxation of capitalists' income.

Comparison to the Case of Taxation of Capitalists' Income

We will here compare the effect on GDP of an increase in government expenditure on imported goods financed by raising indirect tax rates (henceforth referred to as Case 2) to that in the case where the government finances its increased expenditure on imported goods by taxing capitalists' income (henceforth referred to as Case 1) . Comparing (2.33) and (2.20), we find the following. First, focus on the numerators of (2.33) and (2.20). They give the amount of excess demand or excess supply that emerges at the initial equilibrium *Y* following the government's adoption of the policies considered here. We will argue here that the chance of an excess supply emerging at the initial equilibrium *Y* is much higher in the case of indirect taxation. The reasons are the following. First, following the increase in *G* by *A* and the collection of additional tax revenue of *A*, at the initial equilibrium (Y,e), aggregate personal and public consumption expenditure goes up by $(1-c_c)A$ in case 1 and by a substantially smaller amount $\left[1-c_w.\left(\frac{W}{PY}\right)-c_c.\left(1-\frac{W}{PY}\right)\right]A$ in case 2. Note that c_w is likely to be substantially larger than c_c. At the initial equilibrium (Y,e), the BOP deficit that is created in case 1 is $(1-pmc_c)A$. In case 2, however, the BOP deficit that is created is much larger for the following reasons. First, only a part of the additional tax of *A* is paid by the capitalists. Therefore, the fall in their consumption demand for imported goods is much less. Second, the hike in the indirect tax rate raises the domestic price level. This is likely to very substantially lower net export, since net export is likely to be highly price elastic in India for reasons already explained. For these two reasons, the BOP deficit that is created at the initial equilibrium (Y,e) is likely to be much larger in case 2. Hence, at the initial equilibrium *Y*, exchange rate rises in both cases to restore BOP equilibrium. From (2.14) and (2.29) it is clear that net export rises more or less by the same amount per unit increase in *e* ceteris paribus in both the cases. Hence, *e* in the second case is likely to rise by a much larger amount making the consequent fall in investment and consumption demand much greater. Hence, at the initial equilibrium *Y*, for all the reasons cited above, the chance of emergence of an excess supply is much higher in the second case.

The policy of hiking indirect tax rates to finance government expenditure is also unjust as it raises the domestic price level and, thereby, brings about a substantial fall in the real income of the poor workers, who have little ability to sacrifice.

This yields the following proposition:

Proposition 2.10: When the government finances its increased expenditure on imported goods by hiking indirect tax rates, the chance that it will lead to a contraction in GDP in India is substantially higher than that in the case where the government taxes capitalists' income for financing its additional expenditure on imported goods. The policy of hiking indirect tax rates also substantially reduces real income of the poor workers, who have little ability to sacrifice.

We will now consider the case where the fiscal deficit target is absent.

No Fiscal Deficit Target Case

Let us now focus on the case where there is no fiscal deficit target. In this case, BOP equilibrium is still given by (2.23) and $dG = A = d\left(\frac{1}{\gamma}(1-v)M_G\right) = d(vY)$. The value of de is, therefore, still given by (2.32). In the absence of the fiscal deficit target, G is autonomous and it is no longer equal to $(v+a)Y$. Incorporating this change we rewrite the goods market equilibrium condition (2.25) as follows:

$$Y = c_w.\left(\frac{W}{\gamma P^* e}\right).(1-v) + c_c.\left(Y - \frac{W}{\gamma P^* e}\right)(1-v) + I(\bar{r}, e) + G - \bar{K} \qquad (2.35)$$

Taking total differential of (2.35) treating all exogenous variables other than G and v as fixed, substituting (2.32) and (2.27) for de and dv respectively and, then, solving for dY, we get

$$dY = \frac{\left[1 - \left\{c_w.\left(\frac{W}{PY}\right) + c_c.\left(1 - \frac{W}{PY}\right)\right\} - \left(\left(-I_e + (c_w - c_c)(1-v)\frac{W}{\gamma P^* e^2}\right)\left(\frac{1 - \frac{\theta_v}{Y}}{\theta_e}\right)\right)\right]A}{1 - \left[(c_c) + c' + \left(\left\{(c_w - c_c)\frac{W}{\gamma P^* e^2}(1-v) + (-I_e)\right\}.\left(\frac{-\theta_v \frac{v}{Y} - (-\theta_Y)}{\theta_e}\right)\right)\right]} \qquad (2.36)$$

(2.36) and (2.33) are identical except for the fact that the denominator of (2.33) is larger as it does not contain the term a. Thus, in the present case, contraction or expansion in Y will be less than that in the no fiscal deficit target case. This yields the following proposition:

Proposition 2.11: If the government raises its expenditure on imported goods and finances it by raising indirect tax rates, GDP is highly likely to contract in India in the presence of a fiscal deficit target. In the absence of the fiscal deficit target, the contraction in *Y* will be smaller.

2.6 Conclusion

The objective of this chapter is to identify the best method of financing public expenditure on imported goods in India and examine whether the policy we find optimum is consistent with the NEP. Let us, therefore, summarize the major findings of this chapter and identify the best possible policy option. The study carried out here finds that if the government raises its expenditure on imports and finances it with external borrowing, then, in the presence of the fiscal deficit target, there will take place a cumulative contraction in GDP. It will also add to the government's future external debt service charges aggravating India's future BOP woes. This mode of financing is obviously unacceptable. Note that the contraction in GDP hurts the poor people engaged in the unorganized sector. It reduces their income, which they earn mainly in the form of profit.

We also find that the fiscal deficit target, which is an integral part of the NEP, is responsible for the severe contraction in GDP that recourse to external borrowing leads to. This happens for two reasons. First, the increase in government expenditure on imported goods is matched by an equal amount of fall in public expenditure on domestic goods in the presence of the fiscal deficit target bringing about an excess supply at the initial equilibrium *Y*. Second, as producers reduce output to remove the excess supply, excess supply falls by a smaller quantity per unit fall in output, since a decline in output not only reduces private expenditure but also public expenditure. In the absence of the fiscal deficit target, however, GDP remains unaffected. This is because the increase in government's expenditure on imported goods does not reduce its expenditure on domestic goods.

If the increase in government's expenditure on imported goods is financed by internal borrowing, GDP will almost surely contract substantially in India in the presence of the fiscal deficit target. This happens for the following reason. First, the increase in government's expenditure on imported goods by a given amount produces two effects. It reduces government expenditure on domestic goods and creates BOP deficit by the same given amount. Hence, the exchange rate rises and raises net export net of government's imports by the same given amount. Hence, aggregate planned demand for domestic goods at the initial equilibrium level of GDP remains unaffected. However, the rise in the exchange rate lowers investment demand directly and aggregate consumption demand indirectly by raising the domestic price level, which redistributes income from the workers to the capitalists. Thus, at the initial equilibrium level of GDP, there emerges an excess supply of domestic goods bringing about a large and cumulative contraction in GDP. However, in the absence of the fiscal deficit target, GDP may change either way. Even if it contracts, its contraction will be substantially smaller than what happens under the fiscal deficit target. This happens on account of the following reasons. First, the given increase in government's expenditure on imported goods creates BOP deficit of the same given amount as that in the earlier case but leaves government's expenditure on domestic

goods unchanged. The BOP deficit induced increase in the exchange rate will raise net export net of the government's spending on imports by the same given amount. Hence, at the initial equilibrium level of GDP, aggregate planned demand for domestic goods will rise by the same given amount. However, the increase in the exchange rate will lower, for reasons already explained, aggregate consumption and investment demand. Clearly, therefore, in this case GDP may expand also. In this case, the value of the multiplier is also less as public expenditure does not change with GDP. For this reason also, even if GDP contracts, its contraction will be substantially less in the present case.

Let us now consider the case where government's increased expenditure on imported goods is financed by collecting additional taxes from the capitalists. In this case, in the presence of the fiscal deficit target, GDP may even expand. In case it contracts, its contraction will be much less than what happens under the earlier two cases in the presence of the fiscal deficit target. Let us explain. When the government raises its expenditure on imported goods by a given amount and finances it by taxing capitalists' income, government's consumption expenditure goes up by the given amount, but capitalists' disposable income also falls by the same given amount. This reduces capitalists' consumption. The fall in capitalists' consumption, however, is likely to be quite small because of their very low marginal propensity to consume. Thus, at the initial equilibrium GDP and exchange rate, there emerges an excess demand for domestic goods. It also creates BOP deficit, but it will be smaller than the given amount of increase in the government's expenditure on imported goods because of the fall in capitalists' consumption demand for imported goods. Thus, the BOP deficit created in this case at the initial equilibrium GDP and exchange rate will be less than that in the case of internal borrowing. Hence, the increase in the exchange rate and the consequent decline in aggregate consumption and investment demand will also be less. Thus, in this case, GDP may expand. If it contracts, its contraction is highly likely to be much less than that in the earlier two cases of internal and external borrowings in the presence of the fiscal deficit target.

In the absence of the fiscal deficit target, the value of the multiplier will be less in this case since government's marginal propensity to spend out of GDP becomes zero. This will make the contraction or expansion of GDP smaller.

Finally, we considered the case where the government raises its expenditure on imported goods by a given amount and finances it by raising indirect tax collection by the same amount. This will raise on the one hand government's consumption expenditure by the given amount. On the other hand, the given amount of additional indirect tax collection will come from both the workers and the capitalists. Hence, their consumption will fall. The fall in the aggregate planned consumption demand due to the additional tax collection of the given amount will be much larger in the present case than that in the previous case of taxation of capitalists' income because marginal propensity to consume of the workers is substantially larger than the capitalists'.

Hence, the amount of excess demand that will be created at the initial equilibrium level of GDP and the exchange rate in the present case will be much smaller than that in the previous case. The policy considered here will obviously also create BOP deficit at the initial equilibrium GDP and the exchange rate and it will be substantially larger than what is created in the previous case for two reasons. First, only a part of the given amount of additional tax comes from the capitalists and second, the hike in the indirect tax rate will raise the domestic price level and this will very substantially lower net export. The reason is the following. Since India does not have any technology and knowledge of its own, close substitutes of all the goods and services that India produces are produced everywhere else. Hence, even a slight increase in the prices of Indian goods will very substantially lower net export. Therefore, the rise in the exchange rate and the consequent decline in consumption and investment demand will be much larger in the present case than that in the previous case. Hence, the GDP is very much likely to contract in the present case and its contraction will be much larger than that in the previous case. The policy of raising indirect tax collection is also highly unjust as a part of the tax comes from the poor workers who have little ability to sacrifice.

In the absence of the fiscal deficit target, the value of the multiplier will be smaller since government's expenditure becomes independent of GDP. Hence, the amount of contraction in GDP will be less.

Summing up the above results, we find that in the presence of the fiscal deficit target, taxing capitalists' income is the best method of financing an increase in government's expenditure on imports as it may lead to an expansion in GDP. Even if that does not happen, the contraction in GDP will be the least. It is also eminently just, as it puts the burden of financing the additional expenditure on those who have the ability to sacrifice.

We also find that the fiscal deficit target produces strong recessionary tendencies when the additional public expenditure on imports is financed by internal or external borrowing. It also acts as an automatic destabilizer by making the multiplier values larger.

Our finding constitutes a strong critique of the NEP, which has drastically reduced direct tax rates on the rich, raised the importance of indirect taxes in financing government expenditure and made the fiscal deficit target an integral part of its recommended fiscal policy.

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Table 2.1

Employment in the Organized sector (in million)

Year	Growth Rate Of GDP At Constant (2004-05) Prices	Number of Workers Employed
1994-95	6.4	27.53
2000-01	5.3	27.79
2001-02	5.5	27.20
2003-04	8.1	26.45
2004-05	7.0	26.46
2005-06	9.5	26.96
2006-07	9.6	27.24
2007-08	9.6	27.55
2008-09	6.7	28.18
2009-10	8.4	29.00
2010-11	8.4	29
2011-12	5.3	29.65

Source: RBI

Table 2.2

Income Tax Slabs for Individuals and Hindu Undivided Family of Less Than 60 Years of Age for the Financial Year 2018-19

Income Tax Slab	Tax Rate	Health and Education Cess
Income up to Rs.2,50,000	No tax	
Income from Rs.2,50,000 –Rs.5,00,000	5%	4% of total tax
Income from Rs.5,00,000 – Rs.10,0000	20%	4% of total tax
Income more than Rs.10,0000	30%	4% of total tax

Surcharge: 10% of total income tax for income from Rs.50 lakh to Rs.1 crore

Surcharge: 15% of total income tax for income more than Rs.1 crore

Source: Income Tax Department, Government of India

Table 2.3

Percentages of Direct and Indirect Taxes in Total Tax Revenue

	2009-10	**2013-14**	**14-15**	**15-16**	**16-17**	**17-18**
Direct Tax	**60.78**	**56.32**	**56.16**	**51.13**	**49.66**	**49.41**
Indirect Tax	**39.22**	**43.68**	**43.84**	**48.87**	**50.34**	**50.59**

Source: RBI

Appendix 2

We write the BOP equilibrium condition (2.7) of the text as

$$B(e,Y)=0 \qquad \text{(a.2.1)}$$

Where

$$B(*)\equiv X\left(\frac{1}{\gamma},Y^{*}\right)-\frac{1}{\gamma}\left[M_{G}+mc_{c}(1-t)\left\{Y-\frac{W}{\gamma P^{*}e}\right\}+m_{I}I(\bar{r},e)+m_{Y}Y\right]+\bar{K}=0 \qquad \text{(a.2.2)}$$

$$B_{Y}=-\left[mc_{c}(1-t)+m_{Y}\right]<0 \qquad \text{(a.2.2i)}$$

$$B_{e}=\frac{1}{\gamma}\left[m_{I}(-I_{e})-mc_{c}(1-t)\frac{W}{\gamma P^{*}e^{2}}\right]>0 \text{ (for reasons to be explained shortly)} \qquad \text{(a.2.2ii)}$$

Again, we write the goods market equilibrium condition (2.8) of the text as

$$E(e,Y)=0 \qquad \text{(a.2.3)}$$

where

$$E(Y,e)\equiv c_{w}\left(\frac{W}{\gamma P^{*}e}\right)+c_{c}(1-t)\left\{Y-\frac{W}{\gamma P^{*}e}\right\}+I(\bar{r},e)+t\left\{Y-\frac{W}{\gamma P^{*}e}\right\}+aY-\bar{K}-1=0 \qquad \text{(a.2.4)}$$

$$E_{Y}\equiv c_{c}.(1-t)+(t+a)-1<0 \text{ since } 0<c_{c}.(1-t)+(t+a)<1 \text{ (by assumption)} \qquad \text{(a.2.4i)}$$

$$E_{e}\equiv-\left[(c_{w}-c_{c}(1-t))\frac{W}{\gamma P^{*}e^{2}}+(-I_{e})\right]+t.\frac{W}{\gamma P^{*}e^{2}} \qquad \text{(a.2.4ii)}$$

We examine here the stability of the equilibrium values of *e* and *Y*. The adjustment rules for *e* and *Y* are given by

$$\frac{de}{dt}=\mu.[-B(e,Y)] \qquad \mu>0 \qquad \text{(a.2.5)}$$

And

$$\frac{dY}{dt}=\gamma.[E(e,Y)] \qquad \gamma>0 \qquad \text{(a.2.6)}$$

We also assume that the speed of adjustment in *e* is instantaneous, while that of *Y* is sluggish. Thus, when BOP is in disequilibrium, *e* adjusts and restores BOP equilibrium before any change in *Y* can take place. Linearising $B(e,Y)=0$ around the equilibrium values of Y and e and assuming Y to remain unchanged at its equilibrium value, we rewrite (a.2.5) as

$$\frac{d\hat{e}}{dt} = \mu.\left[-B_e\left(e^*, Y^*\right)\right]\hat{e} \qquad \hat{e} \equiv \left(e\text{-}e^*\right) \qquad \mu > 0 \qquad \text{(a.2.7)}$$

From (a.2.7) it is clear that the equilibrium value of e is stable if and only if

$$B_e = \frac{1}{\gamma}\left[m_I\left(-I_e\right) - mc_c\left(1-t\right)\frac{W}{\gamma P^* e^2}\right] > 0 \qquad \text{(a.2.8)}$$

Since the adjustment in e is instantaneous by assumption, (a.2.1) is always satisfied. Linearising (a.2.1) around the equilibrium values of e and Y, we get

$$B_e\left(e^*, Y^*\right)\left(e - e^*\right) + B_Y\left(e^*, Y^*\right)\left(Y - Y^*\right) = 0 \qquad \text{(a.2.9)}$$

Since (a.2.9) is satisfied always, the value of $\left(e - e^*\right)$ will always be given by the following equation

$$\left(e - e^*\right) = -\frac{B_Y\left(e^*, Y^*\right)}{B_e\left(e^*, Y^*\right)}\left(Y - Y^*\right) \qquad \text{(a.2.10)}$$

Linearising $E(\bullet)$ around the equilibrium values of Y and e, substituting (a.2.10) into it, we rewrite (a.2.6) as

$$\frac{d\hat{Y}}{dt} = \gamma.\left[E_Y\left(e^*, Y^*\right) + E_e\left(e^*, Y^*\right)\frac{-B_Y\left(e^*, Y^*\right)}{B_e\left(e^*, Y^*\right)}\right]\hat{Y} \qquad \hat{Y} \equiv \left(Y - Y^*\right) \qquad \text{(a.2.11)}$$

From (a.2.11) it is clear that the equilibrium value of *Y* is stable if and only if

$$\left[E_Y\left(e^*, Y^*\right) + E_e\left(e^*, Y^*\right)\frac{-B_Y\left(e^*, Y^*\right)}{B_e\left(e^*, Y^*\right)}\right] < 0 \Rightarrow$$

$$1 - \left[\left\{c_c\left(1-t\right) + \left(t+a\right) + t\frac{W}{\gamma P^* e^2}\theta\right\} - \left\{\left(c_w - c_c\left(1-t\right)\right)\frac{W}{\gamma P^* e^2} + \left(-I_e\right)\right\}\theta\right] > 0 \quad \text{(see (a.2.i), (a.2.ii),}$$

(a.2.4i) and (a.2.4ii))

Where $\theta \equiv \dfrac{\left(mc_c\left(1-t\right) + m_Y\right)}{m_I\left(-I_e\right) - mc_c\left(1-t\right)\dfrac{W}{\gamma P^* e^2}} > 0$ (a.2.12)

Chapter 3

Inflation and Stabilization Policies in India

Abstract

Stringent restrictions on fiscal deficit as a proportion of GDP are an integral feature of the New Economic Policy, which India has been pursuing since 1991. Reserve Bank of India has also set an inflation target as a major objective of its monetary policy. Using a model suitable for India, this chapter seeks to show that the costs that inflation inflicts on a society gets magnified manifold in the presence of the fiscal deficit target and inflation target.

3.1 Introduction

This chapter focuses on inflation. It seeks to identify the major costs that inflation inflicts on the people in India and show how fiscal and monetary policies enshrined in the NEP aggravate these costs manifold. We pointed out in Chapter 2 that fiscal deficit target is an integral part of the NEP. It imposes a ceiling on the fiscal deficit (government's borrowing) as a proportion of GDP. Here we will point to an aspect that the existing literature on fiscal deficit target has largely overlooked. We will show here that the fiscal deficit target magnifies manifold the adverse effects of inflation.

The kind of monetary policy being pursued these days all across the capitalist world including India is also a matter of grave concern for the poor toiling masses who are net lenders to the capitalists. This monetary policy consists in reducing drastically interest rates as soon as a recession strikes an economy and raising it in times of inflation to weaken inflationary forces. All the major capitalist countries have been in the grip of recession for a long period of time. Japan, US and most of the countries in Europe have been in recession since 1992, 2001 and 2008 respectively (see Table 3.1). Interest rates in all these countries were reduced to the minimum possible level immediately following the onset of recession much to the detriment of the interest of the workers who are net lenders to the capitalists. However, this policy failed to make any impact on recession, which continued unabated (see Tables 3.2 and 3.3). It should be noted here that, even though risk-free interest rates dropped to the minimum possible levels in these countries, loans were available at these low interest rates only to the giant corporations or giant capitalists, whom Bernake, Gertler and Gilchrist (1996) calls quality borrowers. In fact, with the onset of the 'Great Recession' in the US and the cut in the Fed rate to zero in 2007, interest rates for the giant corporation dropped to the minimum possible level but interest rates rose steeply for the small and medium enterprises eroding substantially their competitive strength (see Mishkin (2011) in this context) vis-a-vis the giant corporations. We seek to show in this chapter that if interest rates are raised in times of inflation to tackle it, it will significantly

strengthen inflationary forces and magnify manifold the adverse effects of inflation causing grievous harm to the toiling masses.

Inflation is a matter of grave concern to the people and the government. It inflicts enormous costs on the society. The objective of this chapter is to develop a suitable macro model for India to study how inflation harms the economy. It does so to examine how the costs of inflation are affected in the presence of the fiscal deficit target and inflation target. Even though Patnaik (2006) and Kaldor (1976) warn of the costs of inflation getting aggravated by fiscal deficit target and inflation target respectively, they have not used any model to rigorously establish their claims. We consider it worthwhile to go into the issues in greater detail and capture the destabilizing effects of fiscal deficit target and inflation target rigorously within the framework of a macro-theoretic model suitable for India. We consider our endeavour necessary in view of the Government of India's fiscal and monetary policy stance. In pursuance of the FRBM Act 2003, the Government of India (GoI) adheres to a strict fiscal deficit target. Following the recommendation of the Urjit Patel Committee Report (RBI 2014), the GoI seeks to restrict fiscal deficit to around 3 percent of GDP. The same committee recommended that inflation should be the nominal anchor for monetary policy framework. Following this recommendation, the RBI has set 4 percent as the inflation rate target (RBI 2016). If inflation rate exceeds 4 percent, the RBI raises its policy rates to bring down the inflation rate to its target level. If the inflation rate is less than 4 percent, the RBI lowers its policy rates to give a boost to growth, if it is below the desired or potential level. It is important to know whether these policies, contrary to the policy makers' beliefs, act as automatic destabilizers and aggravate the costs of inflation as suggested by the writers mentioned above.

The chapter shows that the fiscal deficit target substantially reinforces adverse effects of inflation, if the government seeks to keep fiscal deficit under control by adjusting government consumption or administered prices of essential inputs such as services of railways, electricity, coal etc. or by raising indirect tax rates. We have not considered direct taxes here since direct tax rates have been reduced drastically since the adoption of the NEP and the government does not hike direct tax rates to meet its fiscal deficit target. It also shows that the inflation target also reinforces inflationary forces and magnifies manifold the costs that an exogenous increase in the inflation rate inflicts on a society.

3.2 The Model

In this chapter, we will use the model developed in chapter 2. However, we will modify it slightly so that we can capture the major costs of inflation and the effects of fiscal deficit target and inflation target on them with ease. The model, as was the case with the earlier one, consists of a real sector and a financial sector. We consider the real sector first.

The Real sector

Following the Keynesian tradition we assume that aggregate output is demand determined. We will now identify the major determinants of aggregate demand. Let us start with aggregate personal consumption demand. There are two classes of consumers: workers and capitalists. We shall first compute the incomes of these two classes of people. Unlike in the earlier model, where employment was assumed to be fixed, here we assume that to produce 1 unit of Y, l amount of labor is required. w is the money wage rate. So, total wage income for producing Y units of output is wlY. The workers are net lenders. Their total outstanding loan at the beginning of the period is denoted by D. The average interest rate at which the loans were given is denoted by r_0. Total interest income of the workers in the given period is Dr_0. Total real income of the workers, denoted Y_w, is given by $Y_w = \frac{wlY}{P} + \frac{Dr_0}{P}$, where *P* denotes the domestic price level. Total real income of the capitalists (Y_c) is, therefore, given by $Y_c = Y - \frac{wlY}{P} - \frac{Dr_0}{P}$. We assume that workers' and capitalists' incomes are taxed at the rates *tw* and *tc*, respectively. For simplicity, for the present we assume *tw* and *tc* to be equal and denote the common tax rate by *t*. Aggregate output is, accordingly, given by

$$Y = c_w.\left(\frac{WlY}{P} + \frac{Dr_0}{P}\right)(1-t) + c_c.\left(Y - \frac{WlY}{P} - \frac{Dr_0}{P}\right)(1-t) + I(r,e) + G + NX\left(p, c_c.\left(Y - \frac{WlY}{P} - \frac{Dr_0}{P}\right), I(r,e), G\right) \quad (3.1)$$

In equation (3.1), *Y* is NDP, *I* is net investment, *r* is the interest rate, P^*denotes the price of foreign goods in foreign currency, *e* is the exchange rate, *NX* is net export, *p* is the real exchange rate given by (P^*e/P) and Y^* is the NDP of the rest of the world. India being a small economy cannot influence the price of foreign goods prevailing in the world market and so P^* and for similar reasons Y^* are assumed to be given. c_w and c_c are the fixed average and marginal consumption propensities of the workers and capitalists, respectively. It is standard to assume that $c_w > c_c$. Let us now explain the investment function. Investment in India depends not only on the interest rate but also on the nominal exchange rate, *e*. The reasons are the following. Imported capital goods constitute an essential and important ingredient of investment in India (see Table 3.6). (To illustrate with an example, consider the import intensity of studying economics in India. Almost all the text books are imported, almost all the journals we refer to are foreign, all the computers and software we use are imported. Thus, to set up a college or a university or any other facility in India, almost all the knowledge inputs such as books, journals etc. and all the high-tech products have to be imported. This is true not only of educational institutes but also of all modern production facilities.) Following an increase in the exchange rate ceteris paribus, prices of foreign capital goods go up in domestic currency, cost of investment rises, which, given investors' expectations, lowers investment. Imported

intermediate inputs constitute an essential and major ingredient of production in India (see Table 3.6). An increase in the exchange rate, therefore, generates a strong cost push. Large firms in India also have large stocks of external debt (see Table 3.7). An increase in the exchange rate raises external debt service charges in domestic currency. All these adverse supply shocks dampen investors' morale and lower investment. Data on exchange rates, growth rates and capital formation given in Tables 3.4 and 3.5 show that in all the years of recession (2011-12 – 2013-14) exchange rate increased substantially indicating a strong inverse relationship between the exchange rate, rate of capital formation and growth rate in India. For a more elaborate explanation of the reasons for the incorporation of *e* in the investment function and supportive empirical evidences, one may go through Ghosh and Ghosh (2016).

Let us now explain the net export function. The net export function we use here is more general than the one used in Chapter 2. *C*, *I* and *G* represent aggregate demand of domestic agents for both domestic and foreign goods. How these expenditures are allocated between domestic and foreign goods depends upon the real exchange rate. We assume here for simplicity that workers' consumption consist of domestic consumption goods only. Given this assumption, we make net export an increasing function of *p* and Y^*, and a decreasing function of capitalists' consumption, *G* and *I*. Here, capitalists' and government's consumption demand for imported goods and investors' investment demand for imported goods represent their demand for both final imported goods and imported intermediate inputs. For simplicity and without any loss of generality, we do not explicitly and separately consider demand for imported intermediate inputs here, as we did in Chapter 2. In Chapter 2, we distinguish between demand for final import and demand for imported intermediate inputs. In Chapter 2, C, I and G are allocated between domestic goods and imported final goods by assumption. Demand for imported intermediate inputs is considered separately.

We assume, a la Kalecki (1954), that the domestic price level is set on the basis of the average variable cost of production and the most important determinant of the average variable cost in India, besides wage cost, is *e*. Let us now explain why the exchange rate is a major determinant of cost of production in India. Imported intermediate inputs such as petroleum and petroleum products, fertilizer, spares and components are essential ingredients of production in India (see Table 3.6). An increase in the exchange rate, given the prices of foreign goods in foreign currency, makes them costlier in domestic currency pushing up domestic average variable cost of production substantially. Besides cost, as pointed out by Kalecki (1954), price also depends upon the degree of monopoly power enjoyed by the firms. If for some reason or the other the monopoly power of the firms goes up, domestic price level will rise, with the level of average variable cost remaining unchanged. We denote the monopoly power of domestic firms by ϕ and assume it to be exogenously given. Thus, we make the domestic price level *P* an increasing function of *e* and ϕ. We do not consider the wage rate explicitly as a determinant of the average variable cost as we regard it as fixed in the short run. We have also dropped P^*, since it is given here. Thus,

$$P = P\underset{+\ +}{\left(e,\phi\right)} \qquad (3.2)$$

In Chapter 2, we assumed a la Kalecki (1954) that the producers set *P* by applying a fixed mark-up to the average variable cost of production. Here, we deviate from that rigid rule and simply assume that *P* is an increasing function of the average variable cost of production and the degree of monopoly power of the firms. (3.2) is more general than the rigid pricing rule given by (2.2) of Chapter 2.

Our specification of the real sector is complete. We now turn to the financial sector.

The Financial Sector

Interest rate is determined in the financial sector. In India, the Reserve Bank of India (RBI) employs different means such as the liquidity adjustment facility, open market operations etc. to keep the interest rate at a target level. We shall therefore regard *r* as a policy variable of the RBI and take it as given. Thus,

$$r = \bar{r} \qquad (3.3)$$

Incorporating (3.2) and (3.3) into (3.1), we rewrite it as

$$Y = c_w.\left(\frac{WlY}{P(e,\phi)} + \frac{Dr_0}{P(e,\phi)}\right)(1-t) + c_c.\left(Y - \frac{WlY}{P(e,\phi)} - \frac{Dr_0}{P(e,\phi)}\right)(1-t) + I(\bar{r},e) + G + NX\left(p, c_c.\left(Y - \frac{WlY}{P(e,\phi)} - \frac{Dr_0}{P(e,\phi)}\right), I(\bar{r},e), G\right) \qquad (3.4)$$

We shall now explain how exchange rate is determined.

Foreign Currency Market

We will now focus on the foreign currency market where *e* is determined. In India, the exchange rate is best regarded as flexible. There are wide variations in the exchange rate every year (see Table 3.5). Let us now turn to the determination of *e*. The BOP consists of trade surplus and net inflow of foreign capital, which we denote by *K*. We assume for simplicity and without any loss of generality that *K* is exogenously given. We, therefore, write the BOP equilibrium condition, incorporating (3.2) and (3.3) into it and denoting the real exchange rate by *p*, as

$$NX\left(p, c_c.\left(Y - \frac{WlY}{P(e,\phi)} - \frac{Dr_0}{P(e,\phi)}\right)(1-t), I(\bar{r},e), G\right) + \bar{K} = 0 \qquad (3.5)$$

From (3.5) we find that balance of payments denoted *B*, given by the LHS of (3.5), is a function of *Y*, *e* and the exogenous variables such as ϕ. We do not consider other exogenous variables explicitly, as they are not relevant for our purpose.

We can, therefore, rewrite equation (3.5) as

$$B(e,Y;\phi) = 0 \qquad (3.6)$$

$$B_Y = NX_{cc}\left(1 - \frac{Wl}{P}\right).c_c.(1-t) < 0 \qquad (3.6i)$$

In (3.6i), NX_{cc} denotes partial derivative of the net export function with respect to capitalists' consumption. Clearly, this is negative, as a unit increase in capitalists' consumption demand raises capitalists' consumption demand for imported consumption goods also. This lowers net export.

$$B_e = NX_p\left(\frac{P^*}{P} - \frac{P^* e}{P^2}P_e\right) + NX_{cc}.c_c.(1-t)\frac{WlY + Dr_0}{P^2}P_e + NX_I I_e > 0 \qquad (3.6ii)$$

Let us now explain (3.6ii). Following a unit increase in *e*, real exchange rate goes up raising net export. However, the increase in the real exchange rate is likely to be insignificant as an increase in *e* raises *P* substantially. This is captured by the first term on the RHS of (3.6ii). An increase in *e* raises *P* and, thereby, redistributes income in favour of the capitalists at the expense of the workers. This raises capitalists' consumption demand for both domestic and foreign goods lowering net export. This is captured by the second term on the RHS. An increase in *e* also lowers investment demand raising net export. This is captured by the third term on the RHS of (3.6ii). We assume that this term dominates so that $B_e > 0$. This is necessary and sufficient for stability of equilibrium. We have demonstrated this in 3.A.1 in Appendix 3.

$$B_\phi = -NX_p\left(\frac{P^* e}{P^2}\right)P_\phi + (NX_{cc}).c_c.(1-t)\frac{WlY + Dr_0}{P^2}P_\phi < 0 \qquad (3.6iii)$$

Following an increase in the exogenous variable ϕ, *P* goes up for exogenous reasons. The increase in *P* makes domestic goods dearer relative to foreign goods. Since India does not have any technology of its own, close substitutes of the goods India produces are available in plenty in the world market. Hence, an increase in *P* ceteris paribus is likely to reduce export, raise import and, thereby, lower net export by substantial quantities. This is given by the first term on the RHS of (3.6iii). The increase in *P* also redistributes income in favour of the capitalists at the expense of the workers. This also reduces net export by raising import demand of the capitalists. This is captured by the second term on the RHS of (3.6iii). Since c_c is quite small, the second term is quite small. But the absolute value of the first term is likely to be very large. Thus, following an exogenous increase in *P*, *NX* is likely to fall by a large quantity.

The specification of our model is now complete. It consists of two key equations (3.4) and (3.5) or (3.6) in two endogenous variables *e* and *Y*. We solve them as follows:

We first solve (3.5) or (3.6) for *e* as a function of *Y* and the exogenous variables. Thus,

$$e = e(Y;\phi);\ e_Y = \frac{-B_Y}{B_e} > 0, e_\phi = \frac{-B_\phi}{B_e} > 0 \qquad (3.7)$$

Determination of Y and P

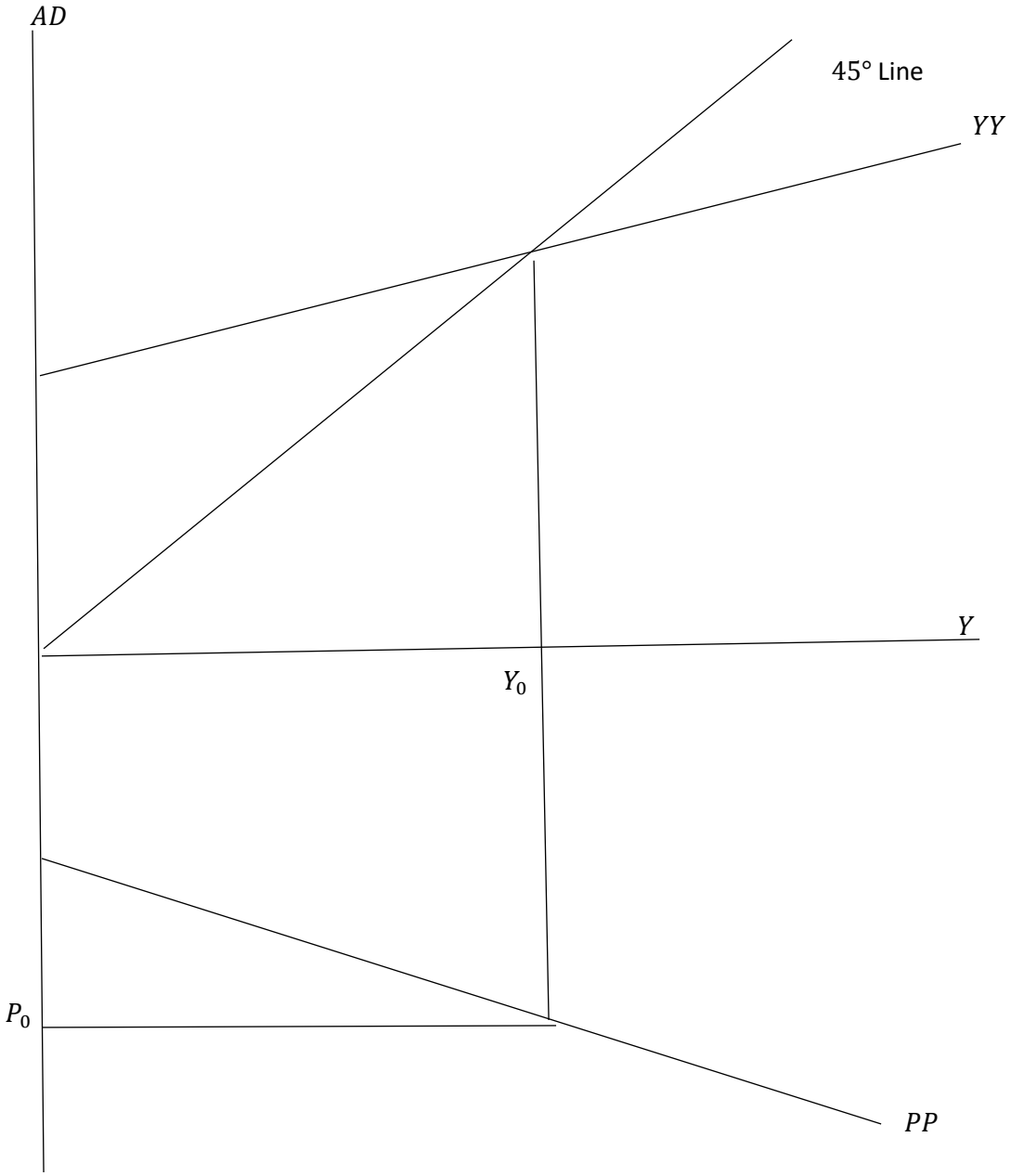

Figure 3.1

Let us explain the signs of the partial derivatives of (3.7). Let us start from a situation of BOP equilibrium. Following a ceteris paribus increase in *Y*, import demand rises for reasons we have already explained. Hence, at the initial equilibrium *e*, net export falls creating BOP deficit. *e*,

therefore, rises to remove the BOP deficit. The explanation of the sign of the other partial derivative is similar.

Substituting (3.7) into (3.2), we get

$$P = P\underset{+\quad +}{\left(e(Y;\phi),\phi \right)} = \overline{P}\underset{+\ +}{\left(Y;\phi \right)} \qquad (3.8)$$

Signs of the partial derivatives of (3.8) follow straightway from (3.2) and (3.7). Substituting (3.3), (3.5), (3.7) and (3.8) into (3.1), we get

$$Y = c_w.\left(\frac{WlY}{\overline{P}(Y;\phi)} + \frac{Dr_0}{\overline{P}(Y;\phi)} \right)(1-t) + c_c.\left(Y - \frac{WlY}{\overline{P}(Y;\phi)} - \frac{Dr_0}{\overline{P}(Y;\phi)} \right)(1-t) + I(\bar{r}, e(Y;\phi)) + G - \overline{K} \equiv$$

$$\overline{E}(Y;\phi) + G = 0 \qquad (3.9)$$

$$\overline{E}_Y = \left[c_w.\left(\frac{Wl}{P} \right)(1-t) + c_c.\left(1 - \frac{Wl}{P} \right)(1-t) \right] - \left[(c_w - c_c)(1-t)\frac{1}{P^2}(WlY + Dr_0)\overline{P}_Y + (-I_e)e_Y \right] < 1 \qquad (3.9i)$$

Let us explain (3.9i). It gives us the total amount of change in personal consumption demand and investment demand following a ceteris paribus unit increase in *Y*. Let us explain. Following a ceteris paribus unit increase in *Y*, with *e* and *P* remaining unchanged, workers' and capitalists' incomes and, therefore, their planned consumption expenditures go up. This is given by the first term within third brackets in the expression on the RHS of (3.9i). The unit increase in *Y* raises *e* by e_Y, which in turn raises *P* by $\overline{P}_Y$. The increase in *e* lowers investment demand. The rise in *P* redistributes income from the workers to the capitalists and, thereby, lowers aggregate personal consumption demand since $c_w > c_c$. The total fall in aggregate personal consumption demand and investment demand is given by the second term within third brackets. Hence, one cannot say a priori whether $\overline{E}_Y$ is positive or negative. However, it is surely less than unity because the first term is so. It is a weighted average of average and marginal consumption propensities of workers and capitalists.

$$\overline{E}_\phi = -\left[(c_w - c_c)(1-t)\frac{1}{P^2}(WlY + Dr_0)P_\phi \right] - \left[(-I_e)e_\phi \right] < 0 \qquad (3.9ii)$$

Let us explain (3.9ii). It gives us the total change in aggregate personal consumption demand and investment demand following a ceteris paribus unit increase in ϕ. It directly raises *P* (see (3.2) and (3.8)), which in turn raises *e* (see (3.7)). The former redistributes income from the workers to the capitalists and, thereby, lowers aggregate personal consumption demand. This is given by the first term of the expression on the RHS of (3.9ii). The latter lowers investment demand. This is given by the second term

We solve (3.9) for the equilibrium value of *Y*. Putting this equilibrium value of *Y* in (3.8) and (3.7), we get the equilibrium values of *P* and *e* respectively. The solution of *Y* is shown in Figure 3.1, where YY schedule represents the RHS of (3.9), while the 45^0 line plots the value of the LHS against *Y*. The equilibrium value of *Y* corresponds to the point of intersection of the YY

and the 45^0 line. The slope of YY is given by (3.9i), which may be negative also. However, for simplicity and without any loss of generality, we take it to be positive. The stability analysis carried out in section 3.A.2 in the appendix shows that the equilibrium value of *Y* is stable iff $\bar{E}_Y < 1$. From (3.9i) we find that this condition is satisfied. In the lower panel, we measure positive values of *P* in the downward direction on the vertical axis. The PP line represents (3.8). The equilibrium *P* corresponds to the equilibrium *Y* on PP.

We are now in a position to use this simple model to identify the costs of inflation in India and how these costs are affected by the fiscal deficit target.

3.3 Inflation and its Costs in India

We will examine here how inflation harms Indian economy. To identify the costs of inflation, we consider an exogenous increase in the rate of inflation, i.e., an exogenous increase in *P*, due to a rise, for example, in the degree of monopoly power of the firms in the Indian economy. The rise in the degree of monopoly power is indicated by an increase in ϕ . To derive the impact of an increase in ϕ on *Y*, we take total differential of (3.9) treating all exogenous variables other than ϕ as fixed and, then, solve for *dY*. This yields

$$dY = \frac{\bar{E}_\phi}{1-\bar{E}_Y} < 0 \qquad (3.10)$$

The sign of (3.10) follows from the stability condition (see 3.A.2 in the appendix) and (3.9ii). The result may be explained as follows. Following an increase in ϕ for exogenous reasons, *P* goes up redistributing income from the workers to the capitalists at the initial equilibrium (Y, e) . It also reduces net export, which induces a rise in *e* that restores net export to its initial equilibrium value. However, the rise in *e* lowers investment demand and reinforces the redistribution effect by causing *P* to rise further. As a result, aggregate demand at the initial equilibrium *Y* falls engendering an excess supply of goods and services. Producers reduce *Y* to remove the excess supply. Per unit decline in *Y*, excess supply falls by $1-\bar{E}_Y$. Hence, excess supply falls by $\bar{E}_\phi$, when *Y* goes down by the amount given by the expression on the RHS of (3.10).

To derive the impact on *e* and *P*, we take total differential of (3.6) and (3.8) treating all exogenous variables other than ϕ as fixed, substitute for *dY* its value as given by (3.10), and, then, solve for *de* and *dP*. This yields

$$de = \frac{-B_Y}{B_e}\left(\frac{\bar{E}_\phi d\phi}{1-\bar{E}_Y}\right) + \frac{-B_\phi}{B_e} d\phi \qquad (3.11)$$

$$dP = \bar{P}_Y\left[\left(\frac{\bar{E}_\phi d\phi}{1-\bar{E}_Y}\right)\right] + \bar{P}_\phi d\phi \qquad (3.12)$$

Let us focus on the expression on the RHS of (3.11). It follows from (3.6i), (3.6ii), (3.6iii) and (3.10) that the first term is negative, but the second term is positive. Hence, the direction of change in e is ambiguous. Let us now focus on the expression on the RHS of (3.12). It follows from (3.8) and (3.10) that the first term is negative, but the second term is positive. Hence, the direction of change in P is also ambiguous. However, we shall prove below that the new equilibrium P will be higher than its initial equilibrium value, though the new equilibrium e may be less.

Let us first explain the adjustment process. Following an increase in ϕ, P rises at the initial equilibrium (Y, e). The increase in P redistributes income from the workers to the capitalists and, thereby, lowers demand at the initial equilibrium (Y, e). It also reduces net export, which induces an increase in e that restores net export to its initial equilibrium value. The rise in e, however, lowers investment demand and reinforces the redistribution of income from the workers to the capitalists by causing P to rise further. Thus, there emerges a large excess supply at the initial equilibrium Y. Hence, Y begins to fall. However, the fall in Y raises net export bringing about a fall in e that keeps net export at its initial equilibrium level. The fall in e lowers P. The decline in e and P raises investment and consumption demand respectively. Thus, through the fall in Y, e and P, the excess supply is removed. If the fall in Y is sufficiently large, e may fall below its initial equilibrium level. However, we shall now show that in the new equilibrium P will remain above its initial equilibrium value. Let us prove. Note that, the fall in Y does not directly lower P. It does so only by reducing e (see (3.8) and (3.2)). Therefore, P can be equal to or less than its initial equilibrium value, only if e goes below its initial equilibrium value (see (3.8) and (3.2) and also note that ϕ is larger). From (3.9) it is clear that, if e is below its initial equilibrium value and P is at or below its initial equilibrium value, the RHS will be greater than Y at every Y equal to or less than its initial equilibrium value. Therefore, even if e falls below its initial equilibrium value, P cannot be less than or equal to its initial equilibrium value in the new equilibrium. The results derived here may be summarized in the form of the following proposition:

Proposition 3.1: An exogenous increase in the inflation rate leads to a contraction in aggregate output and employment. It also makes the rate of inflation in the new equilibrium higher and, thereby, redistributes income from the workers to the capitalists. Inflation, thus, hurts the workers in two ways. It redistributes income from the workers to the capitalists. It causes substantial recession and, therefore, unemployment.

3.4 Factors Worsening the Impact of Inflation

There are two important characteristics of fiscal and monetary policies being pursued by the GoI, namely, fiscal deficit target and inflation target. We examine below whether these targets act as automatic destabilizers and exacerbate the costs of inflation delineated in Proposition 3.1.

3.4.1 Fiscal Deficit Target: An Automatic Destabilizer

Fiscal deficit target is an integral part of the New Economic Policy (NEP). As mentioned earlier, Urjit Patel Committee recommended a ceiling on the size of the fiscal deficit at 3 percent of

GDP (RBI (2014)). Government of India (GoI) has several instruments for achieving its fiscal deficit target such as direct tax rates, indirect tax rates, amount of subsidy, government consumption, prices of essential inputs such as services of railways, power, coal etc. GoI normally does not consider it politically prudent to raise direct tax rates to achieve its fiscal deficit target. It uses the other instruments for the purpose. Since the second measure implies the third one, we only explicitly consider here the first two of these three instruments. Along with it, we also consider *G* as an instrument for achieving the fiscal deficit target.

_G_ as the Instrument for Meeting Government's Fiscal Deficit Target

We consider here the case where the government uses *G* as the instrument for meeting the fiscal deficit target. GoI often uses *G* for this purpose (see, for example, Economic Survey 2014-15, p.23). Fiscal deficit in our model is given by $G-tY$. Fiscal deficit target of the government is a given fraction *a* of *Y*. Therefore, government adjusts *G* in such a manner that the following equation is satisfied:

$$G-tY=aY \qquad (3.13)$$

Substituting (3.13) into (3.9), we rewrite it as

$$Y=\bar{E}(Y;\phi)+(t+a)Y \qquad (3.14)$$

To derive the impact of an increase in ϕ, we take total differential of (3.14) treating all exogenous variables other than ϕ as fixed and, then, solve for *dY*. This yields

$$dY=\frac{\bar{E}_{\phi}}{1-\bar{E}_Y-(a+t)}<0 \qquad (3.15)$$

Comparing (3.10) and (3.15), we find that the fall in *Y* is larger than that under no fiscal deficit target case. The reason may be explained as follows:

Following an exogenous increase in ϕ, *Y* in the first round declines by $dY_1=\frac{\bar{E}_{\phi}}{1-\bar{E}_Y}<0$. The contraction would have stopped here in the absence of any fiscal deficit target (see (3.10)). However, under the fiscal deficit target, this lowers *G* by $(a+t)dY_1$, which will lower *Y* in the second round by $dY_2=\frac{(a+t)dY_1}{1-\bar{E}_Y}<0$. This will lead to further contraction in *G* and *Y*. In the third round *Y* will go down by $dY_3=\frac{(a+t)dY_2}{1-\bar{E}_Y}<0$. This contraction in *Y* will continue until the contraction that takes place in each round eventually falls to zero. Thus, the total decrease in *Y*, using the value of dY_1, is given by

$$dY=dY_1+\frac{(a+t)dY_1}{1-\bar{E}_Y}+\left[\frac{(a+t)}{1-\bar{E}_Y}\right]^2 dY_1+\left[\frac{(a+t)}{1-\bar{E}_Y}\right]^3 dY_1+\ldots\ldots=\frac{\bar{E}_{\phi}}{1-\bar{E}_Y-(a+t)}<0 \qquad (3.16)$$

From the above discussion it is clear that the contraction in *Y* that takes place following an exogenous increase in the inflation rate becomes substantially larger in the presence of the fiscal deficit target. This yields the following proposition:

Proposition 3.2: When government adjusts its consumption expenditure to meet its fiscal deficit target, the recession caused by an exogenous increase in the inflation rate becomes more severe compared to the case where there is no fiscal deficit target. In the present case, therefore, the fiscal deficit target acts as a strong automatic destabilizer.

When government expenditure is reduced in essential sectors to meet the fiscal deficit target, it goes against the poorer sections and inequality widens. This is what happens in India. In the budget of 2017-18, the government following its tradition of sound finance fixed the target of fiscal deficit at 3.2% of GDP. Budget estimates of government expenditure on defence stood at Rs.2,62,390 crore, while for essential sectors like education and health the budget estimates were Rs.79,686 crore and Rs.48,878 crore, respectively (GoI (2018), p.4). Given such priorities of the GoI, if *G* has to be reduced to meet the fiscal deficit target in the face of inflation induced recession, the part of *G* that is allocated to the poor will be cut first. This is an additional cost that inflation will inflict on the poor in India, when *G* is adjusted to meet the fiscal deficit target.

Administered Prices of Essential Inputs as the Instrument for Meeting the Fiscal Deficit Target

In India, the government takes part in production. It produces essential intermediate inputs such as power, services of railways and other transport services, coal, oil etc. Prices of these inputs, which we denote by P_0, are administered by the government. Profit from the production of these inputs is given by

$$\pi_g = P_0 Y \tag{3.17}$$

Where π_g denotes profit of the public sector. Let us explain (3.17). We assume that the fixed requirement of the output of the public sector as intermediate input per unit of *Y* is unity. We assume for simplicity that the public sector in India is vertically integrated. Even the wage cost is fixed in the public sector. Thus, there is no variable cost. We assume for simplicity and without any loss of generality that the fixed cost is nil. Hence, (3.17) gives the profit of the public sector.

Since a part of the aggregate profit of the economy accrues to the government, total pre-tax real income of the capitalists (Y_c) is given by

$$Y_c = Y - \frac{WlY}{P} - \frac{Dr_0}{P} - \frac{P_0 Y}{P} \tag{3.18}$$

GoI often uses administered prices of the essential inputs mentioned above as instruments for meeting fiscal deficit targets. To give a dramatic example, in September 2012, to reduce fiscal deficit, GoI hiked administered prices of diesel and cooking gas. To vindicate the act, which adversely affected the poor, the Prime Minister of India had to address the nation on 12 September, 2012. We quote a few lines from the speech below. "*We are at a point where we can reverse the slowdown in our growth…The decisions we have taken recently are necessary for this purpose. Let me begin with the rise in diesel prices and cap on LPG cylinders…If we had not acted, it would have meant a higher fiscal deficit. If unchecked this would lead to a…*

loss of confidence in our country…and I would be failing in my duty as Prime Minister of this country if I did not take strong preventive action."

To examine how hikes in administered prices of essential inputs affect the economy, we assume *t*, *D* and *a* to be zero for simplicity and write the government's budget constraint as

$$PG = P_0 Y \tag{3.19}$$

Using (3.19), we can write (3.18) as

$$Y_c = Y - \frac{WlY}{P} - G \tag{3.20}$$

Again, from (3.19) we get

$$P_0 = \frac{PG}{Y} \tag{3.21}$$

P_0 is an important determinant of the cost of production and, therefore, that of price. Incorporating it in (3.2), we rewrite it as

$$P = P(e, P_0; \phi) \tag{3.22}$$

However, to avoid unnecessary algebraic complications, we shall drop *e* from (3.22). This will not affect our results qualitatively in any way.

Substituting (3.21) into (3.22) and dropping *e* as a determinant of *P*, we rewrite it as

$$P = P\left(\frac{PG}{Y}; \phi\right);\ P = P(0; \phi) > 0 \text{ and } 0 < \frac{\partial P\left(\frac{PG}{Y}; \phi\right)}{\partial P} = P_{P_0}\frac{G}{Y} < 1 \text{ (by assumption)} \tag{3.23}$$

Given the assumptions stated above, we can solve (3.23) for *P* as a function of *Y* and ϕ, given *G*. Thus,

$$P = \tilde{P}\left(\underset{-}{Y}; \underset{+}{\phi}\right) \tag{3.24}$$

Note that, as follows from (3.23),

$$\tilde{P}_Y = \frac{-P_{P_0}\frac{P}{GY^2}}{1 - P_{P_0}\frac{G}{Y}} < 0, \tilde{P}_\phi = \frac{P_\phi}{1 - P_{P_0}\frac{G}{Y}} > 0 \tag{3.24i}$$

To avoid unnecessary algebraic complications and put our result in the sharpest possible relief, we drop *e* from the investment function and, as we have already mentioned, assume *D* to be equal to zero. This will not affect our results qualitatively. Dropping *e* from the investment function, setting *D* and *t* equal to zero, substituting (3.24) and (3.20) in (3.9) and manipulating terms, we rewrite it as

$$Y = \left[c_w \cdot \left(\frac{Wl}{\tilde{P}(Y;\phi)}\right) + c_c \cdot \left(1 - \frac{Wl}{\tilde{P}(Y;\phi)}\right)\right] Y + I(\bar{r}) + (1 - c_c)G - \bar{K} \equiv \tag{3.25}$$
$$C\left(\tilde{P}(Y;\phi)\right) Y + I(\bar{r}) + (1 - c_c)G - \bar{K}$$

$$C = C\left(\tilde{P}(Y;\phi)\right) \equiv \left[c_w \cdot \left(\frac{Wl}{\tilde{P}(Y;\phi)}\right) + c_c \cdot \left(1 - \frac{Wl}{\tilde{P}(Y;\phi)}\right)\right] \tag{3.25i}$$

We are now in a position to examine the impact of an increase in ϕ on *Y* and *P*. Taking total differential of (3.25) treating all exogenous and policy variables other than ϕ as fixed and, then, solving for *dY*, we get

$$dY = \frac{C_P \tilde{P}_\phi Y d\phi}{1 - C - C_P \tilde{P}_Y Y} < 0 \qquad (3.26)$$

Let us now explain (3.26). Note that in the absence of the fiscal deficit target, P_0 would have remained unchanged and *P* would have increased only on account of the increase in ϕ . Its increase would have been equal to only $P_\phi d\phi$ (see (3.2)) and $\tilde{P}_Y$ would have been zero. Hence, the value of *dY*, denoted by dY_0, as follows from (3.26), would have been given by the following:

$$dY_0 = \frac{C_P P_\phi Y d\phi}{1 - C} < 0 \qquad (3.27)$$

Note that, as follows from (3.23),

$$\tilde{P}_\phi = \frac{P_\phi d\phi}{1 - P_{P_0} \frac{G}{Y}} > P_\phi d\phi \qquad (3.28)$$

Let us explain (3.28). Following an increase in ϕ by $d\phi$, the desired value of *P* rises by $P_\phi d\phi$. However, as producers raise *P* from its initial value, with *Y* remaining unchanged, per unit increase in *P*, fiscal deficit, as follows from (3.19), rises above the target by *G* and, hence to meet the fiscal deficit target, P_0 goes up by $\frac{G}{Y}$ raising the desired value of *P* by $P_{P_0} \frac{G}{Y}$. Thus, per unit increase in *P*, the gap between the desired and the initial value of *P* falls by $\left(1 - P_{P_0} \frac{G}{Y}\right)$. Hence, to remove the gap of $P_\phi d\phi$, *P* has to be raised by the amount given by the expression on the RHS of (3.28).

Clearly, the absolute value of (3.26) is much larger than that of (3.27). Let us now explain it in greater detail.

Following an increase in ϕ by $d\phi$, *P* increases by $P_\phi d\phi$ in the absence of fiscal deficit target creating an excess supply of $-C_P P_\phi Y d\phi$ at the initial equilibrium *Y* reducing *Y* by dY_0 . However, in the presence of the fiscal deficit target, as we have already pointed out, *P* will increase by $\tilde{P}_\phi d\phi > P_\phi d\phi$ at the initial equilibrium *Y* creating a much larger excess supply of $-C_P \tilde{P}_\phi Y d\phi$ reducing *Y* by $dY_1 = \frac{C_P \tilde{P}_\phi Y d\phi}{1 - C} = \frac{1}{1 - P_{P_0} \frac{G}{Y}} dY_0$, with P_0 remaining unchanged at the level it was raised to at the initial equilibrium *Y* following the increase in ϕ . Clearly, $-dY_1 > -dY_0$. However, with the decline in *Y*, as follows from (3.19), fiscal deficit widens inducing the government to raise P_0, which in turn will raise *P* further by $\tilde{P}_Y dY_1$ (see (3.24i)). This will lower demand again by $C_P \tilde{P}_Y Y dY_1$. Therefore, *Y* in the second round will fall by

$dY_2 = \frac{C_P \tilde{P}_Y Y}{1-C} dY_1$. This will, again, lead to further increase in P_0 and P reducing Y in the third round by $dY_3 = \frac{C_P \tilde{P}_Y Y}{1-C} dY_2 = \left(\frac{C_P \tilde{P}_Y Y}{1-C} \right)^2 dY_1$. Similarly, in the fourth round, Y will go down by $dY_4 = \left(\frac{C_P \tilde{P}_Y Y}{1-C} \right)^3 dY_1$. This process of contraction will continue until the excess supply created in each successive round eventually falls to zero. Thus, the total decline in Y is given by (using the value of dY_1)

$$dY = dY_1 + \frac{C_P \tilde{P}_Y Y}{1-C} dY_1 + \left(\frac{C_P \tilde{P}_Y Y}{1-C} \right)^2 dY_1 + \ldots\ldots\ldots = \frac{C_P \tilde{P}_\phi d\phi}{1-C-C_P \tilde{P}_Y Y} \qquad (3.29)$$

Clearly, (3.29) tallies with (3.26).

The increase in ϕ and the cumulative contraction in Y that follows also bring about a cumulative increase in P or the rate of inflation. Taking total differential of (3.24) and substituting (3.24i) and (3.26) into it, we get

$$dP = \frac{1}{1 - P_{P_0} \frac{G}{Y}} P_\phi d\phi + \tilde{P}_Y \frac{C_P \tilde{P}_\phi d\phi}{1-C-C_P \tilde{P}_Y Y} > P_\phi d\phi \qquad (3.30)$$

The above discussion yields the following proposition:

Proposition 3.3: When the government adjusts administered prices of essential inputs to meet the fiscal deficit target, both the decline in *Y* and the increase in *P* that occur following an increase in *P* for exogenous reasons become much larger than what they would have been in the absence of the fiscal deficit target. Thus, the fiscal deficit target in the present case magnifies manifold the costs of an exogenous increase in the rate of inflation.

We will now consider the case where the government adjusts indirect tax rates to meet its fiscal deficit target.

Indirect Taxes as the Instrument for Meeting the Fiscal Deficit Target

We shall now examine how costs of inflation are affected when indirect tax rates are used to meet government's fiscal deficit target. Suppose an indirect tax is imposed at the rate τ on the sales of goods and services. Following that, the market price of domestic goods and services denoted by P^m will be given by

$$P^m = P(1+\tau) \qquad (3.31)$$

Where P denotes the producers' price. Assuming, to avoid unnecessary complications, P to be an increasing function of ϕ alone, we rewrite (3.31) as

$$P^m = P\left(\underset{+}{\phi} \right)(1+\tau) \qquad (3.32)$$

Total indirect tax collection in real terms denoted by T is given by

$$T = \frac{P\tau Y}{P(1+\tau)} = \frac{\tau}{(1+\tau)}Y \equiv (1-\gamma)Y \qquad \gamma \equiv \frac{1}{1+\tau} \quad (3.33)$$

Assuming for simplicity *t*, *a* and government's profit to be equal to zero, fiscal deficit target implies

$$G = (1-\gamma)Y \quad (3.34)$$

From (3.34) we get

$$\gamma = 1 - \frac{G}{Y} \equiv \gamma\left(\underset{+}{Y}\right) \quad (3.35)$$

Workers' and capitalists' real incomes in this case denoted by Y_W and Y_c respectively are given by (assuming *D* and *t* to be zero for simplicity)

$$Y_W = \frac{WlY}{P(1+\tau)} = \frac{Wl}{P}\gamma Y \text{ and } Y_c = \frac{PY - WlY}{P(1+\tau)} = \left(1 - \frac{Wl}{P}\right)Y\gamma \quad (3.36)$$

Given the assumptions already specified, using (3.3), (3.32), (3.35) and (3.36) and assuming for simplicity investment to be a function of *r* alone, we write down the goods market equilibrium condition (3.1) as follows:

$$Y = c(P(\phi))\gamma(Y)Y + I(\bar{r}) + G + NX\left(p, c_c.\left(1 - \frac{Wl}{P(\phi)}\right)\gamma Y, I(\bar{r}), G\right) \quad (3.37)$$

Where

$$c \equiv c(P(\phi)) \equiv \left[c_w.\left(\frac{Wl}{P(\phi)}\right) + c_c.\left(1 - \frac{Wl}{P(\phi)}\right)\right] \quad (3.37i)$$

Substituting (3.5) into (3.37), we rewrite it as follows:

$$Y = c(P(\phi))\gamma(Y)Y + I(\bar{r}) + G - \bar{K} \quad (3.38)$$

To derive the impact of an autonomous increase in ϕ , we take total differential of (3.38) treating all exogenous variables other than ϕ as fixed and, then, solve for *dY*. This gives

$$dY = \frac{c'P'Y\gamma d\phi}{1 - c\gamma - cY\gamma'} < 0 \quad ; \quad c' \equiv -(c_w - c_c)\frac{Wl}{P^2} < 0 \quad (3.39)$$

In the absence of the fiscal deficit target, γ would have remained unchanged and the value of *dY* would have been

$$dY_1 = \frac{c'P'Y\gamma d\phi}{1 - c\gamma} \quad (3.40)$$

Clearly, the fiscal deficit target magnifies manifold the recessionary impact of an autonomous increase in ϕ. Let us explain this point below.

Following an autonomous increase in ϕ by $d\phi$, with γ remaining unchanged, *Y* falls in the first round by $dY_1 = \frac{c'P'Y\gamma d\phi}{1 - c\gamma}$ raising the fiscal deficit above the target level. This will induce a decline in γ by $\gamma' dY_1$, which will reduce consumption by $cY\gamma' dY_1$. This lowers *Y* in the second round by $dY_2 = \frac{cY\gamma'}{1 - c\gamma} dY_1$. This will again raise fiscal deficit above the target level inducing a decline in γ by $\gamma' dY_2$. This will lower consumption demand by $cY\gamma' dY_2$. In the third round,

therefore, *Y* will fall by $dY_3 = \left(\frac{cY\gamma'}{1-c\gamma}\right)^2 dY_1$. This process of contraction will continue until the fall in *Y* that takes place in each round eventually falls to zero. Thus, the total fall in *Y* is given by (putting the value of dY_1)

$$dY = dY_1 + \frac{cY\gamma'}{1-c\gamma}dY_1 + \left(\frac{cY\gamma'}{1-c\gamma}\right)^2 dY_1 + \ldots\ldots\ldots = \frac{c'P'Y\gamma d\phi}{1-c\gamma-cY\gamma'} \qquad (3.41)$$

(3.41) tallies with (3.39). It is clear from (3.41) that the fiscal deficit target magnifies manifold the contraction in *Y* brought about by an exogenous increase in the rate of inflation, when indirect tax rate is adjusted to meet the fiscal deficit target.

Again, from (3.32), (3.33), (3.35) and (3.39) it follows that

$$dP^m = \left(P'\frac{1}{\gamma}d\phi\right) + \left[-P(\phi)\frac{\gamma'}{\gamma^2}\frac{c'P'Y\gamma d\phi}{1-c\gamma-cY\gamma'}\right] \qquad (3.42)$$

(3.42) gives the increase in the market price following the exogenous increase in ϕ. In the absence of the fiscal deficit target, the market price would have gone up by only the first term of the expression on the RHS of (3.42). However, the fiscal deficit target induces hikes in indirect tax rates in the face of inflation induced contraction in *Y*. This engenders further increase in the market price. The increase in the market price that takes place on account of the fiscal deficit target is given by the second term of the expression on the RHS of (3.42). This substantially larger increase in *P* brings about a much larger redistribution of income from the workers to the capitalists. The above analysis yields the following proposition:

Proposition 3.4: When indirect tax rates are adjusted to meet the fiscal deficit target, an exogenous increase in the rate of inflation brings about a substantially larger contraction in GDP and a significantly larger increase in the market price of goods and services making the redistribution of income from the workers to the capitalists much larger compared to the case where there is no fiscal deficit target.

3.4.2 Inflation Target

Following the recommendation of the Urjit Patel Committee, which wanted to make inflation targeting the sole objective of monetary policy, the RBI has set 4 percent as the inflation target. If inflation rate exceeds 4 percent, the RBI raises rates to reduce the inflation rate. In what follows, we shall examine how this policy is likely to affect the costs of inflation. For this purpose we shall consider only those situations where the inflation rate equals or exceeds the target rate of inflation. Suppose $\overline{P}$ is the price level that makes the rate of inflation in the given period equal to its target level, given the price level of the previous period. We make $\bar{r}$ an increasing function of $\left(P - \overline{P}\right)$, when *P* exceeds $\overline{P}$. Dropping $\overline{P}$ for simplicity and without any loss of generality, we write

$$\bar{r} = r\left(P\right)_{+} \qquad (3.43)$$

Note that producers take loans not only to finance investment but also to purchase intermediate inputs and to make factor payments. Interest charges on these loans constitute a component of the variable cost of production. An increase in $\bar{r}$, therefore, not only reduces demand but also generates a cost push. We shall, therefore, incorporate $\bar{r}$ into (3.2) (omit *e* for simplicity, as it is no longer relevant for our purpose) and rewrite it as

$$P = P\underset{+\ +}{\left(\bar{r};\phi\right)} \qquad (3.44)$$

Substituting (3.44) into (3.43), we rewrite it as

$$\bar{r} = r\left(\underset{+}{P\left(\bar{r};\phi\right)}\right) \qquad (3.45)$$

We assume that $r\left(\underset{+}{P\left(0;\phi\right)}\right) > 0,$ and $0 < r_P P_{\bar{r}} < 1$. Under these conditions, (3.45) will yield a unique solution for $\bar{r}$ and it will be stable. Thus, solving (3.45) for $\bar{r}$, we get

$$\bar{r} = \bar{r}\underset{+}{\left(\phi\right)} \qquad (3.46)$$

From (3.45) we find that

$$\bar{r}_{\phi} = \frac{r_P P_{\phi}}{1 - r_P P_{\bar{r}}} > 0 \qquad (3.46\text{i})$$

Substituting (3.46) and (3.44) into (3.9), assuming $D = t = 0$ and dropping *e* from the investment function for simplicity, we rewrite it as follows:

$$Y = \left[\tilde{C}\left(P\left(\bar{r}(\phi),\phi\right)\right)\right]Y + I\left(\bar{r}(\phi)\right) + G - \overline{K} = 0 \qquad (3.47)$$

Where

$$\tilde{C} = \tilde{C}\left(P\left(\bar{r}(\phi),\phi\right)\right) \equiv \left[c_w.\left(\frac{Wl}{P\left(\bar{r}(\phi),\phi\right)}\right) + c_c.\left(1 - \frac{Wl}{P\left(\bar{r}(\phi),\phi\right)}\right)\right] \qquad (3.47\text{i})$$

Let us first focus on the case where the government adjusts *G* to meet its fiscal deficit target so that (3.13) is satisfied, with $t = 0$ for simplicity.

***G* as the Instrument for Meeting Fiscal Deficit target in the Presence of Inflation Target**

We shall examine here how in the presence of inflation target costs of inflation are affected, when government uses *G* to meet its fiscal deficit target. In this case, G is adjusted in such a way that (3.13) is satisfied, with $t = 0$. Substituting (3.13), with $t = 0$, into (3.47), we get

$$Y = \left[\tilde{C}\left(P\left(\bar{r}(\phi),\phi\right)\right)\right]Y + I\left(\bar{r}(\phi)\right) + aY - \overline{K} = 0 \qquad (3.48)$$

To derive the impact of an exogenous increase in ϕ , we take total differential of (3.48) treating all exogenous variables other than ϕ as fixed and, then, solve for *dY*. This yields the following:

$$dY = \frac{\left[\tilde{C}'\left(P_r \bar{r}_{\phi} + P_{\phi}\right)Y + I_r \bar{r}_{\phi}\right]d\phi}{1 - \tilde{C} - a} \qquad (3.49)$$

Let us now explain (3.49). Following an increase in ϕ , *P* rises only by P_{ϕ} in the absence of the inflation target reducing aggregate demand by $\tilde{C}' P_{\phi} Y d\phi$ at the initial equilibrium *Y*. This lowers

Y by $dY_1 = \frac{\tilde{C}' P_\phi Y d\phi}{1-\tilde{C}-a}$. This would have been the total contraction in Y in the absence of the inflation target (see (3.15)). However, in the presence of the inflation target, following the increase in P by P_ϕ, the central bank will raise r by $\bar{r}_\phi = \frac{r_P P_\phi d\phi}{1-r_P P_{\bar{r}}}$, which in turn will raise P by $P_{\bar{r}} \bar{r}_\phi d\phi$. At the given Y, this will lower demand by $\left(\tilde{C}' P_{\bar{r}} Y + I_{\bar{r}}\right)\bar{r}_\phi d\phi$ reducing Y further by $dY_2 = \frac{\left(\tilde{C}' P_{\bar{r}} Y + I_{\bar{r}} \bar{r}_\phi\right)d\phi}{1-\tilde{C}-(a+t)}$. Total contraction in Y is, therefore, $dY = dY_1 + dY_2$ (see (3.49)). Thus, in the presence of the inflation target, the contraction in Y will be substantially larger.

The increase in P will also be many times more. From (3.44) and (3.46), we find that

$$dP = \left(P_\phi + P_{\bar{r}} \bar{r}_\phi\right)d\phi \qquad (3.50)$$

In the absence of the inflation target, increase in the inflation rate is given by the first term of the expression on the RHS of (3.50). In the presence of inflation target, P increase by the whole of the expression on the RHS of (3.50). We present our finding in the form of the following proposition:

Proposition 3.5: When government consumption expenditure is adjusted to meet the fiscal deficit target, the contraction in GDP and the increase in the market price of goods and services that take place following an exogenous increase in the rate of inflation become substantially larger in the presence of inflation targeting bringing about much greater suffering to the workers.

We will now focus on the case where the government adjusts the administered prices of essential inputs to meet its fiscal deficit target.

P_0 as the Instrument for Meeting the Fiscal Deficit Target in the Presence of the Inflation Target

We know that, when P_0 is used as the instrument for meeting the fiscal deficit target, equilibrium Y is given by (3.25) and the value of P, derived from (3.23), is given by (3.24). We also know that $\bar{r}$ is a determinant of P. Incorporating it in (3.23) and (3.24), we rewrite them respectively as (3.51) and (3.52)

$$P = \hat{P}\left(\bar{r}, \frac{PG}{Y}; \phi\right) \qquad (3.51)$$

$$P = \overline{P}\underset{+\ -\ +}{\left(\bar{r}, Y; \phi\right)} \quad \overline{P}_{\bar{r}} = \frac{\hat{P}_{\bar{r}}}{1-\hat{P}_{P_0}\frac{G}{Y}} > 0, \overline{P}_Y = \frac{-\hat{P}_{P_0}\frac{PG}{Y^2}}{1-\hat{P}_{P_0}\frac{G}{Y}} < 0, \overline{P}_\phi = \frac{\hat{P}_\phi}{1-\hat{P}_{P_0}\frac{G}{Y}} > 0 \qquad (3.52)$$

Note that $0 < \hat{P}_{P_0} < 1$ (by assumption). (G/Y) is also obviously less than unity.

Substituting (3.52) into (3.25), we rewrite it as

$$Y = \left[c_w . \left(\frac{Wl}{\overline{P}(Y, \bar{r}; \phi)} \right) + c_c . \left(1 - \frac{Wl}{\overline{P}(Y, \bar{r}; \phi)} \right) \right] Y + I(\bar{r}) + (1 - c_c) G - \overline{K} \equiv \tag{3.53}$$

$$\overline{C}\left(\overline{P}(Y, \bar{r}; \phi)\right) Y + I(\bar{r}) + (1 - c_c) G - \overline{K}$$

$$\hat{C} = \overline{C}\left(\overline{P}(Y, \bar{r}; \phi)\right) \equiv \left[c_w . \left(\frac{Wl}{\overline{P}(Y, \bar{r}; \phi)} \right) + c_c . \left(1 - \frac{Wl}{\overline{P}(Y, \bar{r}; \phi)} \right) \right] \tag{3.53i}$$

We also know that, under inflation targeting $\bar{r}$ is given by (3.43). Incorporating (3.52) into it, we rewrite it as

$$\bar{r} = \bar{r}\left(\underset{+}{\overline{P}}\left(\underset{+}{\bar{r}}, \underset{-}{Y}; \underset{+}{\phi} \right) \right) \tag{3.54}$$

To derive the impact of an exogenous increase in ϕ on *Y*, we take total differential of (3.53) treating all variables other than *Y*, ϕ and $\bar{r}$ as fixed and, then, solve for *dY*. This yields the following:

$$dY = \frac{\overline{C}' \overline{P}_\phi Y d\phi}{1 - \hat{C} - \overline{C}' \overline{P}_Y Y} + \frac{\left(\overline{C}' \overline{P}_{\bar{r}} Y + I' \right) d\bar{r}}{1 - \hat{C} - \overline{C}' \overline{P}_Y Y} \tag{3.55}$$

It is clear that in the absence of inflation targeting, $\bar{r}$ would have remained unchanged and following an exogenous increase in the rate of inflation, *Y* would have contracted by only the first term of the expression on the RHS of (3.55). However, in the presence of inflation targeting, *Y* contracts further by the second term of the expression on the RHS of (3.55). We shall elaborate on this point below:

Under inflation targeting, $\bar{r}$ is given by (3.54). Taking total differential of (3.54) and solving for $d\bar{r}$, we get

$$d\bar{r} = \frac{\bar{r}_P \left(\overline{P}_\phi d\phi + \overline{P}_Y dY \right)}{1 - \bar{r}_P \overline{P}_{\bar{r}}} \equiv R_\phi d\phi + R_Y dY \quad R_\phi \equiv \frac{\bar{r}_P \overline{P}_\phi}{1 - \bar{r}_P \overline{P}_{\bar{r}}} > 0, R_Y \equiv \frac{\bar{r}_P \overline{P}_Y}{1 - \bar{r}_P \overline{P}_{\bar{r}}} < 0 \tag{3.56}$$

Let us explain the expression on the RHS of (3.56). The numerator gives the excess of the desired value of $\bar{r}$ over the initial value of $\bar{r}$ following the increase in *P* due to the increase in ϕ and decline in *Y* by $d\phi$ and dY respectively. The central bank will, therefore, raise $\bar{r}$ from its initial value to its desired value. However, per unit increase in $\bar{r}$, the value of *P* rises by $\overline{P}_{\bar{r}}$, which in turn raises the desired value of *r* by $\bar{r}_P \overline{P}_{\bar{r}}$. Hence, per unit increase in $\bar{r}$, the excess of the desired value of $\bar{r}$ and the initial $\bar{r}$ falls by $\left(1 - \bar{r}_P \overline{P}_{\bar{r}}\right)$, which we assume to be positive and less than unity. Otherwise, no solution will exist. Therefore, to remove the excess of the desired $\bar{r}$ and the initial $\bar{r}$, $\bar{r}$ has to be raised by the expression on the RHS of (3.56). Substituting (3.56) into (3.55) and solving for *dY*, we get

$$dY = \frac{\left[\overline{C}' \overline{P}_\phi Y + \left(\overline{C}' \overline{P}_{\bar{r}} Y + I' \right) R_\phi \right] d\phi}{1 - \overline{C} - \overline{C}' \overline{P}_Y Y - \left(\overline{C}' \overline{P}_{\bar{r}} Y + I' \right) R_Y} < 0 \tag{3.57}$$

We shall now explain (3.57) and in the process show how the contraction in *Y* that occurs following an exogenous increase in ϕ gets magnified manifold in the presence of an inflation target.

Let us delineate how the contraction of *Y* occurs following the exogenous increase in ϕ. At the initial equilibrium *Y* and $\bar{r}$, there takes place, vide (3.52), a cumulative increase in *P* and P_0 and, finally, *P* rises by $\bar{P}_\phi d\phi$ (see (3.24) and (3.24i)). However, $\bar{r}$ does not remain unaffected. The increase in *P* by $\bar{P}_\phi d\phi$ induces an increase in $\bar{r}$, which engenders further increase in *P* and P_0. Thus, a cumulative increase in $\bar{r}$ takes place. Finally, $\bar{r}$ rises by $R_\phi d\phi$ at the initial equilibrium *Y*. This increase in $\bar{r}$ raises *P* by $\bar{P}_{\bar{r}} R_\phi d\phi$. Thus, the total increase in *P* that occurs at the initial equilibrium *Y* is $\left(\bar{P}_\phi + \bar{P}_{\bar{r}} R_\phi\right)d\phi$. This increase in $\bar{r}$ and *P* will reduce demand by $\bar{C}'\left(\bar{P}_\phi Y + \bar{P}_{\bar{r}} Y R_\phi\right)d\phi + I' R_\phi d\phi$ at the initial equilibrium *Y*. With $\bar{r}$ remaining fixed at its higher value, *Y* will fall by

$$dY_1 = \frac{\bar{C}'\bar{P}_\phi Y d\phi}{1-\hat{C}-\bar{C}'\bar{P}_Y Y} + \frac{\left(\bar{C}'\bar{P}_{\bar{r}} Y + I'\right)R_\phi d\phi}{1-\hat{C}-\bar{C}'\bar{P}_Y Y} \qquad (3.58)$$

(3.58) gives the contraction in *Y* that takes place in the first round. In the absence of the inflation target, total decrease in *Y* would have been given by the first term of the expression on the RHS of (3.58) (see (3.26)). We denote it by dY_{1F} and the second term by dY_{1R} and the increase in *P* in the absence of inflation targeting would have been only $\bar{P}_\phi d\phi + \bar{P}_Y dY_{1F}$.

In the first round, $\bar{r}$ and *P* go up by (3.59) and (3.60), respectively:

$$d\bar{r}_1 = R_\phi d\phi \qquad (3.59)$$

$$dP_1 = \left(\bar{P}_\phi + \bar{P}_{\bar{r}} R_\phi\right)d\phi + \bar{P}_Y dY_1 \qquad \text{(see (3.52))} \qquad (3.60)$$

As *Y* contracts, fiscal deficit rises above its target and induces an increase in P_0 and, thereby, in *P* by $\bar{P}_Y dY_1$ (see (3.52)). This will prompt the central bank to raise $\bar{r}$ by $R_Y dY_1$ (see (3.56)), which, in turn, raises *P* by $\bar{P}_{\bar{r}} R_Y dY_1$. The increase in *P* and *r* lower aggregate demand by $\left[\bar{C}'\left(\bar{P}_{\bar{r}} Y R_Y\right) + I' R_Y\right]dY_1$. This leads to further contraction in *Y* in the second round by

$$dY_2 = \frac{\left[\bar{C}'\left(\bar{P}_{\bar{r}} Y R_Y\right) + I' R_Y\right]dY_1}{1-\hat{C}-\bar{C}'\bar{P}_Y Y} \qquad (3.61)$$

In the second round, the increases in *r* and *P* are given by

$$dr_2 = R_Y dY_1 \qquad (3.62)$$

and

$$dP_2 = \bar{P}_{\bar{r}} R_Y dY_1 + \bar{P}_Y dY_2 \qquad (3.63)$$

The increase in *P* by $\bar{P}_Y dY_2$ in the second round will induce a further increase in $\bar{r}$ by

$$dr_3 = R_Y dY_2 \qquad (3.64)$$

This will prompt the producers to raise *P* by $\bar{P}_{\bar{r}} R_Y dY_2$. These increases in *r* and *P*, as in the second round, will lower *Y* in the third round by

$$dY_3 = \frac{\left[\bar{C}'\left(\bar{P}_{\bar{r}} Y R_Y\right) + I' R_Y\right]dY_2}{1-\hat{C}-\bar{C}'\bar{P}_Y Y} = \left(\frac{\left[\bar{C}'\left(\bar{P}_{\bar{r}} Y R_Y\right) + I' R_Y\right]}{1-\bar{C}-\bar{C}'\bar{P}_Y Y}\right)^2 dY_1 \qquad (3.65)$$

The increase in *P* at the end of the third round is given by

$$dP_3 = \bar{P}_{\bar{r}} R_Y dY_2 + \bar{P}_Y dY_3 \qquad (3.66)$$

This process of contraction will continue until the fall in aggregate demand that takes place in each successive round eventually falls to zero. Thus, the total decline in Y is given by (upon substituting the value of dY_1 given by (3.58))

$$dY = dY_1 + \frac{\left[\overline{C}'\left(\overline{P}_{\bar{r}} YR_Y\right) + I'R_Y\right]}{1-\hat{C}-\overline{C}'\overline{P}_Y Y} dY_1 + \left(\frac{\left[\overline{C}'\left(\overline{P}_{\bar{r}} YR_Y\right) + I'R_Y\right]}{1-\hat{C}-\overline{C}'\overline{P}_Y Y}\right)^2 dY_1 + \ldots\ldots\ldots = \frac{\left[\overline{C}'\left(\overline{P}_{\phi} + \overline{P}_{\bar{r}} R_{\phi}\right)Y + I'R_{\phi}\right]d\phi}{1-\hat{C}-\overline{C}'\overline{P}_Y Y - \left[\overline{C}'\left(\overline{P}_{\bar{r}} YR_Y\right) + I'R_Y\right]} \quad (3.67)$$

The total increase in P is given by

$$dP = \left(P_{\phi} + P_{\bar{r}} R_{\phi}\right)d\phi + \left(\overline{P}_{\bar{r}} R_Y + \overline{P}_Y\right)dY_1 + \left(\overline{P}_{\bar{r}} R_Y + \overline{P}_Y\right)dY_2 + \left(\overline{P}_{\bar{r}} R_Y + \overline{P}_Y\right)dY_3 + \ldots\ldots\ldots = \left(P_{\phi} + P_{\bar{r}} R_{\phi}\right)d\phi + \left(\overline{P}_{\bar{r}} R_Y + \overline{P}_Y\right)dY \quad (3.68)$$

It is clear that (3.67) tallies with (3.57).

From the above it is clear that inflation target increases manifold both the contraction in Y and the rise in the price level following an exogenous increase in the inflation rate, when P_0 is adjusted to meet the fiscal deficit target. The above discussion yields the following proposition:

Proposition 3.6: When administered prices of essential inputs are adjusted to meet the fiscal deficit target, inflation targeting increases manifold both the contraction in Y and the rise in the price level that take place following an exogenous increase in the inflation rate. It, therefore, substantially magnifies the deterioration in the economic conditions of the workers that an exogenous increase in the inflation rate brings about.

Following the line chalked out above, one can easily show that the result summarized in Proposition 3.6 will hold when indirect tax rates, instead of the administered prices of essential inputs, are adjusted to meet the fiscal deficit target.

3.5 Conclusion

The paper develops a model suitable for India to identify the costs of inflation and to examine how these costs are affected in the presence of fiscal deficit target and inflation target. Normally, Government of India uses its own consumption expenditure, administered prices of essential inputs and indirect tax rates to meet its fiscal deficit target. Under inflation targeting, when inflation rate rises above its target level, the central bank raises interest rates to bring inflation rate down. This chapter shows that, when the government and the central bank behave the way mentioned above, both fiscal deficit target and inflation target magnify manifold the costs that an exogenous increase in the inflation rate inflicts on the society. These costs are principally borne by the workers.

Fiscal deficit leads to an increase in government's debt service charges in future. This is considered bad by neoclassical economics. This view of fiscal deficit has to be subjected to close scrutiny. Moreover, the instruments that the government uses in India to keep the fiscal deficit under control, as we have shown here, magnifies manifold the adverse effects of an

exogenous increase in the inflation rate. This chapter also shows that hiking interest rates to control inflation may reinforce inflationary forces and make the adverse effects of inflation much more pronounced. Given all these findings and observations, it is important to carefully study the following. First, whether a cap on fiscal deficit is warranted or not? Second, what is the best way of keeping the fiscal deficit under control, if such control is found to be necessary? Third, how the policy makers should keep inflation under control? We will take up these issues in our future research programme.

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Appendix 3

3.A.1 Stability of the equilibrium value of *e*

The equilibrium value of *e* is given by (3.6) in the text. By assumption, adjustment in *e* is instantaneous, while that in *Y* is sluggish. The adjustment rule for *e* is given by

$$\frac{de}{dt} = -a.B(e,Y;\phi) \qquad a > 0 \qquad (3.a.1)$$

Linearizing around the equilibrium value of *e*, which we denote by $\bar{e}$, treating *Y* and ϕ as fixed, we get

$$\frac{d\tilde{e}_t}{dt} = -a.B_e\tilde{e}_t \qquad \tilde{e}_t = e_t - \bar{e} \qquad (3.a.2)$$

From (3.a.2) it is clear that the equilibrium value of *e* is stable iff

$$B_e > 0 \qquad (3.a.3)$$

3.A.2 Stability of the Equilibrium Value of *Y*

Equilibrium value of *Y*, which we denote by $\bar{Y}$, is given by (3.9) in the text. The adjustment rule for *Y* is given by

$$\frac{dY}{dt} = b.\left[\bar{E}(Y,\phi) - Y\right] \qquad b > 0 \qquad (3.a.4)$$

Linearizing (3.a.4) around the equilibrium value of *Y* treating ϕ as fixed, we get

$$\frac{d\tilde{Y}_t}{dt} = b.\left(\bar{E}_Y - 1\right)\tilde{Y}_t \qquad \tilde{Y}_t = Y_t - \bar{Y} \qquad (3.a.5)$$

From (3.a.5) it is clear that the equilibrium value of *Y* is stable iff

$$\bar{E}_Y < 1 \qquad (3.a.6)$$

Table 3.1

Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 US dollars

	1981	82	83	84	85	86	87	88	89	90
China	5.2	9.0	10.8	15.2	13.6	8.9	11.7	11.3	4.2	3.9
France	1.1	2.5	1.3	1.5	1.6	2.4	2.6	4.7	4.4	2.9
Germany	0.5	-0.4	1.6	2.8	2.3	2.3	1.4	3.7	3.9	5.3
Greece	-1.6	-1.1	-1.1	2.0	2.5	0.5	-2.3	4.3	3.8	0.0
Ireland	3.3	2.3	-0.2	4.4	3.1	-0.4	4.7	5.2	5.8	8.5
Italy	0.8	0.4	1.2	3.2	2.8	2.9	3.2	4.2	3.4	2.0
Japan	4.2	3.4	3.1	4.5	6.3	2.8	4.1	7.1	5.4	5.6
Spain	-0.1	1.2	1.8	1.8	2.3	3.3	5.5	5.1	4.8	3.8
UK	-0.8	2.1	4.2	2.3	3.5	3.2	5.5	5.9	2.5	0.5
USA	2.6	-1.9	4.6	7.3	4.2	3.5	3.5	4.2	3.7	1.9

	1991	92	93	94	95	96	97	98	99	2000
China	9.3	14.3	13.9	13.1	11.0	9.9	9.2	7.9	7.6	8.4
France	1.0	1.6	-0.6	2.3	2.1	1.4	2.3	3.6	3.4	3.9
Germany	5.1	1.9	-1.0	2.5	1.7	0.8	1.8	2.0	2.0	3.0
Greece	3.1	0.7	-1.6	2.0	2.1	2.9	4.5	3.2	3.1	4.2
Ireland	1.9	3.3	2.7	5.8	9.6	9.3	11.2	8.9	10.8	10.2
Italy	1.5	0.8	-0.9	2.2	2.0	1.3	1.8	1.6	3.7	1.8
Japan	3.3	0.8	0.2	0.9	1.9	2.6	1.6	-2.0	-0.2	2.3
Portugal	4.4	1.1	-2.0	1.0	4.3	3.5	4.4	4.8	3.9	3.8
Spain	2.5	0.9	-1.0	2.4	2.8	2.7	3.7	4.3	4.5	5.3
UK	-1.2	0.4	2.6	4.0	4.9	2.7	3.1	3.4	3.1	3.8
USA	-0.1	3.6	2.7	4.0	2.7	3.58	4.5	4.4	4.7	4.1

	2001	02	03	04	05	06	07	08	09	10
China	8.3	9.1	10.6	10.1	11.4	12.7	14.2	9.6	9.2	10.6
France	2.0	1.1	0.8	2.8	1.6	2.4	2.4	0.2	-2.9	2.0

Germany	1.7	0.0	-0.7	1.2	0.7	3.7	3.3	1.1	-5.6	4.1
Greece	3.8	3.9	5.8	5.9	3.8	3.9	5.8	5.1	0.6	5.7
Ireland	5.8	5.9	3.8	4.4	6.3	6.3	5.5	-2.2	-5.6	0.4
Italy	1.8	0.3	0.2	1.6	0.9	2.0	1.5	-1.0	-5.5	1.7
Japan	0.4	0.3	1.7	2.4	1.3	1.7	2.2	-1.0	-5.5	4.7
Portugal	1.9	0.8	-0.9	1.8	0.8	1.6	2.5	0.2	-3.0	1.9
Spain	4.0	2.9	3.2	3.2	3.7	4.2	3.8	1.1	-3.6	0.0
UK	2.8	2.5	3.3	2.5	3.0	2.7	2.6	-0.5	-4.2	1.5
USA	1.0	1.8	2.8	3.8	3.3	2.7	1.8	-0.3	-2.8	2.5

	2011	12	13	14	15
China	9.5	7.8	7.7	7.3	
France	2.1	0.2	0.7	0.2	
Germany	3.7	0.4	0.3	1.6	
Greece	-9.1	-7.3	-3.2	0.7	
Ireland	2.6	0.2	1.4	5.2	
Italy	0.6	-2.8	-1.7	-0.4	
Japan	-0.5	1.8	1.6	-0.1	
KoreaRep (South)	3.7	2.3	2.9	3.3	
Malaysia	5.3	5.5	4.7	6.0	
Portugal	-1.8	-4.0	-1.1	0.9	
Spain	-1.0	-2.6	-1.7	1.4	
Thailand	0.8	7.3	2.8	0.9	
UK	2.0	1.2	2.2	2.9	
USA	1.6	2.3	2.2	2.4	

Source: World Bank

Table 3. 2

Interest Rates and Growth Rates in the US

Year	**R[1]**	Y^2
1994	7.15	4.0

1995	8.83	2.7
1996	8.27	3.8
1997	8.44	4.5
1998	8.35	4.5
1999	8.00	4.7
2000	9.23	4.1
2001	6.91	1.0
2002	4.67	1.8
2003	4.12	2.8
2004	4.34	3.8
2005	6.19	3.3
2006	7.96	2.7
2007	8.05	1.8
2008	5.09	-0.3
2009	3.25	-2.8
2010	3.25	2.5
2011	3.25	1.6
2012	3.25	2.2
2013	3.25	1.5

[1]Average majority prime rate charged by banks on short-term loans to business, [2]Percentage increase in Real GDP from the previous year

Source: Data on interest rates have been taken from the Board of Governors of the Federal Reserve System

Table 3.3

Average Growth Rate of Real GDP and Average Interest Rates in the US Economy

Year	Average Growth Rate[1]	Average Prime Lending Rates of Banks	Average Interest Rates on 30-Year Mortgage Contracts
1994-2000	4.04	8.32	7.73
2001-2007	2.5	6.03	6.25
2008-2013	0.8	4.27	4.64

[1]Simple arithmetic mean of the year-on-year growth rates of GDP

Source: Computed from the data given in Table 4

Table 3.4

India's Growth Rate of GDP, Net FDI, Foreign Portfolio Investment, Government Consumption and Gross Fiscal Deficit (GFD)

Year	Growth Rate of GDP At Factor Cost (At constant prices Base 2004-05)	Net FDI (US $ Million)	Net Portfolio Investment (US $ Million)	Total (US $ Million)	Government Consumption (in Rs bn)	GFD[1] (% of GDP)	Rate Of GDCF[2]	Rate Of NDCF
2000-01	5.3	3270	2590	5860	3247.27	5.65	24.6	16.7
2001-02	5.5	4734	1952	6686	3323.69	6.19	24.6	16.5
2002-03	5.0	3157	944	4101	3317.53	5.91	25.4	17.3

2003-04	8.1	2388	11377	13765	3409.62	5.48	27.3	19.5
2004-05	7.0	3712	9291	13003	3545.18	3.88	32.8	25.5
2005-06	9.5	3033	12492	15525	3860.07	3.96	34.9	27.8
2006-07	9.6	7693	6947	14640	4005.79	3.38	36.2	29.2
2007-08	9.6	15891	27434	43325	4389.19	2.54	39.0	32.2
2008-09	6.7	22343	-14032	8311	4845.59	5.99	35.6	27.9
2009-10	8.4	17965	32396	50361	5517.02	6.48	38.4	30.9
2010-11	8.4	11305	30292	41597	5843.52	5.87	39.8	32.5
2011-12	6.5	22006	17171	39177	6345.59	5.89	38.8	31.1
2012-13	4.5	19819	26891	46710	6620.33	5.06	38.9	30.9
2013-14	4.7	21564	4822	26386	6873.89	4.85		

Source: RBI [1]Gross fiscal deficit, [2]Gross domestic capital formation

Table 3.5

Exchange Rate of the Indian Rupee vis-a-vis the US Dollar (Monthly average)

Year/ Month	US $ Average	Year/ Month	US $ Average	Year/ Month	US $ Average	Year/ Month	US $ Average
2008		Oct	46.7211	Jul	44.4174	Apr	54.4971
Jan	39.3737	Nov	46.5673	Aug	45.2788	May	55.1156
Feb	39.7326	Dec	46.6288	Sep	47.6320	Jun	58.5059
Mar	40.3561	2010		Oct	49.2579	Jul	60.0412
Apr	40.0224	Jan	45.9598	Nov	50.8564	Aug	64.5517
May	42.1250	Feb	46.3279	Dec	52.6769	Sep	64.3885
June	42.8202	Mar	45.4965	2012		Oct	61.7563
Jul	42.8380	Apr	44.4995	Jan	51.3992	Nov	62.7221

Aug	42.9374	May	45.8115	Feb	49.1671	Dec	61.7793
Sep	45.5635	June	46.5670	Mar	50.3213	2014	
Oct	48.6555	Jul	46.8373	Apr	51.8029	Jan	62.1708
Nov	48.9994	Aug	46.5679	May	54.4735	Feb	62.3136
Dec	48.6345	Sep	46.0616	June	56.0302	Mar	61.0021
2009		Oct	46.7211	Jul	55.4948	Apr	60.3813
Jan	48.8338	Nov	46.5673	Aug	48.3350	May	59.3255
Feb	49.2611	Dec	46.6288	Sep	54.3353	June	59.7143
Mar	51.2287	2011		Oct	52.8917	Jul	60.0263
Apr	50.0619	Jan	45.3934	Nov	54.6845	Aug	60.9923
May	48.5330	Feb	45.4358	Dec	54.6439		
June	47.7714	Mar	44.9914	2013			
Jul	48.4783	Apr	44.3700	Jan	54.3084		
Aug	48.3350	May	44.9045	Feb	53.7265		
Sep	48.4389	June	44.8536	Mar	54.5754		

Source: RBI

Table 3.6

Commodity Composition of India's Imports

Percentage Share

Commodity Group	2000-01	2010-11	2011-12
Food and Allied Products	**3.3**	**2.9**	**3.1**
Fuel of which	**33.5**	**30.9**	**37.4**

POL	31.3	28.7	31.7
Fertilizer	**1.3**	**1.9**	**2.4**
Capital Goods	**10.5**	**13.6**	**14.1**
Others of which	**52.5**	**49.6**	**49.0**
Chemicals	5.9	5.2	5.1
Pearls, precious, semi-precious stones	9.7	9.3	6.1
Gold and Silver	9.3	11.5	12.6
Electronic Goods	7.0	7.1	7.1

Source: Economic Survey 2012-13

Table 3.7

Composition of India's External Debt (As percentage of total external debt)

	Government(Sovereign) External Debt	**Other External Debt**	**Total External Debt As percentage of Gross National Income**	
End September 2012	**22.3**	**77.7**		
2012			**20.8**	

Source: Economic Survey 2012-13

Chapter 4

The Appropriate Oil Price Policy for India – A Macro-Theoretic Study

Abstract

Since rationing of a scarce good through price rise is the cruellest and most unjust form of rationing, this chapter suggests that the price of oil in India should be administered by the government at appropriately low levels so that the poor can secure the basic necessities of life in adequate quantities and the subsidy should be financed by taxing the rich, who have the ability to pay and make all the non-essential uses of oil. The paper shows that, when the government follows the rationing scheme mentioned above, an increase in the world price of oil will leave the real wage rate and the levels of aggregate output and employment unaffected insulating the workers from the ill effects of a rise in the world price of oil. In contrast, an increase in the world price of oil under free market conditions will lower the real wage rate and very much likely to bring about a substantial contraction in aggregate output and employment much to the misery of the poor. Similar result will obtain even in the administered price regime if the subsidy is financed by means of indirect taxation.

4.1 Introduction

To motivate the study undertaken in this chapter, we have to delineate briefly the main features of the oil pricing strategy followed over decades in India. India followed the system of administered pricing mechanism (APM) in case of several major petroleum products following the recommendations of the Oil Pricing Committee (OPC) that became effective since July 1975. Under this mechanism, prices of petroleum and petroleum products were administered much below their respective world prices. The rationale behind this strategy was simple. India depended on import of crude oil to meet more than 77% of its petroleum requirements. It was therefore exposed to the volatilities in the international prices of crude and petroleum products over which it had no control. A hike in the prices of petroleum and petroleum products produces severe adverse effects on all the major sectors like agriculture, transportation etc. It fuels food inflation and inflation in the prices of all other basic necessities of life, which sends shock waves to the common man who was desperately trying to make his both ends meet. APM ensured stable and low prices and insulated India from fluctuations in the international price of oil. The government imposed regulatory controls to prevent leakage of oil which is a scarce

productive resource into non-essential uses. The rationale behind the APM was then consistent with the plan objectives of self-reliance and providing the masses with the basic necessities of life at low or negligible prices.

However, in the post-reform period, various committees appointed by the government for policy recommendations for restructuring the oil industry suggested that APM is unsuitable for long term growth and efficiency of oil industry. They recommended that all sorts of control over domestic price of oil should be withdrawn so that domestic oil price becomes more or less the same as the world price of oil. The argument behind these recommendations is summed up clearly in the following quotation from Government of India (2012-13): *"The government appreciates the economic role of rational energy pricing. Rational energy prices provide the right signals to both the producers and consumers and lead to a demand-supply match, providing incentives for reducing consumption on the one hand and stimulating production on the other. Aligning domestic energy prices with the global prices, especially when large imports are involved, may be ideal option as misalignment could pose both micro- and macro-economic problems. At microeconomic level, underpricing of energy to the consumer not only reduces the incentive for being energy efficient, it also creates fiscal imbalances. Leakages and inappropriate use may be the other implications. Underpricing to the producer reduces both his incentive and ability to invest in the sector and increases reliance on imports. Over the years, India's energy prices have become misaligned and are now much lower than global prices for many products. The extent of misalignment is substantial, leading to large untargeted subsidies."*

So from 2013, the APM was dismantled and it was decided that the prices of major petroleum products would be market determined. One major reason, as we have seen above, is to give the consumers the signal that oil is a scarce good and they should economize on its use. However, rationing the use of an essential good such as oil through price-rise is the cruellest and most unjust form of rationing. The brunt of such rationing is borne by the poor, who are thrown out of the market. To establish a just system of rationing, the government should administer the price of oil at appropriately low levels to make sure that the poor are able to secure the basic necessities of life in adequate quantities and finance the subsidy by taxing the rich, who are the only ones that make non-essential uses of oil and they do so on a very substantial scale. Under this scheme, firms receive the market price; consumers pay a low price and the brunt of rationing justifiably falls on the rich who make all the non-essential uses of oil.

In this paper, we have developed a macro model suitable for India to examine how a hike in the world price of oil affects the economic condition of the poor and aggregate output and employment when domestic price of oil is market determined so that it equals the world price

of oil. We have carried out the same exercise for the case where the government follows the just rationing scheme mentioned above. The paper also examines how a hike in the world oil price affects the lot of the poor and aggregate output and employment when the government administers the price of oil at appropriately low levels and finances the subsidy by levying indirect taxes on essential products. We consider this mode of financing since indirect taxation of essential goods of late has become a favourite instrument of tax collection in India (see Ghosh and Ghosh (2019), Chapter 5).

Our endeavour is worthwhile because in the literature on oil pricing policy there does not exist any theoretical study that has undertaken the tasks mentioned above. Hence, the paper fills up an important gap in the literature. In fact, some empirical studies have found evidences of growth rate falling and the rate of inflation rising following decontrol of oil prices much to the misery of the poor (see, for example, Bhanumurthy, Das & Bose (2012)). This result corroborates a major finding of our paper.

4.2 The Model

We use here a model similar to those developed in Chapters 2 and 3. Here, we have modified the models developed in Chapters 2 and 3 appropriately to suit our purpose. We examine the effects of hikes in the world price of oil in two different regimes: In one, the government administers or fixes the domestic price of oil so that it becomes independent of the world price of oil. In the other, the domestic price of oil is the same as the world price of oil. We compare the effects in these two regimes to assess which one is better for India. The model consists of a real sector and a financial sector. We consider the real sector first.

The Real Sector

Following the Keynesian tradition, we assume that aggregate output is demand determined. We shall now identify the major determinants of aggregate demand. Let us start with aggregate personal consumption demand. There are two classes of consumers: workers and capitalists. We shall first compute the incomes of these two classes of people. To produce 1 unit of Y, l amount of labor is required. w is the money wage rate. So, total wage income for producing Y units of output is wlY. The workers are net lenders. Their total outstanding loan at the beginning of the period is denoted by D. The average interest rate at which the loans were given is denoted by r_0. Total interest income of the workers in the given period is Dr_0. Total real income of the workers, denoted byY_w, is given by $\frac{wlY}{P} + \frac{Dr_0}{P}$ where P is the domestic price level.

Total real income of the capitalists (Y_c) is, therefore, given by $Y - \frac{wlY}{P} - \frac{Dr_0}{P}$. For simplicity, we ignore for the present government expenditure and taxes. Aggregate output is, accordingly, given by

$$Y = c_w \left[\frac{wlY}{P} + \frac{Dr_0}{P}\right] + c_c \left[Y - \frac{wlY}{P} - \frac{Dr_0}{P}\right] + I(r,e) + X\left[\frac{P_n^* \cdot e}{P}\right] - m.\frac{P_o^* e}{P} Y - M_n\left[\frac{P_n^* \cdot e}{P}, c_c \left[Y - \frac{wlY}{P} - \frac{Dr_0}{P}\right], I(r,e)\right] \quad (4.1)$$

In equation (4.1), Y is NDP; I is net investment; r is the interest rate; P_o^* and P_n^* denote the prices of oil import and non-oil import, respectively, in foreign currency; e is the exchange rate; X is total exports and $M_o \equiv m\frac{P_o^* e}{P} Y$ and M_n are oil and non-oil imports, respectively. They are expressed in terms of domestic goods. $\frac{P_n^* \cdot e}{P}$ and $\frac{P_o^* \cdot e}{P}$ are, respectively, prices of non-oil imports and oil imports in terms of domestic goods. India, being a small open economy, cannot influence the prices of foreign goods prevailing in the world market and so P_o^* and P_n^* are assumed to be given. c_w and c_c are the fixed average and marginal consumption propensities of the workers and capitalists, respectively. It is standard to assume that $0 < c_c < c_w < 1$. Let us now explain the investment function. Investment in India depends not only on the interest rate but also on the nominal exchange rate, e. The reasons are the following. Imported capital goods constitute an essential and important ingredient of investment in India. (To illustrate with an example, consider the import intensity of studying economics in India. Almost all the text books are imported, almost all the journals we refer to are foreign, all the computers and software we use are imported. Thus, to set up a college or a university or any other facility in India, almost all the knowledge inputs such as books, journals etc. and all the high-tech products have to be imported.) Following an increase in the exchange rate, ceteris paribus, prices of foreign capital goods go up in domestic currency, cost of investment rises, which, given investors' expectations, lowers investment. Imported intermediate inputs constitute an essential and major ingredient of production in India. An increase in the exchange rate, therefore, generates a strong cost push. Large firms in India also have large stocks of external debt. An increase in the exchange rate raises external debt service charges in domestic currency. All these adverse supply shocks dampen investor morale and lowers investment. Data on exchange rates, growth rates and capital formation given in Tables 4.2 and 4.1 show that in all the years of recession (2011-12 – 2013-14) exchange rate increased substantially indicating a strong inverse relationship between the exchange rate, rate of capital formation and growth rate in India. For a more elaborate explanation of the reasons for the incorporation of e in the investment function and supportive empirical evidences, one may go through Ghosh and Ghosh (2016).

We have not considered government expenditure and taxes, as they are not relevant for our present purpose.

Let us now explain the export and import functions. India principally exports non-oil goods. Hence, exports are an increasing function of $\frac{P_n^* e}{P}$. We have not considered explicitly the NDP of the rest of the world as a determinant of export for simplicity. We assume for simplicity that oil is used only as an intermediate input in production and a fixed m amount of imported oil is required per unit of *Y*. Hence, $m.\frac{P_o^* e}{P} Y$ gives the value of oil import in terms of domestic goods. Both C and I represent domestic agents' demand for both domestic and foreign goods. Hence, demand for non-oil imports is made an increasing function of both C and I. How C and I will be allocated between domestic non-oil goods and foreign non-oil goods is determined by $\frac{P_n^* e}{P}$. Hence, non-oil import is made a decreasing function of $\frac{P_n^* e}{P}$. For simplicity we have assumed that the government does not use any non-oil imported goods nor do workers consume non-oil imported goods.

We assume, a la Klecki (1954), that the domestic price level is set by applying a fixed mark-up to the average variable cost of production given in the present model by $wl + P_o^* em$. However, for analytical simplicity and without any loss of generality, we shall omit the average wage cost and assume that

$$P = \theta P_o^* em\ ; \qquad \theta > 1 \tag{4.2}$$

In (4.2), θ is the fixed mark-up. The omission of the average wage cost will not affect our results qualitatively, but will save us a lot of analytical complications.

Our specification of the real sector is complete. We now turn to the financial sector.

The Financial Sector

Interest rate is determined in the financial sector. In India, the Reserve Bank of India (RBI) employs different means such as the liquidity adjustment facility, open market operations etc. to keep the interest rate at a target level. We shall therefore regard *r* as a policy variable of the RBI and take it as given. Thus,

$$r = \overline{r} \tag{4.3}$$

We shall now explain how the exchange rate is determined.

Foreign Currency Market

We shall now focus on the foreign currency market where e is determined. In India, the exchange rate is best regarded as flexible. There are wide variations in the exchange rate every

year (see Table 4.2). Let us now turn to the determination of e. The BOP consists of trade surplus and net inflow of foreign capital. We ignore the latter for simplicity as it is of little relevance in the present context. The BOP equilibrium condition is given by

$$X\left[\frac{P_n{}^*\mathrm{e}}{P}\right] - \frac{P_o^* e}{P} mY - M_n\left[\frac{P_n{}^*\mathrm{e}}{P}, c_c.\left[Y - \frac{wlY}{P} - \frac{Dr_0}{P}\right], I(r,e)\right] = 0 \quad (4.4)$$

We rewrite the BOP equilibrium condition, incorporating (4.2) and (4.3) into it, as

$$X\left[\frac{P_n{}^*}{\theta P_o^* m}\right] - \frac{1}{\theta}Y - M_n\left[\frac{P_n{}^*}{\theta P_o^* m}, c_c.\left[Y - \frac{wlY}{\theta P_o^* em} - \frac{Dr_0}{\theta P_o^* em}\right], I(\bar{r},e)\right] = 0 \quad (4.4a)$$

From (4.4a) we find that the balance of payments denoted *B,* given by the LHS of (4.4a), is a function of *Y, e* and the exogenous variables such as P_o^*etc. We do not consider other exogenous variables explicitly, as they are not relevant for our purpose.

We can, therefore, rewrite equation (4.4a) as

$$B(e, Y; P_o^*) = 0 \quad (4.5)$$

$$B_Y = -\frac{1}{\theta} - M_{nc}c_c\left(1 - \frac{wl}{\theta P_o^* em}\right) < 0 \quad (4.5i)$$

In (4.5i), M_{nc} denotes partial derivative of the non-oil import function with respect to capitalists' consumption. Clearly, this is positive, as a unit increase in capitalists' consumption demand raises capitalists' consumption demand for imported consumption goods also.

$B_e = M_{nI}(-I_e) - M_{nc}c_c\frac{wlY+Dr_0}{[\theta P_o^* me^2]} > 0$ (for reasons of stability (see Appendix 4) (4.5ii)

In (4.5ii), M_{nI} denotes partial derivative of the non-oil import function with respect to investment. It is clearly positive since $I_e < 0$. Thus, following a ceteris paribus increase in the exchange rate, net export rises on account of the fall in import brought about by the reduction in investment. However, following the ceteris paribus rise in e, domestic price level rises raising capitalists' real income. Hence, their consumption demand for imported goods rises and it rises by $M_{nc}c_c\frac{wlY+Dr_0}{[\theta P_o^* me^2]}$ lowering net export. However, for reasons of stability, net export is assumed to rise with a ceteris paribus increase in e. This is quite plausible since c_c is likely to be quite small, while investment in India is highly import intensive for reasons we have already explained.

$$B_{P_o^*} = -\left[X_{p_n} + \left(-M_{np_n}\right)\right]\frac{P_n^*}{\theta m(P_o^*)^2} - M_{nc}C_c\frac{wlY+Dr_0}{\theta meP_o^{*2}} \ll 0\ p_n \equiv \frac{P_n^* e}{P} \quad (4.5iii)$$

Let us explain (4.5iii). Following an increase in P_0^*, domestic prices go up. Since close substitutes of Indian goods are available everywhere, it will bring about a large fall in Indian

exports and a substantial increase in India's non-oil imports. The rise in the domestic price level will also redistribute income in favour of the capitalists bringing about an increase in capitalists' demand for imported consumption goods. Value of oil import in terms of domestic goods will stay unaffected as world oil price and domestic price level increase in the same proportion. Thus, an increase in the world price of oil ceteris paribus will lower India's net export on a very substantial scale.

Putting (4.2), (4.3) and (4.4) into (4.1), we rewrite it as

$$Y = c_w.\left[\frac{wlY+Dr_0}{\theta P_o^* em}\right] + c_c.\left[Y - \frac{wlY+Dr_0}{\theta P_o^* em}\right] + I(\bar{r}, e) \equiv E(Y, e; P_o^*) \tag{4.6}$$

$$0 < E_Y = c_w.\left(\frac{wl}{\theta P_o^* em}\right) + c_c.\left(1 - \frac{wl}{\theta P_o^* em}\right) < 1; \frac{wl}{\theta P_o^* em} < 1 \tag{4.6i}$$

$$E_e = -(c_w - c_c)\left(\frac{wlY+Dr_0}{(\theta P_o^* em)^2}\right)\theta P_o^* m - (-I_e) < 0 \tag{4.6ii}$$

$$E_{P_o^*} = -(c_w - c_c)\left(\frac{wlY+Dr_0}{(\theta P_o^* em)^2}\right)\theta em < 0 \tag{4.6iii}$$

The specification of our model is now complete. It contains two key equations (4.5) and (4.6) in two endogenous variable *e* and *Y*. We can solve (4.5) and (4.6) for their equilibrium values.

4.3 The Effect of an Increase in the World Price of Oil under Free Market Conditions

We shall examine here how an increase in P_o^* **affects** Y, e and the price level. Taking total differential of (4.5) treating all variables other than Y, e and P_o^* as fixed and, then, solving for de, we get

$$de = \frac{-\left[B_Y dY + B_{P_o^*} dP_o^*\right]}{B_e} \gg 0 \text{ when } dY > 0 \text{ and } dP_0^* > 0 \tag{4.7}$$

Taking total differential of (4.6) treating all variables other than Y, e and P_o^* as fixed, substituting (4.7) into it and, then, solving for dY, we get

$$dY = \frac{E_e\left(\frac{-B_{P_o^*}}{B_e}\right)dP_o^* + E_{P_o^*}dP_o^*}{1-\left[E_Y - (-E_e)\left(\frac{-B_Y}{B_e}\right)\right]} < 0 \text{ for } dP_o^* > 0 \tag{4.8}$$

Under the standard assumptions regarding the adjustment mechanisms of *Y* and *e*, one can easily show that for the equilibrium to be stable the denominator of the expression on the RHS of (4.8) has to be positive – see (4.a.10) in Appendix 4. We assume that the term within third

brackets in the denominator of the expression on the RHS of (4.8) lies between 0 and 1. This assumption is, of course, not necessary for our results. It follows from (4.5i) – (4.5iii) and (4.6i) – (4.6iii) that the numerator is negative when $dP_o^* > 0$.

We shall now delineate how the contraction in *Y* takes place following a given increase in P_o^* and in the process explain (4.7) and (4.8). Following the given increase in P_o^*, domestic price level rises at the initial equilibrium *Y* and *e* redistributing income in favour of the capitalists. This will reduce aggregate consumption demand by the amount given by the second term in the numerator of the expression on the RHS of (4.8) – see (4.6iii). Since close substitutes of Indian products are available everywhere else, the rise in the domestic price level at the initial equilibrium Y and e will very substantially lower export and raise import creating a large BOP deficit. e at the initial equilibrium Y will, therefore, rise and restore BOP equilibrium by lowing investment and, thereby, import of capital goods. The rise in *e* will also raise the domestic price level lowering aggregate consumption demand. The fall in investment and consumption demand due to the rise in *e* at the initial equilibrium *Y* is given by the first term in the numerator of the expression on the RHS of (4.8) – see (4.7) and (4.6ii). Thus, at the initial equilibrium *Y*, aggregate consumption and investment demand fall by the amount given by the numerator, while net export remains unchanged at zero. Therefore, at the initial equilibrium Y, aggregate planned demand for domestic goods falls by the amount given by the numerator denoted by N_{y1}. Hence, producers reduce Y in the first round by $dY_1 = N_{y1}$. The fall in Y with e remaining unchanged at its new higher value, lowers aggregate planned demandby $E_Y.dY_1$- see (4.6i). The fall in Y by dY_1 reduces import and, thereby creates BOP surplus of $(B_Y.dY_1)$ – see (4.5i). This will lower e by $\frac{-B_Y}{B_e}.dY_1$, which in turn will raise aggregate planned demand by $E_e\frac{-B_Y}{B_e}.dY_1$ – see (4.7) and (4.6i). Thus, in the second round, aggregate planned demand for domestic goods will fall in the net by $\left(E_Y - E_e\frac{B_Y}{B_e}\right).dY_1$inducing the producers to lower Y by $dY_2 = \left(E_Y - E_e\frac{B_Y}{B_e}\right).dY_1$. Similarly, Y in the third round will fall by $dY_3 = \left(E_Y - E_e\frac{B_Y}{B_e}\right).dY_2 = \left(E_Y - E_e\frac{B_Y}{B_e}\right)^2.dY_1$. This process of contraction in Y will continue until the fall in demand that takes place in each successive round eventually falls to zero. When that happens, the economy achieves its new equilibrium. Thus, the total fall in Y that occurs is given by (putting the value of dY_1)

$$dY = dY_1 + \left(E_Y - E_e\frac{B_Y}{B_e}\right).dY_1 + \left(E_Y - E_e\frac{B_Y}{B_e}\right)^2.dY_1 + \cdots \ldots \ldots \ldots.$$

$$= \frac{E_e\left(\frac{-B_{P_o^*}}{B_e}\right)dP_o^* + E_{P_o^*}dP_o^*}{1 - \left[E_Y - (-E_e)\left(\frac{-B_Y}{B_e}\right)\right]}$$

(4.9)

This explains (4.8).

We shall now prove that even though the direction of change in e is ambiguous, P will necessarily be higher in the new equilibrium. In our above discussion, we have found that at the initial equilibrium Y, e will rise by a large amount following the increase in P_o^*. However, Y will not stay put at its initial equilibrium level; it will fall from there. The fall in Y will also lower e. In the new equilibrium, e may, therefore, be greater than or less than or equal to its initial equilibrium value. This is clear from (4.7) also, when we substitute (4.8) into it. If e does not fall below its initial equilibrium level, P will be higher. However, if e falls below its initial equilibrium level, P may fall. However, we shall prove that P in the new equilibrium will necessarily be higher than its initial equilibrium value. Now, P can be less if and only if e is less. Suppose e is less and P is either the same as or less than its equilibrium value. Then at the initial equilibrium Y, there is excess demand in the goods market as the RHS of (4.6) is larger than its LHS. Since $0 < E_Y < 1$, see (4.6i), (4.6) will be satisfied at a larger Y. Since in the new equilibrium Y is less, P has to be higher than its initial equilibrium value, when e is less than its initial equilibrium value. When e is equal to or greater than its initial equilibrium value, P is necessarily higher than its initial equilibrium value. Thus, an increase in the world price of oil under free market conditions will hurt workers in India by reducing employment and also by lowering their real wage rate. Thus, we get the following proposition:

Proposition 4.1: A hike in the world price of oil under free market conditions hurts workers by reducing aggregate output and employment and also by lowering their real wage rate by raising the domestic price level.

[Price rationing, as we have said before, is the cruellest and most unjust form of rationing as the brunt of the rationing is borne by the poor. Under free market conditions, one of the most important factors that raises the price level in India is a hike in the oil price in the world market. This is because India is a large importer of oil, which is an extremely important intermediate input of production. From the above it follows that a rise in the price level induced by a hike in the world oil price worsens workers' economic condition substantially (and, therefore, the contraction in aggregate output mainly takes place in the unorganized sector, which produces most of the wage goods. The sector catering to the capitalists (large producers who control the corporations) may even experience an expansion in their output level. However, to formally establish these points, we have to use a disaggregated model.)]

In our view, since the poor have little ability to pay, domestic price of oil should not be allowed to rise following a oil price hike in the world market. The government should fix the domestic price of oil and, when the world price of oil rises, the increase in subsidy should be financed by taxing the capitalists, who have the ability to pay and make non-essential uses of oil and other goods on a very substantial scale. The policy is obviously just and tends to reduce inequality. We shall focus on this policy below:

4.4 Administered Price of Oil and Financing the Subsidy by Taxing Capitalists' Income

Denoting the administered price of oil in the domestic economy in domestic currency by $\bar{P}_o$, we rewrite (4.2) as

$$P = \theta \bar{P}_o m \tag{4.10}$$

In the present case, we assume for simplicity that the government imports all the oil and the government's oil import bill expressed in terms of domestic goods is G. Hence,

$$G = \frac{P_o^* \mathrm{em}}{\theta \bar{P}_o m} Y \equiv G(Y, e; P_o^*) \tag{4.11}$$

Substituting (4.10) into (4.4) and also incorporating the tax levied on the capitalists denoted T, we rewrite (4.4) as

$$X\left[\frac{P_n^* e}{\theta \bar{P}_o m}\right] - \frac{P_o^* \mathrm{em}}{\theta \bar{P}_o m} Y - M_n\left[\frac{P_n^* e}{\theta \bar{P}_o m}, c_c.\left[Y - \frac{wlY + Dr_0}{\theta \bar{P}_o m} - T\right], I(\bar{r}, e)\right] \equiv \bar{B}(e, Y; P_o^*, T) = 0 \tag{4.12}$$

$$\bar{B}_e = (X_{\bar{P}_n} - M_{n\bar{p}_n})\frac{P_n^*}{\theta \bar{P}_o m} + M_{nI}(-I_e) - \frac{P_o^*}{\theta \bar{P}_o} Y \equiv (X_{\bar{P}_n} - M_{n\bar{p}_n})\frac{P_n^* e}{\theta \bar{P}_o m} + M_{nI}(-I_e) - G_e;\ \ \bar{P}_n \equiv \frac{P_n^* e}{\theta \bar{P}_o m} \tag{4.12i}$$

$\bar{B}_e$has to be positive for stability. One can easily derive this stability condition following the line suggested in Appendix 4. Following the line suggested in the Appendix, one can easily derive this condition.

$$\bar{B}_Y = -\frac{P_o^* e}{\theta \bar{P}_o} - M_{nc}.c_c.\left(1 - \frac{wl}{\theta \bar{P}_o m}\right) \equiv -G_Y - M_{nc}.c_c.\left(1 - \frac{wl}{\theta \bar{P}_o m}\right) < 0 \tag{4.12ii}$$

$$\bar{B}_{P_o^*} = -\frac{e}{\theta \bar{P}_o} Y \equiv -G_{P_o^*} < 0 \tag{4.12iii}$$

$$\bar{B}_T = M_{nc} c_c > 0 \tag{4.12iv}$$

Substituting (4.10) and (4.12) into (4.1) and incorporating T and (4.11) into it, we write it as follows:

$$Y = c_w.\left[\frac{wlY + Dr_0}{\theta \bar{P}_o m}\right] + c_c.\left[Y - \frac{wlY + Dr_0}{\theta \bar{P}_o m} - T\right] + I(\bar{r}, e) + G(Y, e; P_o^*) \equiv \bar{E}(Y, e; T) + G(Y, e; P_o^*) \tag{4.13}$$

$$0 < \bar{E}_Y = c_w.\left(\frac{wl}{\theta \bar{P}_o m}\right) + c_c.\left(1 - \frac{wl}{\theta \bar{P}_o m}\right) < 1; \frac{wl}{\theta \bar{P}_o m} < 1 \tag{4.13i}$$

$$\bar{E}_e = -(-I_e) < 0 \quad (4.13ii)$$

$$\bar{E}_T = -c_c < 0 \quad (4.13iii)$$

Taking total differential of (4.12), we get

$$\bar{B}_e de + \bar{B}_Y dY + \bar{B}_{P_o^*} dP_o^* + \bar{B}_{\bar{T}} dT = 0 \quad (4.14)$$

We assume here that dT is set in such a manner that the increase in oil import bill due to the rise in world oil price is fully met by the fall in capitalists' import of consumption goods. Thus, dT is set in such a manner that the following equation is satisfied:

$$\bar{B}_{P_o^*} dP_o^* + \bar{B}_T dT = 0 \text{ or, } dT = \frac{-\bar{B}_{P_o^*} dP_o^*}{T} = \frac{G_{P_o^*} dP_o^*}{M_{nc} c_c} \quad (4.15)$$

Substituting (4.15) into (4.14) and, then, solving for de, we get

$$de = \frac{-\bar{B}_Y dY}{\bar{B}_e} \quad (4.16)$$

Now, taking total differential of (4.13) treating all variables other that *Y*, *e*, T and P_o^* as fixed, we get

$$dY = \bar{E}_Y dY + \bar{E}_e de + \bar{E}_T dT + G_Y dY + G_e de + G_{P_o^*} dP_o^* \quad (4.17)$$

Substituting (4.13iii), (4.15) and (4.16) into (4.17) and, then, solving for dY, we get

$$dY = \frac{\left(1 - \frac{1}{M_{nc}}\right) G_{P_o^*}}{1 - \left[E_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]} < 0 \quad (4.18)$$

The denominator of the expression on the RHS of (4.18) has to be positive for stability. Following the line suggested in Appendix 4, one can easily derive this condition. From (4.18) it follows that Y will decrease. However, since $M_{nc}$is likely to be quite close to 1, the decrease in Y is likely to be quite small.

Let us now explain (4.18). Following the given increase in $P_o^*$by dP_o^*, G rises by $G_{P_o^*} dP_o^*$ and oil import bill rises by the same amount lowering net export at the initial equilibrium (Y,e). However, government raises T by $\frac{G_{P_o^*} dP_o^*}{M_{nc} c_c}$ so that non-oil import falls by the same $G_{P_o^*} dP_o^*$ amount restoring net export to its initial equilibrium value of zero at the initial equilibrium (Y,e). The increase in T, however, lowers capitalists' consumption by $c_c . \frac{G_{P_o^*} dP_o^*}{M_{nc} c_c}$. Hence, at the initial equilibrium (Y,e), there emerges an excess demand for Y of $G_{P_o^*} dP_o^* - c_c \frac{G_{P_o^*} dP_o^*}{M_{nc} c_c} = \left(1 - \frac{1}{M_{nc}}\right) G_{P_o^*} dP_o^* < 0$. This is the numerator of the expression on the RHS of (4.18). Hence, producers in the first round will lower Y by $dY_1 = \left(1 - \frac{1}{M_{nc}}\right) G_{P_o^*} dP_o^*$. The decrease in Y, with e remaining unchanged, will lower aggregate demand by $(\bar{E}_Y + G_Y) dY_1$. The decrease in Y,

however, will reduce both oil and non-oil import lowering e by $\frac{-\bar{B}_Y}{\bar{B}_e}dY_1$ – see (4.16) – so that net export is restored to zero. This decrease in e will raise aggregate demand by $-(-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}dY_1$. Hence, in the net, aggregate demand and Y in the second round will go down by $dY_2 = \left[\bar{E}_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]dY_1$. For similar reasons, Y in the third round will fall by $dY_3 = \left[\bar{E}_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]dY_2 = \left[\bar{E}_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]^2 dY_1$. This process of contraction will continue until the fall in demand that is occurs in each successive round eventually falls to zero. Therefore, the total decrease in Y is given by

$$dY = dY_1 + \left[\bar{E}_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]dY_2 + \left[\bar{E}_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]^2 dY_1$$

$$+ \cdots \ldots = \frac{\left(1 - \frac{1}{M_{nc}}\right)G_{P_o^*}}{1 - \left[\bar{E}_Y + G_Y - (-\bar{E}_e - G_e)\frac{-\bar{B}_Y}{\bar{B}_e}\right]}$$

This explains (4.18).

Capitalists are just a few in numbers. They earn the major part of NDP as profit. Their consumption basket consists of the finest items available all across the world. India being a backward economy cannot produce those fine products. Accordingly, capitalists in India allocate all their additional consumption expenditure to imported goods making M_{nc} equal to unity. Our above discussion yields the following proposition:

Proposition 4.2: When domestic price of oil is administered by the government, then if the government finances the increase in oil import bill due to an increase in the world price of oil by taxing capitalists' income in such a manner that capitalists' consumption demand for import falls by the same amount, Y will fall and the real wage rate will stay unaffected. The larger the import intensity of capitalists' consumption, the smaller will be the decrease in Y. Since import intensity of capitalists' consumption is highly likely to be unity in India, in all likelihood NDP will stay unaffected in India.

We will now turn to the case where the subsidy is financed by hiking indirect tax rates.

4.5 Administered Price of Oil and Financing the Subsidy by Imposing Indirect Taxes

We assume here that the government administers the price of oil below the world price of oil and finances the subsidy by imposing indirect taxes on all goods. In this case, the price received by the domestic producers, i.e. the domestic price level excluding the indirect tax is given by

(4.10). However, the price including the indirect tax, i.e. the price faced by the buyers of domestic goods, denoted $P^{/}$ is given by

$$P^{/} = (1+\tau)P = (1+\tau)\theta\,\bar{P}_o m \tag{4.19}$$

Let us now compute the profit of the domestic producers. Denoting the nominal profit of the domestic producers by $\tilde{\pi}$, we get (assuming Dr_0 to be equal to zero for simplicity)

$$\tilde{\pi} = P(1+\tau)Y - wlY - P\tau Y \tag{4.20}$$

Denoting the real profit in terms of domestic goods by π, we get

$$\frac{\tilde{\pi}}{P(1+\tau)} = \pi = Y - \frac{wl}{P(1+\tau)}Y - \frac{\tau}{(1+\tau)}Y \tag{4.21}$$

Clearly, the second term of the expression on the RHS is the total wage income in terms of domestic goods and the third term is the total indirect tax revenue in terms of domestic goods. The government here buys all the oil from abroad and it buys nothing else so that G is given by

$$G = \frac{P_o^* \mathrm{em}}{\theta \bar{P}_o m(1+\tau)}Y \tag{4.22}$$

However, the government sells oil to the domestic users at the price $\bar{P}_o$ and finances the subsidy with indirect tax revenue. Thus,

$$P_o^* emY - \bar{P}_o mY = P\tau Y = \theta\tau\bar{P}_o mY \text{(using (4.10))} \tag{4.23}$$

The government sets τin such a manner that (4.23) is satisfied. Solving (4.23) for τ, we get

$$\tau = \frac{P_o^* e}{\theta \bar{P}_o} - \frac{1}{\theta} \tag{4.24}$$

From (4.24), we get

$$\frac{1}{1+\tau} = (1-\gamma) = \frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o + P_o^* e}; \quad \gamma \equiv \frac{\tau}{1+\tau} \tag{4.25}$$

Substituting (4.25) into (4.21), using (4.19) and rearranging terms, we get

$$\pi = \left(1 - \frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o + P_o^* e}\right\}Y \tag{4.21a}$$

and, similarly,

$$\frac{wl}{P}(1-\gamma)Y = \frac{wl}{\theta\bar{P}_o m}.\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o + P_o^* e}\right\}Y \tag{4.21b}$$

Substituting (4.25) into (4.22), we write it as

$$G = \frac{P_o^* e}{(\theta-1)\bar{P}_o + P_o^* e}Y = \tilde{G}(e, Y; P_o^*) \tag{4.22a}$$

Note that a ceteris paribus increase in either P_o^*or e will have a small impact on G as they raise the indirect tax rate and, thereby, the domestic price. In fact, if $\theta = 1$, G is completely independent of P_o^* and e.

Substituting (4.19) and (4.25) into (4.4), we rewrite the BOP equilibrium condition as

$$X\left[\frac{P_n*\mathrm{e}}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^*e}\right]-\frac{P_o^*e}{(\theta-1)\bar{P}_o+P_o^*e}Y-M_n\left[\frac{P_n*\mathrm{e}}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^*e},c_c.Y\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^*e}\right\}\right],I(\bar{r},e)\right]\equiv\tilde{B}(e,Y;P_o^*)=0 \qquad (4.26)$$

$$\tilde{B}_e=(X_{\tilde{P}_n}-M_{n\tilde{P}_n})\left(\frac{P_n^*}{m}\right).\frac{(\theta-1)\bar{P}_0}{[(\theta-1)\bar{P}_o+P_o^*e]^2}+M_{nI}(-I_e)+M_{nc}c_c\left(1-\frac{wl}{\theta\bar{P}_o m}\right)\frac{\theta\bar{P}_0P_o^*}{[(\theta-1)\bar{P}_o+P_o^*e]^2}Y-\frac{P_o^*(\theta-1)\bar{P}_o}{[(\theta-1)\bar{P}_o+P_o^*e]^2}Y\equiv(X_{\tilde{P}_n}-M_{n\tilde{P}_n})\left(\frac{P_n^*}{m}\right).\frac{(\theta-1)\bar{P}_0}{[(\theta-1)\bar{P}_o+P_o^*e]^2}+M_{nI}(-I_e)+M_{nc}c_c\left(1-\frac{wl}{\theta\bar{P}_o m}\right)\frac{\theta\bar{P}_0P_o^*}{[(\theta-1)\bar{P}_o+P_o^*e]^2}Y-\tilde{G}_e>0 \quad \text{(for reasons of stability)} \quad \tilde{p}_n\equiv\frac{P_n^*e}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^*e} \qquad (4.26i)$$

Note that an increase in *e* raises the indirect tax rate and, thereby, the domestic price level. Hence, its impact on terms of trade for non-oil import is quite small. This makes the absolute value of the first term on the RHS of (4.26i) quite small. In fact, if $\theta=1$, its value is zero. For similar reasons, the value of $\tilde{G}_e$ is small too. Again, c_c is very small. Hence, the value of the third term is also quite small. Therefore, following an increase in *e*, net export rises on account of the reduction in import due to the fall in I. This is captured by the second term of the expression on the RHS of (4.26i).

$$\tilde{B}_Y=-\frac{P_o^*e}{(\theta-1)\bar{P}_o+P_o^*e}-M_{nc}.c_c.\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^*e}\right\}\right]\equiv-\tilde{G}_Y-M_{nc}.c_c.\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o m}{(\theta-1)\bar{P}_o+P_o^*e}\right\}\right]<0 \qquad (4.26ii)$$

$$\tilde{B}_{P_o^*}=-(X_{\tilde{P}_n}-M_{n\tilde{P}_n})\left(\frac{P_n^*e}{m}\right).\frac{e}{[(\theta-1)\bar{P}_o+P_o^*e]^2}+M_{nc}c_c\left(1-\frac{wl}{\theta\bar{P}_o m}\right)\frac{\theta\bar{P}_oe}{[(\theta-1)\bar{P}_o+P_o^*e]^2}Y-\frac{e(\theta-1)\bar{P}_o}{[(\theta-1)\bar{P}_o+P_o^*e]^2}Y\equiv-(X_{\tilde{P}_n}-M_{n\tilde{P}_n})\left(\frac{P_n^*}{m}\right).\frac{e}{[(\theta-1)\bar{P}_o+P_o^*e]^2}+M_{nc}c_c\left(1-\frac{wl}{\theta\bar{P}_o m}\right)\frac{\theta\bar{P}_oe}{[(\theta-1)\bar{P}_o+P_o^*e]^2}Y-\tilde{G}_{P_o^*}<0 \quad \text{(to be explained)} \qquad (4.26iii)$$

Substituting (4.19), (4.25) and (4.26) into (4.1), assuming *D* to be equal to zero for simplicity and incorporating (4.22a) into it, we write it as

$$\begin{aligned}Y=c_w.\left[\frac{wl}{\theta\bar{P}_o m}.\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^*e}\right\}Y\right]+c_c.Y\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^*e}\right\}\right]+I(\bar{r},e)\\+X\left[\frac{P_n*\mathrm{e}}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^*e}\right]\\-M_n\left[\frac{P_n*\mathrm{e}}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^*e},c_c.Y\left[\left(1\right.\right.\right.\\\left.\left.\left.-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^*e}\right\}\right],I(\bar{r},e)\right]\equiv\tilde{E}(Y,e;P_o^*)+N(Y,e;P_o^*)\end{aligned}$$

(4.27)

In (4.27),

$$\tilde{E}(Y,e;T) \equiv c_{w.}\left[\frac{wl}{\theta\bar{P}_o m}.\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^* e}\right\}Y\right] + c_c.Y.\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^* e}\right\}\right] + I(\bar{r},e) \quad (4.28)$$

$$0 < \tilde{E}_Y = c_w.\left(\frac{wl}{\bar{P}_o\theta m}\right).\left\{\frac{\bar{P}_o\theta}{(\theta-1)\bar{P}_o+P_o^* e}\right\} + c_c.\left(1-\frac{wl}{\bar{P}_o\theta m}\right).\left\{\frac{\bar{P}_o\theta}{(\theta-1)\bar{P}_o+P_o^* e}\right\} < 1; \frac{wl}{\bar{P}_o\theta m} < 1 \quad (4.28i)$$

$$\tilde{E}_e = -\left[-I_e + \left[c_w.\left(\frac{wl}{\bar{P}_o\theta m}\right).+c_c.\left(1-\frac{wl}{\bar{P}_o\theta m}\right)\right].Y.\left\{\frac{\bar{P}_o\theta P_o^*}{[(\theta-1)\bar{P}_o+P_o^* e]^2}\right\}\right] < 0 \quad (4.28ii)$$

$$\tilde{E}_{P_o^*} = -\left[\left[c_w.\left(\frac{wl}{\bar{P}_o\theta m}\right).+c_c.\left(1-\frac{wl}{\bar{P}_o\theta m}\right)\right].Y.\left\{\frac{\bar{P}_o\theta e}{[(\theta-1)\bar{P}_o+P_o^* e]^2}\right\}\right] < 0 \quad (4.28iii)$$

and

$$N(Y,e;P_o^*) \equiv X\left[\frac{P_n * \mathrm{e}}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^* e}\right] - M_n\left[\frac{P_n * \mathrm{e}}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^* e}, c_c.Y\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^* e}\right\}\right], I(\bar{r},e)\right] \quad (4.29)$$

$N_e = -(X_{\tilde{P}_n} - M_{n\tilde{P}_n})\left(\frac{P_n^*}{m}\right).\frac{(\theta-1)\bar{P}_o}{[(\theta-1)\bar{P}_o+P_o^* e]^2} + M_{nI}(-I_e) + M_{nc}c_c\left(1-\frac{wl}{\bar{P}_o\theta m}\right)\frac{\theta\bar{P}_o P_o^*}{[(\theta-1)\bar{P}_o+P_o^* e]^2}Y > 0$(for reasons of stability, which one can easily deduce following the stability analysis carried out in the appendix.) $\tilde{p}_n \equiv \frac{P_n^* e}{m}\frac{1}{(\theta-1)\bar{P}_o+P_o^* e}$ (4.29i)

Note that an increase in *e* raises the indirect tax rate and, thereby, the domestic price level. Hence, its impact on terms of trade for non-oil import is quite small. This makes the absolute value of the first term on the RHS of (4.29i) quite small. In fact, if $\theta = 1$, its value is zero. Again, c_c is very small. Hence, the value of the third term is also quite small. Since import intensity of investment is very high in India, a ceteris paribus increase in *e* raises N by reducing investment and, thereby, the import of capital goods. Hence, N_e is positive.

$$N_Y = -M_{nc}.c_c.\left[\left(1-\frac{wl}{\theta\bar{P}_o m}\right).\left\{\frac{\theta\bar{P}_o}{(\theta-1)\bar{P}_o+P_o^* e}\right\}\right] < 0 \quad (4.29ii)$$

$N_{P_o^*} = -(X_{\tilde{P}_n} - M_{n\tilde{P}_n})\left(\frac{P_n^* e}{m}\right).\frac{e}{[(\theta-1)\bar{P}_o+P_o^* e]^2} + M_{nc}c_c\left(1-\frac{wl}{\theta\bar{P}_o m}\right)\frac{\theta\bar{P}_o e}{[(\theta-1)\bar{P}_o+P_o^* e]^2}Y < 0$(to be explained) (4.29iii)

Taking total differential of (4.26) and solving for de, we get

$$de = \frac{-\left[\tilde{B}_Y dY + \tilde{B}_{P_o^*} dP_o^*\right]}{\tilde{B}_e} \gg 0 \text{ for } dY > 0 \text{ and } dP_o^* > 0 \quad (4.30)$$

Let us explain (4.30). The numerator of the expression on the RHS gives the BOP deficit that is created at the initial equilibrium e following dY amount of increase in Y and the given increase in $P_o^*$by dP_o^*. The given increase in P_o^*raises oil import bill in terms of domestic goods, for reasons we have already explained, by a small amount. However, the rise in the indirect tax rate that it brings about raises the domestic price level. Since close substitutes of Indian goods are available everywhere, the rise in the domestic price level will substantially lower net export. The increase in the indirect tax collection will also reduce capitalists' income and, thereby, their demand for imported consumption goods. However, despite this offset, there is likely to be a very substantial increase in the BOP deficit, since marginal propensity to consume of the capitalists is quite small. The increase in Y will also create BOP deficit by raising oil import and also by raising capitalists' income and, thereby, their demand for imported consumption goods. e will, therefore, rise to remove it. As we have already pointed out, an increase in e raises net export by lowering I. The denominator gives the increase in B per unit rise in e ceteris paribus. de is likely to be large for given values of dY and dP_o^*, since, given other things, the size of the BOP deficit created at the initial equilibrium (Y, e) is substantially large.

Taking total differential of (4.27) treating all variables other than Y, e and P_o^* as fixed, substituting (4.30) into it and solving for dY, we get

$$dY = \frac{\left[\tilde{E}_{P_o^*} + N_{P_o^*} + (\tilde{E}_e + N_e)\frac{-\tilde{B}_{P_o^*}}{\tilde{B}_e}\right] dP_o^*}{1 - \left[(\tilde{E}_Y + N_Y) - (-\tilde{E}_e - N_e)\frac{-\tilde{B}_Y}{\tilde{B}_e}\right]} < 0 \quad (4.31)$$

Note that the denominator of the expression on the RHS of (4.31) has to be positive for the equilibrium to be stable. Following the line suggested in Appendix 4, one can easily derive this stability condition.

Let us explain the expression on the RHS of (4.31). Following an increase in P_o^*, oil import bill rises lowering net export by the same amount at the initial equilibrium (Y,e). However, this is matched by an equal increase in G so that aggregate demand for domestic goods remains unaffected. However, indirect tax collection increases by the same amount reducing disposable income of both the workers and capitalists. This lowers consumption demand of both workers and capitalists. This is captured by the term $\tilde{E}_{P_o^*} dP_o^*$. The rise in the domestic price level due to the increase in the indirect tax rate substantially lowers net export of non-oil goods despite the fall in capitalists' demand for imported consumption goods as a part of the additional indirect tax collection is borne by them. This is captured by the term $N_{P_o^*} dP_o^*$. At the initial equilibrium (Y,e), there, thus, emerges a very large BOP deficit, which brings about a large increase in e by the amount $\frac{-\tilde{B}_{P_o^*} dP_0^*}{\tilde{B}_e}$at the initial equilibrium Y – see (4.30). The increase in e raises oil import bill, G and indirect tax collection by equal amounts. The first two cancel each other out leaving aggregate demand for domestic goods unaffected. However, the increase in e lowers investment substantially. The increase in indirect tax collection lowers consumption demand.

The sum of the fall in consumption and investment demand is given by the term $\tilde{E}_e \frac{-\tilde{B}_{P_o^*}}{\tilde{B}_e} dP_o^*$ (see (4.28ii) and (4.30)). The increase in e will raise export net of non-oil import by $N_e \frac{-\tilde{B}_{P_o^*}}{\tilde{B}_e} dP_o^*$ (see (4.29i) and (4.30)), but this will be due to the fall in consumption and investment demand – (see (4.29i)). This is because the rise in e, as it is accompanied by an increase in the indirect tax rate, will leave the terms of trade more or less unaffected. Hence, $N_e \frac{-\tilde{B}_{P_o^*}}{\tilde{B}_e}$ will be much smaller than the absolute value of $\tilde{E}_e \frac{-\tilde{B}_{P_o^*}}{\tilde{B}_e}$ and, as follows from (4.28ii) and (4.29i), $\left(\tilde{E}_e + N_e\right) \frac{-\tilde{B}_{P_o^*}}{\tilde{B}_e} < 0$. Thus, the absolute value of the numerator denoted NU gives the large excess supply that emerges at the initial equilibrium Y following the given increase in P_o^*. Hence, Y in the first round will fall by dY_1 = NU. This will reduce disposable income and, therefore, consumption demand of the workers and the capitalistsby $\tilde{E}_Y NU$ – see (4.28i). However, a part of the fall in capitalists' consumption demand will represent fall in demand for imported consumption goods. This is given by $N_Y . NU$ – see (4.29ii). Hence, aggregate consumption demand for domestic goods will fall by $\left(\tilde{E}_Y - (-N_Y)\right) NU$. The fall in Y has another effect. It lowers demand for imported consumption goods and oil creating BOP surplus. Hence, e will fall by $\frac{-\tilde{B}_Y}{\tilde{B}_e} NU$ raising aggregate demand for domestic goods, as explained earlier, by $\left(-\tilde{E}_e - N_e\right) \frac{-\tilde{B}_Y}{\tilde{B}_e} NU$. Thus, in the net, aggregate demand for domestic goods and, therefore, for Y will fall by $dY_2 = [\left(\tilde{E}_Y - (-N_Y)\right) - \left(-\tilde{E}_e - N_e\right) \frac{-\tilde{B}_Y}{\tilde{B}_e}] NU$. For similar reason, Y in the third round will fall by $dY_3 = [\left(\tilde{E}_Y - (-N_Y)\right) - \left(-\tilde{E}_e - N_e\right) \frac{-\tilde{B}_Y}{\tilde{B}_e}]$ $dY_2 = [\left(\tilde{E}_Y - (-N_Y)\right) - \left(-\tilde{E}_e - N_e\right) \frac{-\tilde{B}_Y}{\tilde{B}_e}]^2 dY_1$. This contraction in Y will continue until the fall in demand that takes place in each successive round eventually falls to zero. Thus, the total fall in Y is given by

$$dY = NU + [\left(\tilde{E}_Y - (-N_Y)\right) - \left(-\tilde{E}_e - N_e\right) \frac{-\tilde{B}_Y}{\tilde{B}_e}] \quad NU + [\left(\tilde{E}_Y - (-N_Y)\right) - \left(-\tilde{E}_e - N_e\right) \frac{-\tilde{B}_Y}{\tilde{B}_e}]^2 NU + \ldots\ldots\ldots = \frac{NU}{1 - [\left(\tilde{E}_Y - (-N_Y)\right) - (-\tilde{E}_e - N_e) \frac{-\tilde{B}_Y}{\tilde{B}_e}]} \quad (4.32)$$

This explains (4.31).

Let us now focus on the real wage rate. The real wage rate is given by the coefficient of Y in (4.21b). It shows that if the value of $P_o^* e$ in the new equilibrium is larger than that in the initial equilibrium, the real wage rate in the new equilibrium will be less. Substituting (4.19), (4.26), (4.21a), (4.21b) and (4.26) into (4.1), we rewrite it as follows:

$$Y = c_w . \left[\frac{wl}{\theta \bar{P}_o m} . \left\{\frac{\theta \bar{P}_o}{(\theta - 1)\bar{P}_o + P_o^* e}\right\} Y\right] + c_c . Y \left[\left(1 - \frac{wl}{\theta \bar{P}_o m}\right) . \left\{\frac{\theta \bar{P}_o}{(\theta - 1)\bar{P}_o + P_o^* e}\right\}\right] + I(\bar{r}, e) + \frac{P_o^* e}{(\theta - 1)\bar{P}_o + P_o^* e} Y$$

(4.33)

The last term on the RHS of (4.33) is *G*. We know that in the new equilibrium Y is less. Hence, in the new equilibrium, value of the RHS of (4.33) must be less too. We will now examine whether that is possible if the value of $P_o^* e$ is less in the new equilibrium. In the new equilibrium, P_o^* is higher. Hence, *e* has to fall more than proportionately from the initial equilibrium to the new equilibrium for $P_o^* e$ to be less in the new equilibrium. We have already noted that, a given fall in *e* will bring about a small amount of fall in *G*. In fact, if $\theta = 1$, it will be completely independent of *e*. However, a fall in *e* will raise *I* substantially. It will also raise *C* by a large amount. Hence, if in the new equilibrium $P_o^* e$ becomes less than its initial equilibrium value, the value of the RHS of (4.33) at the initial equilibrium value of *Y* becomes larger than the initial equilibrium Y. Hence, the goods market will be in equilibrium at a larger Y. For the goods market to be in equilibrium at a smaller Y, the value of $P_o^* e$ has to be larger in the new equilibrium. Hence, in the new equilibrium, the real wage rate must be less.

Our above discussion yields the following proposition:

Proposition 4.3: If the government administers the price of oil below the world price of oil and finances the subsidy by imposing indirect taxes on all goods, aggregate output and employment will fall and the real wage rate will decline much to the misery of the workers.

We will now examine how a ceteris paribus increase in the indirect tax rate affects the levels of GDP and the real wage rate. The purpose is to show that if indirect tax rates are raised beyond the amount necessary to finance the increase in the oil import bill, as we have done in the case of the taxation of capitalists' income, the GDP will shrink and the real wage rate will fall further exacerbating workers' economic condition.

4.5.1 Effect of an Increase in the Indirect Tax Rate

Substituting back (4.25) into (4.26), (4.27) and (4.29), we rewrite them as follows:

$$X\left[\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma)\right] - \frac{P_o^* e}{\theta \bar{P}_o}(1-\gamma)Y - M_n\left[\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma), c_c . Y\left[\left(1-\frac{wl}{\theta \bar{P}_o m}\right).\{1-\gamma\}\right], I(\bar{r}, e)\right] \equiv \hat{B}(e, Y; \gamma) = 0 \quad (4.34)$$

$$Y = c_{w.}\left[\frac{wl}{\theta \bar{P}_o m}.\{1-\gamma\}Y\right] + c_c . Y.\left[\left(1-\frac{wl}{\theta \bar{P}_o m}\right).\{1-\gamma\}\right] + I(\bar{r}, e) + X\left[\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma)\right] - M_n\left[\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma), c_c . Y\left[\left(1-\frac{wl}{\theta \bar{P}_o m}\right).\{1-\gamma\}\right], I(\bar{r}, e)\right] \equiv \bar{D}(Y, e; \gamma) + \bar{N}(Y, e; \gamma) \quad (4.35)$$

$$\bar{D}_Y = \left[c_w . \frac{wl}{\theta \bar{P}_o m}. + c_c . \left(1-\frac{wl}{\theta \bar{P}_o m}\right)\right](1-\gamma) > 0 \quad (4.35\mathrm{i})$$

$$\bar{D}_e = I_e < 0 \quad (4.35\mathrm{ii})$$

$$\bar{D}_\gamma = -\left\{c_{w.}\left[\frac{wl}{\theta \bar{P}_o m}\right] + c_c . \left[\left(1-\frac{wl}{\theta \bar{P}_o m}\right)\right]\right\} Y < 0 \quad (4.35\mathrm{iii})$$

$$X\left[\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma)\right] - M_n\left[\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma), c_c . Y\left[\left(1-\frac{wl}{\theta \bar{P}_o m}\right).\{1-\gamma\}\right], I(\bar{r}, e)\right] \equiv \bar{N}(e, Y; \gamma) = 0 \quad (4.36)$$

Taking total differential of (4.34) treating all exogenous variables other than γ to be fixed and, then, solving for *de*, we get

$$de = \frac{-[\hat{B}_Y dY + \hat{B}_\gamma d\gamma]}{\hat{B}_e} \gg 0 \text{ for } dY > 0 \text{ and } d\gamma > 0 \tag{4.37}$$

$$\hat{B}_Y = -\frac{P_o^* e}{\theta \bar{P}_o m}(1-\gamma)dY - M_{nc}c_c.\left[\left(1 - \frac{wl}{\theta \bar{P}_o m}\right).\{1-\gamma\}\right] < 0 \tag{4.38}$$

Following an increase in *Y*, oil import and capitalists' demand for import rise lowering net export.

$$\hat{B}_\gamma = -\left(X_{p_n^/} - M_{np_n^/}\right)\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m} + \frac{P_o^* e}{\theta \bar{P}_o m}Y + M_{nc}c_c.Y\left[\left(1 - \frac{wl}{\theta \bar{P}_o m}\right).\right] < 0 \;\; ; \quad p_n^/ \equiv \frac{P_n * \mathrm{e}}{\theta \bar{P}_o m}(1-\gamma) \tag{4.39}$$

Following an increase in γ, domestic price goes up. This, for reasons we have already explained, will very substantially lower net export of non-oil goods. It will, however, lower the value of oil import in terms of domestic goods and capitalists' consumption demand for imported goods. The former is highly likely to dominate the latter reducing net export. This explains the sign in (4.39).

$$\hat{B}_e = \left(X_{p_n^/} - M_{np_n^/}\right)\frac{P_n *}{\theta \bar{P}_o m}(1-\gamma) + M_{nI}(-I_e) - \frac{P_o^*}{\theta \bar{P}_o m}(1-\gamma)Y > 0 \tag{4.40}$$

Following an increase in *e*, net export of non-oil goods will rise substantially. Investment will go down raising net export of non-oil goods significantly. The value of oil import will rise. However, the first two effects are highly likely to dominate the third one raising net export. This explains the sign of (4.40). We need this sign for reasons of stability also. This stability condition can be easily deduced following the stability analysis done in Appendix 4.

Thus, following an increase in both Y and γ, BOP deficit emerges and e has to rise to remove it. This explains (4.37).

Again, we find that

$$\bar{N}_Y = -M_{nc}c_c.\left[\left(1 - \frac{wl}{\theta \bar{P}_o m}\right).\{1-\gamma\}\right] < 0 \tag{4.41}$$

$$\bar{N}_\gamma = -\left(X_{p_n^/} - M_{np_n^/}\right)\frac{P_n * \mathrm{e}}{\theta \bar{P}_o m} + M_{nc}c_c.Y\left[\left(1 - \frac{wl}{\theta \bar{P}_o m}\right).\right] < 0 \tag{4.42}$$

Following an increase in γ, domestic price goes up. This, for reasons we have already explained, will very substantially lower net export of non-oil goods. It will, however, lower capitalists' consumption demand for imported goods. The former is highly likely to dominate the latter reducing net export. This is so because c_c is likely to be very small. This explains the sign in (4.42).

$$\bar{N}_e = \left(X_{p_n^/} - M_{np_n^/}\right)\frac{P_n *}{\theta \bar{P}_o m}(1-\gamma) + M_{nI}(-I_e) > 0 \tag{4.43}$$

We will now derive the impact of a given increase in γ on *Y*. Taking total differential of (4.35) treating all exogenous variables other than γ as fixed, substituting for *de* its value given by (4.37) and, then, solving for *dY*, we get

$$\frac{dY}{d\gamma} = \frac{\bar{D}_\gamma + \bar{D}_e\left(\frac{-\bar{B}_\gamma}{\bar{B}_e}\right) + \bar{N}_\gamma + \bar{N}_e\left(\frac{-\bar{B}_\gamma}{\bar{B}_e}\right)}{1 - \left[(\bar{D}_Y + \bar{N}_Y) + \bar{N}_e\left(\frac{-\bar{B}_Y}{\bar{B}_e}\right) - \left(-\bar{D}_e\left(\frac{-\bar{B}_Y}{\bar{B}_e}\right)\right)\right]} \tag{4.44}$$

Let us now determine the sign of the expression on the RHS of (4.44). The denominator has to be positive for reasons of stability. We can easily deduce this stability condition following the stability analysis done in Appendix 4. Let us now focus on the numerator. The first term $\bar{D}_\gamma$ is negative (see (4.35iii)). The second term is also highly likely to be negative (see (4.35ii), (4.39) and (4.40)). Let us now consider the third and the fourth terms. An increase in γ brings about a large fall in *N* by the amount $-N_\gamma$. This brings about a large BOP deficit despite the fall in G and capitalists' demand for imported consumption goods. The exchange rate *e*, therefore, rises to correct the BOP deficit. The rise in *e* removes BOP deficit by raising *N* even though G rises with the increase in e. Thus, the net change in *N*, given by the sum of the third and the fourth terms, is likely to be quite small. Hence, the numerator is highly likely to be negative. Let us explain the adjustment process. Following a unit increase in γ, at the initial equilibrium (Y, e), disposable income of the workers and the capitalists go down lowering their consumption demand by $\bar{D}_\gamma$. The unit increase in γraises the domestic price level and, thereby, substantially lowers *N* bringing about a large BOP deficit despite the fall in capitalists' and government's demand for imports. Therefore, at the initial equilibrium Y, e rises to remove the BOP deficit. It does so by raising N since government's import demand rises with an increase in e. Thus, N is likely to get restored close to its initial value. However, the rise in e will reduce investment demand. Thus, at the initial equilibrium Y, there is highly likely to emerge a large excess supply inducing the producers to produce and employ less. This yields the following proposition:

Proposition 4.4: An increase in the indirect tax rate is highly likely to bring about a large contraction in GDP and employment. It will also reduce the real wage rate. Thus, ordinary workers will suffer immensely.

From the above proposition it follows that if the government raises the indirect tax rate above the level that is necessary to finance the subsidy on oil, as we did in the case where the subsidy was financed by taxing capitalists' income, ordinary workers' economic condition will deteriorate even further.

We will now summarize our findings below.

4.6 Conclusion

We summarize here the major findings of the paper along with the concluding observations. India is heavily dependent on oil import and oil is an essential ingredient of production in India. Taking these two factors into account, our paper shows that an increase in the world price of

oil under free market conditions lowers real wage rate and leads to a contraction in aggregate output and employment causing considerable deterioration in the economic condition of the poor workers.

Rationing the use of a scarce good through price increase, as we have pointed out already, is the cruellest form of rationing as it forces the poor, who have little ability to pay and sacrifice, out of the market and the capitalists benefit at their expense. To create a just system of rationing, as the paper suggests, the government should administer the price of oil below the world price of oil and finance the subsidy by taxing the capitalists' income. In this case, if the world price of oil rises and the increase in subsidy is financed by taxing the capitalists' income in an appropriate manner, the real wage rate will stay unaffected and aggregate output and employment will remain more or less unchanged. In this case, the capitalists, who have the ability to sacrifice and make all the non-essential use of oil, bear the brunt of ration. However, if the subsidy is financed by indirect taxation of essential goods, a rise in the world price of oil will reduce the real wage rate and very likely to bring about a large contraction in aggregate output and employment heaping miseries on the workers. The results derived here apply not only to oil but also to any essential imported intermediate input.

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Table 4.1*:* Growth Rate of GDP, Rate of Gross Domestic Capital Formation

Year	Growth Rate of GDP At Factor Cost (At constant prices Base 2004-05)	Rate Of GDCF[1]	Rate Of NDCF
2000-01	5.3	24.6	16.7
2001-02	5.5	24.6	16.5
2002-03	5.0	25.4	17.3
2003-04	8.1	27.3	19.5
2004-05	7.0	32.8	25.5
2005-06	9.5	34.9	27.8
2006-07	9.6	36.2	29.2
2007-08	9.6	39.0	32.2
2008-09	6.7	35.6	27.9
2009-10	8.4	38.4	30.9

2010-11	8.4	39.8	32.5
2011-12	6.5	38.8	31.1
2012-13	4.5	38.9	30.9
2013-14	4.7		

Source: RBI

[1]Gross domestic capital formation, [2]Net domestic capital formation

Table 4.2: Exchange Rate of the Indian Rupee vis-a-vis the US Dollar (Monthly average)

Year/ Month	US $ Average	Year/ Month	US $ Average	Year/ Month	US $ Average	Year/ Month	US $ Average
2008		Oct	46.7211	Jul	44.4174	Apr	54.4971
Jan	39.3737	Nov	46.5673	Aug	45.2788	May	55.1156
Feb	39.7326	Dec	46.6288	Sep	47.6320	Jun	58.5059
Mar	40.3561	2010		Oct	49.2579	Jul	60.0412
Apr	40.0224	Jan	45.9598	Nov	50.8564	Aug	64.5517
May	42.1250	Feb	46.3279	Dec	52.6769	Sep	64.3885
June	42.8202	Mar	45.4965	2012		Oct	61.7563
Jul	42.8380	Apr	44.4995	Jan	51.3992	Nov	62.7221
Aug	42.9374	May	45.8115	Feb	49.1671	Dec	61.7793
Sep	45.5635	June	46.5670	Mar	50.3213	2014	
Oct	48.6555	Jul	46.8373	Apr	51.8029	Jan	62.1708
Nov	48.9994	Aug	46.5679	May	54.4735	Feb	62.3136

Dec	48.6345	Sep	46.0616	June	56.0302	Mar	61.0021
2009		Oct	46.7211	Jul	55.4948	Apr	60.3813
Jan	48.8338	Nov	46.5673	Aug	48.3350	May	59.3255
Feb	49.2611	Dec	46.6288	Sep	54.3353	June	59.7143
Mar	51.2287	2011		Oct	52.8917	Jul	60.0263
Apr	50.0619	Jan	45.3934	Nov	54.6845	Aug	60.9923
May	48.5330	Feb	45.4358	Dec	54.6439		
June	47.7714	Mar	44.9914	2013			
Jul	48.4783	Apr	44.3700	Jan	54.3084		
Aug	48.3350	May	44.9045	Feb	53.7265		
Sep	48.4389	June	44.8536	Mar	54.5754		

Source: RBI

Appendix 4

Stability of Equilibrium

We will examine here the stability of the equilibrium values of Y and e given by (4.5) and (4.6) in the text.

We assume here that e adjusts instantaneously to clear the foreign currency market, while the speed of adjustment in Y is sluggish. More precisely, e adjusts and equilibrates the foreign currency market before any change in Y can take place. Let us now examine under what conditions e will be able to clear the foreign currency market, with Y remaining unchanged at its equilibrium value and the initial value of e deviating from its equilibrium value.

We assume the following adjustment rule for e

$$\frac{de}{dt} = b.[-B(Y,e)] \qquad b > 0 \qquad (4.a.1)$$

Linearising the above equation around the equilibrium values of Y and e, we rewrite it as follows:

$$\frac{d\tilde{e}}{dt} = b.[\{-B_Y(Y^*,e^*)\}\tilde{Y} + \{-B_e(Y^*,e^*)\}\tilde{e}] \;; \qquad \tilde{Y} \equiv (Y - Y^*),\ \tilde{e} \equiv (e - e^*) > 0 \qquad (4.a.2)$$

We assume that the initial value of Y equals its equilibrium value, while the initial value of e is different from its initial value. Under these conditions, (4.a.2) reduces to

$$\frac{d\tilde{e}}{dt} = b.[\{-B_e(Y^*,e^*)\}\tilde{e}] \;; \qquad (4.a.3)$$

From (4.a.3) it follows that the equilibrium value of e is stable if and only if $B_e > 0$ (4.a.4)

Given our assumption that e adjusts instantaneously and keeps BOP in equilibrium always, the adjustment rule for Y is given by

$$\frac{dY}{dt} = a.[E(Y,e) - Y] \qquad a > 0 \qquad \text{(see (4.6) in the text)} \qquad (4.a\ .5)$$

Linearising the above equation around the equilibrium values of Y and e, we rewrite it as follows:

$$\frac{d\tilde{Y}}{dt} = a.[\{E_Y(Y^*,e^*) - 1\}\tilde{Y} + \{E_e(Y^*,e^*)\}\tilde{e}] \;; \qquad \tilde{Y} \equiv (Y - Y^*),\ \tilde{e} \equiv (e - e^*) > 0 \qquad (4.a.6)$$

Since BOP is in equilibrium always through instantaneous adjustments in e, the following equation should be satisfied in the neighbourhood of (Y^*, e^*)

$$B(e,Y) = B_Y(Y^*,e^*)\tilde{Y} + B_e(Y^*,e^*)\tilde{e} = 0 \qquad (4.a.7)$$

We can solve (4.a.7) for $\tilde{e}$ in terms of $\tilde{Y}$. This is given by

$$\tilde{e} = -\frac{B_Y(Y^*,e^*)}{B_e(Y^*,e^*)}\tilde{Y} \qquad (4.a.8)$$

Substituting (4.a.8) into (4.a.6), we get

$$\frac{d\tilde{Y}}{dt} = a.\left[\{E_Y(Y^*,e^*) - 1\} + \{E_e(Y^*,e^*)\}\frac{-B_Y(Y^*,e^*)}{B_e(Y^*,e^*)}\right]\tilde{Y} \qquad (4.a.9)$$

From (4.a.9), it is clear that the equilibrium value of Y is stable if and only if

$$\{E_Y(Y^*, e^*) - 1\} + \{E_e(Y^*, e^*)\}\frac{-B_Y(Y^*, e^*)}{B_e(Y^*, e^*)} < 0 \text{ or, } 1 - \left\{E_Y(Y^*, e^*) - (-E_e(Y^*, e^*))\frac{-B_Y(Y^*, e^*)}{B_e(Y^*, e^*)}\right\} > 0$$

(4.a.10)

Stability analysis of the other cases can be carried out following the line suggested above.

Chapter 5

Conclusion

5.1 Introduction

The New Economic Policy (NEP) adopted by the Government of India in July 1991 is heavily biased in favour of the big businessmen who control the corporate sector. We refer to these businessmen as capitalists. The NEP recommends removal of all kinds of restrictions imposed during the Nehru-Mahalanobis era on the freedom and ease of doing business. During the Nehru-Mahalanobis era, the government owned most of the large industrial enterprises, almost all the large financial institutions and all the non-land natural resources of the country. The NEP recommends transfer of the ownership of all the large industrial enterprises, financial institutions and non-land natural resources from the government to capitalists. In the area of public finance, the NEP has drastically reduced direct tax rates and imposed stringent restrictions on government's fiscal deficit, which stands for government's borrowing. Under the NEP, the government specifies a fiscal deficit target as a percentage of GDP and seeks to keep its fiscal deficit at the target level. The drastic reduction in the direct tax rates and the stringent fiscal deficit target has put the Government of India under the compulsion to take recourse to indirect taxes as the main instrument for financing its expenditure. As a result, the major part of government's tax revenue at the present comes from indirect taxes. The NEP has, therefore, transferred the burden of financing public expenditure from the capitalists to the workers to a large extent. Government of India has always been spending a large part of its expenditure on imported products. The present government is no exception. These developments in the area of public finance constitute the subject of Chapter 2. It seeks to identify the optimum mode of financing government's expenditure on imports and examines whether the fiscal deficit target makes the effects of different modes of financing public expenditure better or worse. Under the NEP, the RBI has set inflation targeting as a major objective of its monetary policy. The RBI at the present has set 4 percent as the inflation target. The RBI through its different policies regulates the interest rates. If the rate of inflation exceeds 4 percent, the RBI raises interest rates to lower the inflation rate to the target level. Chapter 3 of the thesis focuses on inflation. It seeks to identify the costs that inflation inflicts on the people of India and examines how inflation target and fiscal deficit target affect these costs. Petroleum and petroleum products, which we have referred to as oil in our thesis, have always been major items of import in India. Under the Nehru-Mahalanobis Programme, the government used to administer the domestic price of oil much below its international price to protect the people of India from the pernicious effects of hikes in the international prices of oil. The NEP has deregulated the price of oil and has made it equal to its international price. Chapter 4 of our thesis has made a comparative assessment of these two policies of pricing oil and seeks to

identify the one that is just and efficient. In what follows we will summarize and explain briefly the major results of Chapters 2, 3 and 4, which constitute the core of the thesis.

5.2. Chapter 2: Financing Public Expenditure on Imports under the New Economic Policy

We will report here the major results of the study carried out in this chapter and explain them briefly. However, to make these results and their explanations comprehensible, we will briefly delineate the objective of the study and the analytical framework that has been used to carry it out.

5.2.1 The Objective of the Study

We have already pointed out that the NEP has drastically reduced direct tax rates. As a result, indirect taxes have emerged as the major means of financing government expenditure. It has also imposed a fiscal deficit target, which constitutes a cap on government's borrowing. Government of India also spends a large part of its income on imported goods. In this chapter, we have sought to make an assessment of these aspects of the fiscal policy of the NEP. We have considered the case where the government raises its expenditure on imported goods and finances it by resorting to four different means of financing namely external borrowing, internal borrowing, taxation of capitalists' income and indirect taxation. We have examined the short term macroeconomic impacts of all these four policies both in the presence of the fiscal deficit target and in its absence. We have done this in order to identify the best policy of financing government expenditure on imported goods and also to assess whether the fiscal deficit target makes the effects of these policies better or worse. This endeavor is worthwhile because in the literature there is no study that has examined these issues. Now, we will describe in brief the analytical framework that we have used to achieve our objective.

5.2.2 The Analytical Framework

We have developed for our purpose a short-period model of a small open economy based on the lines suggested by Keynes (1936) and Kalecki (1954). Thus, in this model, aggregate output of goods and services is determined by aggregate final demand for goods and services and the price is set by applying a fixed mark-up to the average variable cost of production. Participants in production are divided into two classes: workers and capitalists. The latter earn profit, while the former supply labour. Workers are much poorer than the capitalists. Hence, workers' marginal propensity to consume out of their income is much higher than that of the capitalists. For simplicity, the amount of labour employed in production is assumed to be fixed. Thus, labour is treated as a fixed input here. This does not affect our results qualitatively. (Even

though this is a simplifying assumption that does not affect the results of the paper qualitatively, it can be justified in Indian context. In India, about half of the GDP is produced in the organized sector consisting of the large non-agricultural enterprises. However, it employs less than six percent of the work force and the number of workers employed in this sector has been more or less stagnant in the post-reform period. This was the case even though its output grew at the rate of around six percent per year on the average in the post-reform period. In the unorganized sector (consisting of agriculture and small non-agricultural enterprises), the major part of production is carried out in family firms and the family members earn profit, which is, however, a negligible part of the total profit. The profit earned by the small family firms is negligible relative to the total profit because they sell their produce to the capitalists. The small producers are numerous, while the capitalists are just a few in number and the bargaining strength of the small producers is virtually nil vis-à-vis the capitalists. The small producers have to sell their produce to the capitalists at the lowest possible price, which is set by the capitalists. The capitalists in turn sell the produce of the small producers to the consumers at the highest possible price. Hence, almost all the profit that production and sale of the produce of the small producers generate is reaped by the capitalists.)We have incorporated in this model the relevant salient features of the Indian economy. India's production is highly import intensive. It has to import petroleum and petroleum products, fertilizer, electronic goods and components on a large scale to sustain its production. Hence, in our model, imported intermediate inputs are used in production. Imported intermediate inputs are the only variable input in production in this model. Again, on the basis of the recent quarterly date of exchange rates for several years, we have deduced that India has a flexible exchange rate regime. Moreover, since India does not have any independent technological or knowledge base, we have assumed that investment in India is highly import intensive. Therefore, if the exchange rate goes up or the price of foreign non-oil goods rises, cost of investment in India will go up substantially. This will, given investors' expectations, reduce investment on a large scale. Thus, investment in our model is a decreasing function not only of the interest rate but also of the exchange rate, given the world prices of non-oil foreign goods in foreign currency. Again, since India does not have any independent base of knowledge and technology, close substitutes of almost all the goods it produces are available everywhere else. Accordingly, export demand for its products and demand for non-oil imports are likely to be highly price elastic. We have incorporated this feature also. Using this framework, we have sought to accomplish the objective of this paper. The two key endogenous variables of the model are the GDP and the exchange rate.

5.2.3 The Findings of Our Study

The results we have derived are the following. If the government finances the increase in its expenditure on imported products taking recourse to external borrowing, then, in the presence of the fiscal deficit target, there will take place a cumulative contraction in GDP. It will also

add to the government's future external debt service charges aggravating India's future BOP woes. This mode of financing is obviously unacceptable. Note that here contraction in GDP hurts the poor people engaged in production in the unorganized sector. It will reduce their income, which they get mainly in the form of profit.

We also find that the fiscal deficit target, which is an integral part of the NEP, is responsible for the severe contraction in GDP that recourse to external borrowing leads to. This happens for two reasons. First, the increase in government expenditure on imported goods is matched by an equal amount of fall in public expenditure on domestic goods in the presence of the fiscal deficit target bringing about an excess supply at the initial equilibrium levels of GDP and the exchange rate. Second, as producers reduce output to remove the excess supply, excess supply falls by a smaller quantity per unit fall in output, since a decline in output not only reduces private expenditure but also public expenditure. The public expenditure falls with a decline in GDP because it becomes an increasing function of GDP in the presence of the fiscal deficit target, which is specified as a fraction of GDP. In the absence of the fiscal deficit target, however, GDP remains unaffected. This is because the increase in government's expenditure on imported goods does not reduce its expenditure on domestic goods.

If the increase in government's expenditure on imported goods is financed by internal borrowing, GDP will almost surely contract substantially in India in the presence of the fiscal deficit target. This happens for the following reason. First, the increase in government's expenditure on imported goods by a given amount financed by internal borrowing produces two effects. It reduces government expenditure on domestic goods and creates BOP deficit by the same given amount. Hence, the exchange rate rises and raises net export net of government's imports by the same given amount (the net inflow of capital is assumed to be exogenously given in our model). Hence, aggregate planned demand for domestic goods at the initial equilibrium level of GDP remains unaffected. However, the rise in the exchange rate lowers investment demand directly. It also makes imported intermediate inputs costlier in terms of domestic currency. Hence, cost of production and, therefore, the domestic price level rise redistributing income from the workers to the capitalists. This lowers aggregate consumption demand since marginal propensity to consume of the workers is higher than that of the capitalists. Thus, at the initial equilibrium level of GDP, there emerges an excess supply of domestic goods bringing about a large and cumulative contraction in GDP. However, in the absence of the fiscal deficit target, GDP may change either way. Even if it contracts, its contraction will be substantially smaller than what happens under the fiscal deficit target. This happens on account of the following reasons. First, the given increase in government's expenditure on imported goods creates BOP deficit of the same given amount as that in the earlier case but leaves government's expenditure on domestic goods unchanged. The BOP

deficit induced increase in the exchange rate will raise net export net of the government's spending on imports by the same given amount. Hence, at the initial equilibrium level of GDP, aggregate planned demand for domestic goods will rise by the same given amount. However, the increase in the exchange rate will lower, for reasons already explained, aggregate consumption and investment demand. Clearly, therefore, in this case, GDP may expand also. In this case, the value of the multiplier is also less as public expenditure does not change with GDP. For this reason also, even if GDP contracts, its contraction will be substantially less in the present case.

Let us now consider the case where government's increased expenditure on imported goods is financed by collecting additional taxes from the capitalists. In this case, in the presence of the fiscal deficit target, GDP may even expand. In case it contracts, its contraction will be much less than what happens under the earlier two cases in the presence of the fiscal deficit target. Let us explain. When the government raises its expenditure on imported goods by a given amount and finances it by taxing capitalists' income, government's consumption expenditure goes up by the given amount, but capitalists' disposable income also falls by the given amount. This reduces capitalists' consumption. The fall in capitalists' consumption, however, is likely to be quite small because of their very low marginal propensity to consume. Thus, at the initial equilibrium GDP and exchange rate, there emerges an excess demand for domestic goods. It also creates BOP deficit, but it will be smaller than the given amount of increase in the government's expenditure on imported goods because of the fall in capitalists' consumption demand for imported goods. Thus, the BOP deficit created in this case at the initial equilibrium GDP and exchange rate will be less than that in the case of internal borrowing. Hence, the increase in the exchange rate and the consequent decline in aggregate consumption and investment demand will also be less. Thus, in this case, GDP may expand. If it contracts, its contraction is highly likely to be much less than that in the earlier two cases of internal and external borrowings in the presence of the fiscal deficit target.

In the absence of the fiscal deficit target, the value of the multiplier will be less in this case since government's marginal propensity to spend out of GDP becomes zero. This will make the contraction or expansion of GDP smaller.

Finally, we considered the case where the government raises its expenditure on imported goods by a given amount and finances it by raising indirect tax collection by the same amount. This will raise on the one hand government's consumption expenditure by the given amount. On the other hand, the given amount of additional indirect tax collection will come from both the workers and the capitalists. Hence, their consumption will fall. The fall in the aggregate planned consumption demand due to the additional tax collection of the given amount will be much

larger in the present case than that in the previous case of taxation of capitalists' income because marginal propensity to consume of the workers is substantially larger than the capitalists'. Hence, the amount of excess demand that will be created at the initial equilibrium level of GDP and the exchange rate in the present case will be much smaller than that in the previous case. The policy considered here will obviously also create BOP deficit at the initial equilibrium GDP and the exchange rate and it will be substantially larger than what is created in the previous case for two reasons. First, only a part of the given amount of additional tax comes from the capitalists and second, the hike in the indirect tax rate will raise the domestic price level and this will very substantially lower net export. The reason is the following. Since India does not have any technology and knowledge of its own, close substitutes of all the goods and services that India produces are produced everywhere else. Hence, even a slight increase in the prices of Indian goods ceteris paribus will very substantially lower net export. Therefore, the rise in the exchange rate and the consequent decline in consumption and investment demand will be much larger in the present case than that in the previous case. Hence, the GDP is very much likely to contract in the present case and its contraction will be much larger than that in the previous case. The policy of raising indirect tax collection is also highly unjust as a part of the tax comes from the poor people who have little ability to sacrifice.

In the absence of the fiscal deficit target, the value of the multiplier will be smaller since government's expenditure becomes independent of GDP. Hence, the amount of contraction in GDP will be less.

Summing up the above results, we find that in the presence of the fiscal deficit target, taxing capitalists' income is the best method of financing an increase in government's expenditure on imports as it may lead to an expansion in GDP. Even if that does not happen, the contraction in GDP will be the least. It is also eminently just, as it puts the burden of financing the additional expenditure on those who have the ability to sacrifice.

We also find that the fiscal deficit target produces strong recessionary tendencies when the additional public expenditure on imports is financed by internal or external borrowing. It also acts as an automatic destabilizer by making the multiplier values larger.

Our finding constitutes a strong critique of the NEP, which has drastically reduced direct tax rates on the rich, raised the importance of indirect taxes in financing government expenditure and made the fiscal deficit target an integral part of its recommended fiscal policy.

Fiscal deficit of course has longer term implications. It will add to government's debt service charges in future. This is considered bad by neoclassical economics. This line of though should be subjected to close scrutiny. We plan to take it up in our future research programme.

5.3 Chapter 3: Inflation and Stabilization Policies in India

We will present here the major results of this chapter and explain them briefly. However, to make the explanations comprehensible, we will have to briefly delineate the objective of this chapter and the analytical framework used to accomplish it.

5.3.1 The Objective

This chapter focuses on inflation. It seeks to identify the major costs that inflation inflicts on the people in India. It also seeks to examine how these costs are affected in the presence of the fiscal deficit target and inflation target. We pointed out in Chapter 2 that fiscal deficit target is an integral part of the fiscal policy of the NEP. It imposes a ceiling on the fiscal deficit (government's borrowing) as a proportion of GDP. Here we have focused on an aspect that the existing literature on fiscal deficit target has largely overlooked. We have examined here how the fiscal deficit target affects the adverse effects of inflation.

The kind of monetary policy being pursued these days all across the capitalist world including India is also a matter of grave concern for the poor toiling masses who are net lenders to the capitalists. One major objective of this monetary policy is inflation targeting. This means that, if the inflation rate rises above a target level, the RBI raises the interest rate to lower it to the target level. We seek to examine in this chapter how inflation targeting is likely to affect the costs of inflation in India.

We will now briefly present the main features of the analytical framework used to accomplish the objective.

5.3.2 The Analytical Framework

In this chapter, we have used the model of a small open economy developed in chapter 2. However, we have modified it slightly so that we can capture the major costs of inflation and the effects of fiscal deficit target and inflation target on them with ease. The model, as was the case with the earlier one, consists of a real sector and a financial sector. We consider the real sector first. As before, in the real sector, aggregate output is demand determined and the price is set on the basis of the average variable cost of production. However, we have treated labour as a variable input here. We have also replaced the rigid mark-up pricing rule of Chapter 2 with a more general one, where domestic price is just an increasing function of the average variable cost of production. The major determinants of the average variable cost of production that we have considered here are the exchange rate, government administered prices of essential intermediate inputs produced in the public sector such as railway fares, coal prices, power

tariffs etc., the indirect tax rate and the interest rate, which is a policy variable of the RBI. A number of essential intermediate inputs such as the ones mentioned above are produced in the public sector and their prices are administered by the government. These essential intermediate inputs enter into the production of all goods and services directly or indirectly. Clearly, the administered prices of these intermediate inputs are an important determinant of the average variable cost of production and, thereby, that of the domestic price level. As we have pointed out in Chapter 2, under the NEP, direct tax rates have been slashed drastically and indirect tax rates are being raised continuously to raise revenue. Obviously, indirect tax rates are also important determinants of the average variable cost of production and, thereby, that of the domestic price level. Finally, following Kalecki (1954), we have assumed that besides the average variable cost of production, domestic price level also depends upon the degree of monopoly power of the firms. We have taken this as exogenously given.

Let us now consider the financial sector. The RBI in India takes measures so that the interest rates remain at target levels. One of the major objectives of RBI's monetary policy is to keep inflation below a target level, which is 4 percent at the present. If the inflation rates go above the target level, the RBI takes steps to raise the interest rates. Now, the firms take loans not only to finance their investment but also to pay for intermediate inputs and factor services. A part of the interest charges on loans, therefore, is included in the average variable cost of production. An increase in the interest rate will, therefore, raise the average variable cost of production and, thereby, the domestic price level. As before, the two key endogenous variables in this model are the domestic GDP and the exchange rate.

Note that the theoretical framework used here considers an economy in a given period of time. In the given period of time, the price of the preceding period is given. Hence an increase in the domestic price in the given period implies an increase in the rate of inflation.

5.3.3 Major Results

We have used the framework described above to examine first how the welfare of the people is affected by an increase in the domestic price level following an exogenous increase in the degree of monopoly power of the firms. We have found that it will bring about a very large contraction in domestic GDP and employment. The increase in the domestic price level brings about a redistribution of income from the workers to the capitalists. Thus, workers will be very badly affected.

The reason why this happens may be briefly stated as follows. An exogenous increase in the monopoly power of the firms will raise the domestic price level at the initial equilibrium levels of GDP and the exchange rate. This will produce a strong contractionary effect for two reasons. First, it will redistribute income from the workers to the capitalists reducing aggregate

consumption demand. Second, as close substitutes of Indian products are available everywhere else for reasons we have already explained, the rise in the domestic price level will lead to a very large fall in net export. The exchange rate will, therefore rise and restore net export to zero. However, the rise in the exchange rate will lower investment demand. It will also raise the domestic price level further reducing consumption demand. A large excess supply will, therefore emerge at the initial equilibrium level of GDP. Hence, GDP and employment will fall substantially.

We have, then, examined how the fiscal deficit target affects the costs of an exogenous increase in the inflation rate when the government uses the following instruments to meet its fiscal deficit target: its own consumption expenditure, administered prices of the essential intermediate inputs that it produces and, finally, the indirect tax rates. Let us first focus on government's consumption expenditure. Following an exogenous increase in the degree of monopoly power of the firms, domestic price level will go up. This will, for reasons we have already explained, lead to a large contraction in GDP. This will, with government expenditure remaining unchanged, lower government's tax revenue and widen fiscal deficit beyond the target. In this case, the government will lower its consumption expenditure to meet its fiscal deficit target. This will, again, create excess supply of goods and services and GDP will fall again. Thus, there will be a cumulative contraction of GDP due to the fiscal deficit target when the government adjusts its consumption expenditure to meet the fiscal deficit target. Thus, in this case, the fiscal deficit target magnifies manifold the adverse impact of an exogenous increase in the rate of inflation.

Let us now focus on the second case. In this case, the government produces some essential intermediate inputs and uses the profit from the production and sale of the essential intermediate inputs to meet its fiscal deficit target. When fiscal deficit rises above the target level, it raises the prices of these essential inputs to raise profit and vice versa. Following an exogenous increase in the monopoly power of the firms, domestic price level rises. This, as we have already explained, will lead to a large contraction in GDP and employment. With government's expenditure remaining unchanged, this will lead to a widening of the fiscal deficit above the target level. The government will, therefore, raise the prices of the essential intermediate inputs. It will raise the domestic price level further bringing about another round of large contraction of GDP and employment and this process of contraction will continue. Thus, in this case also, the fiscal deficit target magnifies manifold the costs that an exogenous increase in the rate of inflation inflicts on the workers.

Let us now consider the case where the government adjusts indirect tax rates to meet its fiscal deficit target. In this case also, following an exogenous increase in the degree of monopoly

power of firms, the domestic price level rises and, for the reasons explained earlier, GDP and employment level contract by a large amount. With government's expenditure remaining unchanged, this will lead to an increase in the fiscal deficit above the target level. This will induce the government to raise indirect tax rates to reduce the fiscal deficit. This will lead to a further increase in the domestic prices. It will lead to another round of contraction in the levels of GDP and employment. This process of contraction will obviously proceed further. Thus, in this case also, the fiscal deficit target exacerbates the adverse effects of an exogenous increase in the rate of inflation.

Let us now bring in the inflation rate target. We have found that it exacerbates the harmful effects of an exogenous increase in the inflation rate. The reason is quite simple. Note that here the relevant set of domestic prices in the given period is the one that makes the domestic inflation rate equal to or greater than the target rate of inflation in the given period. Now, following an exogenous increase in the degree of monopoly power of the firms, domestic price level goes up. In the presence of the inflation target, the RBI will raise the interest rate to bring the price down. However, the rise in the interest rate will raise the variable cost of production inducing the producers to raise prices further. Thus, there will be a cumulative increase in the price level due to the inflation target at the initial equilibrium levels of GDP and the exchange rate. Hence, the contraction in GDP and the employment levels will be much larger. The price increase and the contraction will be more severe in the cases where the government uses the prices of essential intermediate inputs and indirect tax rates to keep the fiscal deficit at the target level. In these cases, following the initial large contraction in GDP, the fiscal deficit will rise above the target level. The government will hike the administered prices of essential inputs or indirect tax rates to lower the fiscal deficit. However, these measures will raise the domestic price level. This will induce a cumulative increase in the interest rate and the domestic price level. Thus, in every round the contraction in GDP and the employment level will be much larger.

Our study in this chapter shows that both fiscal deficit target and inflation target exacerbate substantially the adverse effects of inflation, given the ways the government and the central bank seek to achieve these targets. Thereby, it behoves us to consider the following issues. Fiscal deficit leads to an increase in government's debt service charges in future. This is considered bad by neoclassical economics. This view of fiscal deficit has to be subjected to close scrutiny. Moreover, the instruments that the government uses in India to keep the fiscal deficit under control, as we have shown here, magnifies manifold the adverse effects of an exogenous increase in the inflation rate. This chapter also shows that hiking interest rates to control inflation may reinforce inflationary forces and make the adverse effects of inflation much more pronounced. Given all these findings and observations, it is important to carefully study the following. First, whether a cap on the fiscal deficit is warranted or not? Second, what

is the best way of keeping the fiscal deficit under control, if such control is found to be necessary? Third, how the policy makers should keep inflation under control? We will take up these issues in our future research programme.

5.4 Chapter 4: The Appropriate Oil Price Policy for India – A Macro-Theoretic Study

We will present here the major results of this chapter and their brief explanations. However, to make them comprehensible, we have to delineate the objective of this chapter and the theoretical framework we have used to accomplish it.

5.4.1 The Objective

India is a large importer of petroleum and petroleum products, which we will refer to as oil. Oil is an essential intermediate input of production in India. An increase in the international price of oil is a major cause of inflation in India in the post-reform period. In the pre-reform period in 1975, an administered price setting mechanism with regard to oil was put in place to safeguard the people in India from the onerous effects of oil price hikes in the world market. Under this mechanism, the government administered the domestic price of oil for the people of India much below the world price of oil and kept it fixed there so that the Indians had access to the basic necessities of life at low and stable prices. With the beginning of Economic Reforms in India since July 1991, the administered price mechanism was being gradually dismantled with a view to making domestic price of oil equal to its international price. Government's rationale of linking the domestic price of oil to its international price is the following. If the domestic price of oil rises when its international price goes up, consumers get the signal that oil is scarcer and they get induced to economize on the use of oil. Similarly, the domestic producers of oil get the signal that oil is scarcer and they find it profitable and also get the resources to invest in the oil sector to increase its production. However, this argument for doing away with the administered price of oil is completely flawed for the following reason. Rationing a scarce good through a rise in its price is the cruelest means of rationing since it forces the poorer people out of the market of the scarce good, while the rich are hardly affected. For example, in India, if the price of oil rises, small farmers who own more than 85 percent of agricultural land will be forced to reduce their purchase of oil. It will lower food output. Food price will accordingly rise. This will force the poor to reduce their food consumption, while the rich will hardly be affected. Thus, the brunt of rationing through price increase is borne by the poor who are very badly and cruelly affected when they are forced to lower the consumption of essential scarce goods. In contrast, if the domestic price of oil is administered below the international price of oil at a low level so that the poor have access to all the basic necessities of life on an adequate scale, and the subsidy on the consumption of oil is financed by taxing the rich, then the brunt of rationing will be borne by rich, who make all the non-essential uses of oil. Obviously, this rationing scheme is fully just. The producers are not harmed in any manner as they receive the international price of oil. The objective of this chapter is to develop

this argument in a macro-theoretic framework suitable for India. The study undertaken in this chapter is worthwhile, since no other theoretical study in the relevant literature has sought to accomplish the objective noted above.

5.4.2 The Macro-Theoretic Framework

Here, we use the short-period model for a small open economy developed in Chapter 2. However, we reiterate below the major features of this framework to brush up our memory. Thus, in this model, aggregate output of goods and services is determined by aggregate final demand for goods and services and the price is set by applying a fixed mark-up to the average variable cost of production. Participants in production are divided into two classes: workers and capitalists. The latter earn profit, while the former supply labour. Workers are much poorer than the capitalists. Hence, workers' marginal propensity to consume out of their income is much higher than that of the capitalist. Besides labour, imported oil is used as an input in production. On the basis of recent quarterly date of exchange for several years, we have deduced that India has a flexible exchange rate regime. Again, since India does not have any independent technological or knowledge base, we have assumed that investment in India is highly import intensive. Therefore, if the exchange rate goes up or the price of foreign non-oil goods rises, cost of investment in India will go up substantially. This will, given investors' expectations, reduce investment on a large scale. Thus, Investment in our model is a decreasing function not only of interest rate but also of exchange rate, given the world prices of non-oil foreign goods in foreign currency. Again, since India does not have any independent base of knowledge and technology, close substitutes of almost all the goods it produces are available everywhere else. Accordingly, export demand for its products and demand for non-oil imports are likely to be highly price elastic. We have incorporated this feature also. Using this framework, we have sought to examine how a rise in the international price of oil is likely to affect aggregate output, employment and workers' economic well-being under free market conditions. We have also examined the impact of an increase in the international price of oil when the domestic price of oil is administered by the government below its international price and the subsidy is financed by taxing capitalists' income.

In the post-reform period, the government has cut direct tax rates drastically. It keeps direct tax rates unchanged but hikes indirect tax rates quite often to increase its revenue. As a result, at the present, the major part of government's tax revenue comes from indirect taxes (see Ghosh and Ghosh (2019) in this context). We have, therefore, also considered the case where the government finances the subsidy in the administered price regime by hiking indirect tax rates.

5.4.3 The Results Derived

The results that our study in **C**hapter 4 has yielded are the following. We have found that following an increase in the international price of oil under free market conditions, aggregate output and employment are highly likely to contract on a large scale and the real wage rate also falls substantially in India heaping untold miseries on the poor. The reason may be briefly stated as follows. Following an increase in the international price of oil, which is equal to the domestic price of oil under free market condition, a large BOP deficit will be created at the initial equilibrium values of the NDP and the exchange rate for two reasons. First, since demand for imported oil is price inelastic, the oil import bill rises. Second, the rise in the domestic price of oil raises the domestic price level. Since close substitutes of Indian products are available everywhere, for reasons we have already explained, there will take place a very large fall in the net export of non-oil goods. The exchange rate will, therefore, rise by a large amount and restore net export to zero again. However, the rise in the exchange rate has little impact on terms of trade or price of foreign goods in terms of domestic goods. This is because a rise in the exchange rate raises the price of oil in terms of domestic goods. Since Indian production is highly oil intensive, it will raise the domestic price level substantially. Therefore, an increase in the exchange rate raises net export mainly by lowing investment, which reduces import of capital goods. The very large increase in the domestic price level due to both the increase in the international price of oil and the exchange rate redistributes income from the workers to the capitalists lowering aggregate consumption demand on a large scale since marginal propensity to consume out of income of the workers is much larger than that of the capitalists. Because of the large fall in aggregate consumption and investment demand, there will emerge a large excess supply at the initial equilibrium value of NDP inducing producers to lower NDP substantially.

Let us now consider the case where the government administers the domestic price of oil below the international price of oil and finances the subsidy by taxing capitalists' income. In this case, we have found that if international price of oil rises and the government finances the increase in the subsidy by raising the tax on capitalists' income by such an amount that capitalists' consumption demand for imported goods falls by the amount by which the value of oil import has gone up, aggregate output and employment in all likelihood will stay unaffected. The price level and the real wage rate will remain unchanged also. This result may be explained as follows. Capitalists earn the major part of NDP as profit. They are also just a few in numbers. Accordingly, the amount of consumption expenditure they make, though substantial, constitutes a small fraction of their income. They consume the finest consumption items produced all across the world. Since India is a backward country, almost all the consumption goods that the capitalists consume have to be imported. Hence, their marginal propensity to spend on imported goods out of their consumption expenditure may reasonably be taken to be unity in India. If the amount of additional tax collected by the government equals the increase in the subsidy due to the rise in the international price of oil, capitalists' consumption demand

for imported goods will fall by a small fraction of it. To make it fall by the amount of the increase in the oil import bill, the amount of additional tax collected from the capitalists has to be much larger. This increase in the tax burden on the capitalists will lower capitalists' demand only for imported non-essential consumption goods. Aggregate demand for domestic goods at the initial equilibrium levels of the NDP and the exchange rate will remain unaffected. The BOP will also remain in equilibrium. Hence, the exchange rate, domestic price level, NDP and the real wage rate will remain unchanged as well.

Let us now consider the case where the increase in the subsidy on the use of oil due to the increase in the international price of oil is financed by hiking indirect tax rates on all goods. The burden of the indirect tax will be borne by both the workers and the capitalists and, hence, their consumption demand will fall. Since India does not have any independent technological or knowledge base and produces with imported technology, close substitutes of almost all the goods India produces are available everywhere else. Hence, the hike in the indirect tax rate and the increase in the domestic price level that it brings about leads to a very large fall in the net export of non-oil goods. The value of oil import has gone up too. Thus, at the initial equilibrium levels of NDP and the exchange rate, there emerges an excess supply of domestic goods and services and a very large BOP deficit. The exchange rate, therefore, begins to rise to raise net export back to zero. An increase in the exchange rate raises net export in two ways. First, the increase in the exchange rate makes foreign goods dearer relative to domestic goods inducing everyone to substitute domestic goods for foreign goods and, thereby, raising net export. Second, it reduces investment in India and, thereby, lowers import of capital goods. The first effect does not work much in the present case. This is because of two reasons. First, with the rise in the exchange rate, oil import bill increases. Second, with the rise in the exchange rate and the consequent increase in the oil import bill, the indirect tax rate goes up to finance the additional subsidy. This raises the domestic price level substantially. Thus, an increase in the exchange rate cannot make foreign goods much dearer relative to domestic goods. Because of the two reasons mentioned above, an increase in the exchange rate in the present case in India raises net export principally by lowering investment. Therefore, with the increase in the exchange rate at the initial equilibrium level of NDP, the excess supply of domestic goods will increase. Hence, there will take place a large contraction in NDP and employment. The real wage rate will go down too because of the increase in the domestic price level. If indirect tax rate is raised beyond the level that is necessary to finance the subsidy, the contraction in the levels of NDP and employment and the fall in the real wage rate will be larger.

The conclusion of this chapter is that the government should fix the domestic price of oil much below the international price of oil so that the poor workers in India have adequate access to the basic necessities of life. It should finance the subsidy on the use of oil by taxing the capitalists on an appropriate scale. This will protect the workers' jobs and incomes in the face of increases in the international price of oil, tax away a part of the surplus income of the capitalists and reduce their non-essential uses of oil.

The results that apply to oil also apply to all other essential imported intermediate inputs.

5.5. Concluding Observations

The thesis shows that the best mode of financing public expenditure on imported goods is by taxing the capitalists' income in the presence of a fiscal deficit target. It may benefit the workers. Even if it harms them, the harm done to the workers will be the least compared to what happens under the other modes of financing, namely, external borrowing, internal borrowing and indirect taxation. It also shows that the best policy regarding the pricing of oil or other essential imported intermediate inputs is to administer their prices below their international prices so that the poor have adequate access to the basic necessities of life in adequate quantities and finance the subsidy by taxing the capitalists. It also shows that the fiscal deficit target and inflation target produce strong destabilizing effects following an increase in the inflation rate for exogenous reasons. Hence, the rationale of the fiscal deficit target should be subjected to close scrutiny. Efforts should be made to identify the best methods of controlling inflation. We would take up these issues in our future research programme.

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