

CHAPTER 5

RESULTS

This chapter presents and discusses the results of the study. The chapter is divided into four parts. The first part of the chapter discusses the different scenarios (simulations) that were run for this study, followed by the presentation and discussion of results of the short run and long run versions of the model. Finally, the key findings are summarized.

5.1 Scenarios

In order to address the research questions of this study we ran seven simulations (denoted as SIM) each under the short run and long run versions of the model. As mentioned before Research Questions 1 and 2 are related to the efficiency and equity implications of MGNREGA under alternative assumptions about financing the program. Further, the incremental benefit that could be associated with the creation of productive assets, due to MGNREGA, is another issue of interest (Research Question 3). Consumption smoothing is one of the main objectives of employment guarantee programs, and the extent to which MGNREGA could be successful in this regard is another research issue (Research Question 4). The final research question is related to the optimal allocation of scarce public resources (Research Question 5). In other words, Research Question 5 deals with investments in MGNREGA vis a vis investments in other sectors of the economy.

In order to address Research Question 1, the effects of higher transfers (0.5 percent of GDP) to poor rural households, according to their population shares based on Sundaram and Tendulkar (2003), were estimated (SIM 1). In SIM 2 the transfers to rural households are financed through direct taxes, and this simulation addresses Research Question 2. Research

Question 3 is addressed by estimating the effects of higher agricultural productivity along with higher transfers to rural households (SIM 3). Two simulations were run to address Research Question 4 – first a scenario (SIM 4) with lower agricultural productivity is run, and then we compare it with a scenario (SIM 5) with lower agricultural productivity and higher transfers to rural households. A comparison of SIM 4 and SIM 5 provides estimates of the consumption smoothing benefits of MGNREGA. Finally, Research Question 5 is addressed by simulating the effects of higher subsidies (equivalent to transfers under MGNREGA) to agriculture (SIM 6) and to manufacturing (SIM 7). For each of the above simulations, the effects on GDP, welfare (aggregated and disaggregated), factor prices, factor income, factor supplies, fiscal deficit, production, and prices (consumer prices) are presented.

5.2 Short run effects

In this section the short run effects (Table 5.1 and Table 5.2) are presented. As discussed earlier, the short and long run versions of the model differ in the treatment of sectoral capital and the economy wide rental rate of capital. In the short run, sectoral capital and the economy wide rental rate are held fixed, and a sectoral distortion factor clears the capital market.

5.2.1 Effect on GDP

The results show that there is a positive effect on GDP in all the scenarios, except in SIM 4 where there is a decline in GDP. The highest increase in GDP is observed in SIM 6, where public investments (in the form of subsidies) are made in the agriculture sector, instead of investments in MGNREGA. In SIM 6 there is significant increase in agricultural output and lower agricultural prices. Thus, the critical role of public investments in agriculture for

enhancing growth is revealed through SIM 6. It is interesting to note that changes in GDP are much lower, although positive, in SIM 2 and SIM 7, relative to the other scenarios. In other words, financing MGNREGA through taxes (SIM 2) or subsidizing the manufacturing sector instead of spending equivalent resources on MGNREGA are relatively inefficient policy options. There is loss in GDP in SIM 4, where the effect of lower agricultural productivity is modelled.

These results in general validate the results of previous studies. The main difference between our results and the literature (Narayan et al, 1988) is that we find that financing MGNREGA through taxes significantly reduces the benefits (GDP) to the economy relative to a scenario where tax rates are fixed, while the results are just the opposite in case of the Narayan et al (1988) study. The differences arise due to different assumptions (closures) of the models. We assume that aggregate investment is unaffected (fixed investment) while the Narayan study assumes that aggregate investment is affected (flexible investment) in the scenario where tax rates are fixed. In other words, we assume an investment driven closure while the Narayan study assumes a savings driven closure.

Table 5.1: Short run macro effects

	Unit	SIM1	SIM2	SIM 3	SIM 4	SIM 5	SIM 6	SIM 7
Transfer/subsidy amount	billion rupees	116.30	116.30	116.30	NA	116.30	116.30	116.30
GDP change	billion rupees	93.36	8.57	98.18	-4.82	88.54	135.06	1.99
Aggregate welfare change (equivalent variation)	billion rupees	118.68	11.35	121.45	-2.76	115.92	113.54	41.64
Household welfare change (equivalent variation)								
RH1	billion rupees	12.15 (1.7)	3.24 (0.5)	12.35 (1.7)	-0.19 (0)	11.95 (1.7)	11.92 (1.7)	2.38 (0.3)
RH2	billion rupees	60.15 (3.5)	38.74 (2.3)	60.68 (3.5)	-0.53 (0)	59.62 (3.5)	29.87 (1.7)	6.57 (0.4)
RH3	billion rupees	8.56 (4.1)	6.13 (2.9)	8.60 (4.1)	-0.05 (0)	8.51 (4.0)	2.70 (1.3)	0.57 (0.3)
RH4	billion rupees	28.29 (2.1)	12.37 (0.9)	28.82 (2.1)	-0.53 (0)	27.75 (2.1)	20.46 (1.5)	4.77 (0.4)
RH5	billion rupees	6.86 (0.7)	-4.95 (-0.5)	7.16 (0.7)	-0.30 (0)	6.55 (0.6)	12.52 (1.2)	5.02 (0.5)
Rural	billion rupees	116.01	55.53	117.61	-1.6	114.38	77.47	19.31
UH1	billion rupees	0.08 (0)	-8.40 (-0.9)	0.40 (0)	-0.32 (0)	-0.24 (0)	8.10 (0.9)	1.99 (0.2)
UH2	billion rupees	1.86 (0.1)	-29.83 (-0.9)	2.62 (0.1)	-0.75 (0)	1.11 (0)	23.97 (0.7)	19.94 (0.6)
UH3	billion rupees	0.68 (0.2)	-3.60 (-1.2)	0.76 (0.3)	-0.08 (0)	0.60 (0.2)	3.57 (1.2)	1.45 (0.5)
UH4	billion rupees	0.07 (0)	-2.34 (-0.9)	0.07 (0)	-0.00 (0)	0.06 (0)	0.42 (0.2)	-1.03 (-0.4)
Urban	billion rupees	2.69	-44.17	3.85	-1.15	1.53	36.06	22.35
Wage rate								
Rural labour	percent change	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban labour	percent change	-1.17	-0.10	-1.12	-0.05	-1.22	0.29	0.44
Capital	percent change	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Factor income								
Rural labour	percent change	0.78	0.18	0.76	0.01	0.79	1.46	0.42
Urban labour	percent change	0.01	-0.02	0.06	-0.04	-0.03	1.04	0.76
Capital	percent change	0.94	0.05	0.96	-0.03	0.91	1.71	0.90
Factor supply								
Rural labour	percent change	0.78	0.18	0.76	0.01	0.79	1.46	0.42
Urban labour	percent change	1.18	0.06	1.17	0.01	1.19	0.76	0.30
Capital	percent change	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fiscal deficit	percent change	5.20	-0.19	5.20	-0.02	5.20	5.90	6.60

*Figures in parentheses are equivalent variation relative to base level consumption expenditure in percent

5.2.2 Effect on welfare

The effect on welfare is estimated for the different scenarios. Welfare is measured in terms of equivalent variation. Equivalent variation measures the amount of money we would have to give (or take) to provide the representative consumer with the same level of utility as he or she would have obtained after the policy reform. In other words, it is the money value of the policy change before it actually happens. If we want to compare many potential changes to the status quo, the equivalent variation is the best option since the price vector used in all comparisons is the same, that is, the status quo price vector. There is a close relationship between equivalent variation and Pareto efficiency. An allocation is defined as potentially Pareto efficient if no agent could make a lumpsum transfer to another agent and make everyone at least as well off. According to the potential Pareto efficiency criterion, a change is beneficial if it would be possible to compensate all the losers from the change and still make some people strictly better off. In practice losers may not receive any compensation, but the logic of the argument is that a change is beneficial if it generates enough money to make everyone better off.

There is increase in aggregate welfare (sum of household welfare) in all the scenarios, except in SIM 4, implying that all the scenarios are beneficial (Pareto efficient) for society. The highest increase in welfare is observed in SIM 3, where MGNREGA transfers are accompanied by increase in agricultural productivity, as a result of creation of productive assets. A disaggregation of the welfare effects across household groups reveals that rural household groups are better off in all the scenarios, except in SIM 4. Among the rural household groups the welfare effects are significantly larger for the rural labour categories (RH2 and RH3) in the scenarios where transfers take place (SIM 1, 2, 3 and 5). The

implication is that MGNREGA has a huge potential to improve living standards and reduce inequality. However, the welfare benefits associated with these two household groups reduce if the program is financed through taxes (SIM 2). In SIM 2 all the urban households are worse off, as most of the tax burden is on these groups, and this in turn has a significant negative impact on rural consumption. Although the commonly held view in India is that rural consumption fuels urban consumption, SIM 2 shows that urban consumption also has a major role in determining rural consumption levels. Thus, financing the program through direct taxes could significantly reduce the benefits to the most vulnerable rural household groups. In SIM 6, where equivalent resources are spent of subsidizing agriculture instead of increasing transfers through MGNREGA, welfare benefits are observed for all household groups. The welfare gains are more or less evenly distributed among the different rural household groups. From an efficiency perspective SIM 6 is the best, however, from a welfare perspective subsidizing the agriculture sector is not the best option. Investments in MGNREGA coupled with higher agricultural productivity gives the highest returns from a welfare perspective.

5.2.3 Effects on factor prices, factor income and factor supply

As mentioned earlier the economy wide wage rate of rural labour and capital are fixed, while the wage rate of urban labour is flexible, in the model. The results show that the wage rate of urban labour falls in all the scenarios, except in SIM 6 and 7, where subsidies are provided to agriculture and manufacturing, respectively. In SIM 1, 2, 3, and 5, where transfers to rural households are modelled, rural labour becomes relatively more expensive than urban labour. In other words, MGNREGA has an effect on the rural labour market by increasing rural wages. As a result there is a higher increase in rural labour income compared to urban labour income in the scenarios involving transfers. The increase in rural labour income has a

relatively bigger impact on the rural labour household groups (RH2 and RH3). Rural labour income increases under the agricultural productivity shock scenario (SIM 4) also due to the assumption of fixed rural wage rate. Berg et al (2012) have studied the effects of MGNREGA on agricultural wages at the district level in India and they find that the program leads to an average annual increase in real daily agricultural wages of 5.3 per cent. Interestingly, in SIM 6 and 7 the effects on wage rates are reversed. In these two simulations urban labour becomes relatively more expensive. Finally, there is a positive impact on the supply of both rural and urban labour in all the scenarios.

5.2.4 Effect on fiscal deficit

Fiscal deficit increases by a significant amount, ranging from 5 to 7 percent, relative to the baseline, in the scenarios involving transfers or subsidies. The increase in deficit is relatively higher in the scenarios involving subsidies (SIM 6 and SIM 7), and one reason for this observation could be that in these scenarios there is a weak linkage for generating additional savings in the economy relative to the other scenarios where direct transfers to households result in higher household savings (savings rate for households is fixed in the model) and a lower deficit. In other words there is more crowding out of private savings in SIM 6 and SIM 7 relative to the other scenarios. The effect on the fiscal deficit is almost negligible in SIM 2 where transfers are financed through taxes.

5.2.5 Effects on production and prices

The results show that there is increase in production in most scenarios and sectors. In SIM 4, however, there is negligible impact on production. Interestingly, the highest increase in

production is observed in case of agriculture in all the scenarios except SIM 7 (subsidy to manufacturing), where a manufacturing sector (MANU 2) experiences the highest increase in production. The implication is that transfers to rural households and subsidies to agriculture stimulate agricultural growth, the effect being stronger in case of the latter. Further, transfers increase food prices, while subsidies to agriculture lower food prices.

Table 5.2: Short run effects on production and prices (percent change relative to baseline)

	SIM1	SIM2	SIM 3	SIM 4	SIM 5	SIM 6	SIM 7
Production							
Agriculture	1.02	0.24	1.08	-0.05	0.97	1.45	0.18
Mining	0.26	0.01	0.26	0.00	0.26	0.14	0.06
Manufacturing1	0.97	0.19	1.00	-0.03	0.94	0.98	0.06
Manufacturing2	0.46	0.02	0.46	0.00	0.46	0.26	0.79
Construction	0.05	0.00	0.05	0.00	0.05	0.04	0.02
Electricity	0.80	0.09	0.81	-0.01	0.80	0.59	0.38
Transport	0.85	0.02	0.86	-0.01	0.84	0.64	0.30
Trade	0.76	0.02	0.77	-0.01	0.75	0.60	0.09
Financial services	0.65	-0.08	0.65	0.00	0.64	0.47	0.18
Commercial services	0.57	-0.02	0.57	0.00	0.57	0.39	0.09
Consumer price							
Agriculture	0.33	0.11	0.22	0.11	0.44	-1.52	0.11
Mining	0.00	0.00	0.00	0.00	0.00	0.46	-0.30
Manufacturing1	0.10	0.00	0.10	0.00	0.10	0.00	0.00
Manufacturing2	-0.20	0.00	-0.20	0.00	-0.30	0.49	-1.78
Construction	-0.32	-0.08	-0.32	-0.08	-0.40	0.24	-0.40
Electricity	0.00	0.00	0.00	-0.11	-0.11	0.76	0.11
Transport	-0.20	0.00	-0.10	0.00	-0.20	0.61	-0.20
Trade	0.25	-0.13	0.25	-0.13	0.13	0.89	0.38
Financial services	0.69	-0.35	0.69	0.00	0.52	1.38	0.69
Commercial services	-0.63	-0.08	-0.55	-0.08	-0.63	0.39	0.00

5.3 Long run effects

In this section the long run effects (Table 5.3 and Table 5.4) are discussed. As mentioned earlier, in the long run, capital is mobile across sectors and the economy wide rental rate of capital adjusts to clear the capital market. The total supply of capital is fixed.

5.3.1 Effect on GDP

The results show that there is a positive effect on GDP in all the scenarios, except SIM 4 and SIM 7 where there is a decline in GDP. The highest increase in GDP is observed in SIM 6, as in the short run, where public investments (in the form of subsidies) are made in the agriculture sector, instead of investments in MGNREGA. Further, the results suggest that lower agricultural productivity (SIM 4) and subsidies to manufacturing (SIM 7) reduce efficiency in the economy.

5.3.2 Effect on welfare

There is increase in aggregate welfare in all the scenarios, except SIM 4, as in the short run. The highest increase in welfare is observed in SIM 3, where MGNREGA transfers are accompanied by increase in agricultural productivity, as a result of creation of productive assets. It is interesting to note that while subsidies to manufacturing are detrimental from an efficiency perspective in the long run, the same does not hold true from a welfare perspective. In other words subsidies to manufacturing have positive welfare effects in the long run. Manufactured goods form a sizeable part of household consumption, and subsidies to manufacturing lower the price of manufactured goods thus leading to improvement in welfare. In the short run, subsidies to manufacturing have positive effects on both efficiency

and welfare. Rural households suffer welfare losses in SIM 4, while urban households suffer welfare losses in SIM 2 and SIM 4, as in the short run.

5.3.3 Effects on factor prices, factor income and factor supply

The results show that the wage rate of urban labour falls in all the scenarios, except SIM 6 and SIM 7, where subsidies are provided to agriculture and manufacturing, respectively. This result is similar to the result obtained in the short run. The rental rate of capital increases or remains the same across the scenarios. In general income increases for all the factors and in all the scenarios, except SIM 2, where urban labour is worse off, and SIM 4, where both urban labour and capital are worse off. Finally, there is increase in labour supply across both rural and urban labour markets in all the scenarios, although the magnitude of increase varies considerably across the scenarios.

5.3.4 Effect on fiscal deficit

Fiscal deficit increases by a significant amount, ranging from 5 to 7 percent, relative to the baseline, in the scenarios involving transfers (without higher taxes) or subsidies, while there is almost negligible effect in SIM 2 (transfers financed through taxes) and SIM 4 (lower agricultural productivity). In general the effect on the fiscal deficit in the long run version of the model is relatively less (lower fiscal deficit) compared to the effect in the short run version of the model. The policy implication is that government spending must be accompanied by an investment friendly regulatory framework in order to reap higher economic benefits.

Table 5.3: Long run macro effects

	Unit	SIM1	SIM2	SIM 3	SIM 4	SIM 5	SIM 6	SIM 7
Transfer amount	billion rupees	116.30	116.30	116.30	NA	116.30	116.30	116.30
GDP change	billion rupees	123.99	11.28	127.58	-3.59	120.41	161.84	-14.19
Aggregate welfare change (EV)	billion rupees	134.48	12.05	136.72	-2.23	132.24	130.41	35.06
Household welfare change (EV)								
RH1	billion rupees	13.32 (2.1)	3.52 (0.5)	13.45 (2.1)	-0.14 (0)	13.18 (2.0)	13.34 (2.1)	1.93 (0.3)
RH2	billion rupees	63.22 (4.1)	39.43 (2.5)	63.60 (4.1)	-0.37 (0)	62.84 (4.0)	33.57 (2.2)	5.54 (0.4)
RH3	billion rupees	8.86 (4.5)	6.15 (3.1)	8.90 (4.5)	-0.03 (0)	8.83 (4.5)	3.07 (1.6)	0.47 (0.2)
RH4	billion rupees	30.32 (2.4)	12.83 (1.0)	30.69 (2.5)	-0.37 (0)	29.94 (2.4)	23.02 (1.8)	3.66 (0.3)
RH5	billion rupees	8.49 (0.9)	-4.86 (-0.5)	8.73 (0.9)	-0.24 (0)	8.24 (0.9)	14.28 (1.5)	4.33 (0.4)
Rural	billion rupees	124.21	57.07	125.37	-1.15	123.03	87.28	15.93
UH1	billion rupees	1.59 (0.2)	-8.34 (-0.9)	1.84 (0.2)	-0.25 (0)	1.34 (0.2)	9.73 (1.1)	0.90 (0.1)
UH2	billion rupees	7.10 (0.2)	-30.68 (-0.9)	7.84 (0.3)	-0.74 (0)	6.36 (0.2)	28.59 (0.9)	18.43 (0.6)
UH3	billion rupees	1.16 (0.4)	-3.56 (-1.3)	1.23 (0.5)	-0.07 (0)	1.10 (0.4)	4.08 (1.5)	1.28 (0.5)
UH4	billion rupees	0.43 (0.2)	-2.43 (-0.9)	0.44 (0.2)	-0.01 (0)	0.43 (0.2)	0.73 (0.3)	-1.48 (-0.6)
Urban	billion rupees	10.28	-45.01	11.35	-1.07	9.23	43.13	19.13
Wage rate								
Rural labour	percent change	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban labour	percent change	-1.29	-0.10	-1.24	-0.10	-1.34	0.19	0.48
Capital	percent change	1.14	0.00	1.14	0.00	1.14	2.09	0.76
Factor income								
Rural labour	percent change	0.99	0.18	0.98	0.01	1.01	1.69	0.43
Urban labour	percent change	0.18	-0.01	0.22	-0.04	0.14	1.25	0.73
Capital	percent change	1.22	0.09	1.24	-0.02	1.20	2.07	0.87
Factor supply								
Rural labour	percent change	0.99	0.18	0.98	0.01	1.01	1.69	0.43
Urban labour	percent change	1.45	0.08	1.43	0.01	1.46	1.05	0.24
Capital	percent change	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fiscal deficit	percent change	5.10	-0.17	5.10	-0.02	5.10	5.80	6.50

5.3.5 Effects on production and prices

The results show that in general there is increase in production across scenarios and sectors. In SIM 4 there is negligible impact on production. The highest increase in production is observed in case of agriculture in all the scenarios except SIM 7 (subsidy to manufacturing), where a manufacturing sector (MANU 2) experiences the highest increase in production. Food prices increase in all the scenarios, except in SIM 6, where agricultural production is subsidized. Again these results are similar to the short run case.

Table 5.4: Long run effects on production and prices (percent change relative to baseline)

	SIM1	SIM2	SIM 3	SIM 4	SIM 5	SIM 6	SIM 7
Production							
Agriculture	1.32	0.32	1.36	-0.04	1.28	1.83	0.08
Mining	0.18	0.00	0.18	0.00	0.18	-0.07	-0.12
Manufacturing1	1.22	0.24	1.24	-0.02	1.20	1.23	-0.05
Manufacturing2	0.46	0.01	0.46	0.00	0.46	0.24	1.00
Construction	0.06	0.00	0.06	0.00	0.06	0.05	0.02
Electricity	0.91	0.10	0.92	-0.01	0.90	0.68	0.42
Transport	0.98	0.03	0.99	-0.01	0.97	0.77	0.27
Trade	0.95	0.02	0.96	-0.01	0.94	0.79	0.07
Financial services	0.91	-0.16	0.92	-0.01	0.90	0.72	0.23
Commercial services	0.65	-0.02	0.65	0.00	0.65	0.48	0.04
Consumer price							
Agriculture	0.23	0.00	0.12	0.12	0.23	-2.10	0.23
Mining	0.21	0.00	0.21	0.00	0.21	1.04	-0.62
Manufacturing1	0.10	0.00	0.10	0.00	0.10	0.00	0.10
Manufacturing2	0.00	0.00	0.00	-0.11	0.00	0.79	-2.60
Construction	-0.09	0.00	-0.09	-0.09	-0.09	0.54	-0.45
Electricity	0.11	0.00	0.11	-0.11	0.00	1.00	-0.11
Transport	0.00	0.00	0.00	0.00	-0.10	0.80	-0.20
Trade	0.11	0.00	0.22	0.00	0.11	0.89	0.56
Financial services	0.39	0.00	0.39	0.00	0.39	1.42	0.52
Commercial services	-0.50	0.00	-0.42	-0.08	-0.50	0.58	0.00

5.3 Key findings

There is positive effect on growth and welfare under MGNREGA. The highest increase in aggregate welfare is observed when MGNREGA transfers are accompanied by increase in agricultural productivity, as a result of creation of productive assets. In general, MGNREGA leads to significant welfare gains for rural labour households relative to other households. The implication is that MGNREGA has a huge potential to improve living standards of the poorest, and reduce inequality in society. However, it is not the best option in terms of enhancing growth. The highest increase in GDP is observed when equivalent investments (in the form of subsidies) are made in the agriculture sector instead of MGNREGA.

The mode of financing MGNREGA affects the results. Financing the program through taxes significantly reduces growth and welfare gains relative to scenarios where the program is financed through government borrowings. Thus, financing MGNREGA through taxes is not a good policy option.

MGNREGA affects the rural labour market by increasing rural wages relative to urban wages. There is higher increase in rural labour income compared to urban labour income in the scenarios involving transfers. The program also leads to higher employment in both rural and urban areas. Finally, MGNREGA significantly increases the demand for food thus stimulating agricultural production and prices.

The results of the short and long run versions of the model, in general, are similar in direction but different in magnitude. In the long run the effects on GDP and welfare are stronger relative to the short run, mainly because there is more flexibility in terms of resource allocation (intersectoral mobility of capital). Therefore, effects on factor income and supply

are stronger in the long run case. The implication is that MGNREGA could have significant effects on resource allocation in the economy in the long run. The effects of MGNREGA are not only confined to rural India but are spread throughout the economy. Even though MGNREGA is designed to provide short term relief to the rural poor, it has the potential to bring about long term structural changes in the economy.

Thus, our findings address the research questions of the study. First, we find that alternative ways of financing MGNREGA could lead to significantly different effects on the economy. Financing the program through taxes significantly reduces growth and welfare. Second, if the program leads to higher agricultural productivity, welfare gains are particularly large. Third, the consumption smoothing benefits of MGNREGA are very high. Comparison of a scenario of agricultural productivity shock with a scenario of agricultural productivity shock along with MGNREGA reveals that MGNREGA could be an ideal tool to smooth consumption in both rural and urban areas during times of distress. Finally, investments in MGNREGA could lead to equivalent or higher welfare gains relative to alternative investments in the economy.