Place-Based versus Place-Neutral Policies for Promoting Regionally Balanced Economic Growth: A Sri Lankan Case using CGE based Simulation

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Abstract

Reducing regional disparities while maintaining economic growth represent a major challenge for many developing countries like Sri Lanka. This study analyzes the advantages of place-based versus place-neutral polices for generating national and regional economic growth. Simulation experiments are carried out based on selected agricultural policies using a disaggregated Sri Lankan bottom-up regional Computable General Equilibrium (CGE) model developed by the author. Preliminary results suggest that place-neutral policies are better in terms of national growth; but place-based policies are better in terms of regional disparity reduction impacts. However these results may depend on the nature of the policies and the targeted industry.

Introduction

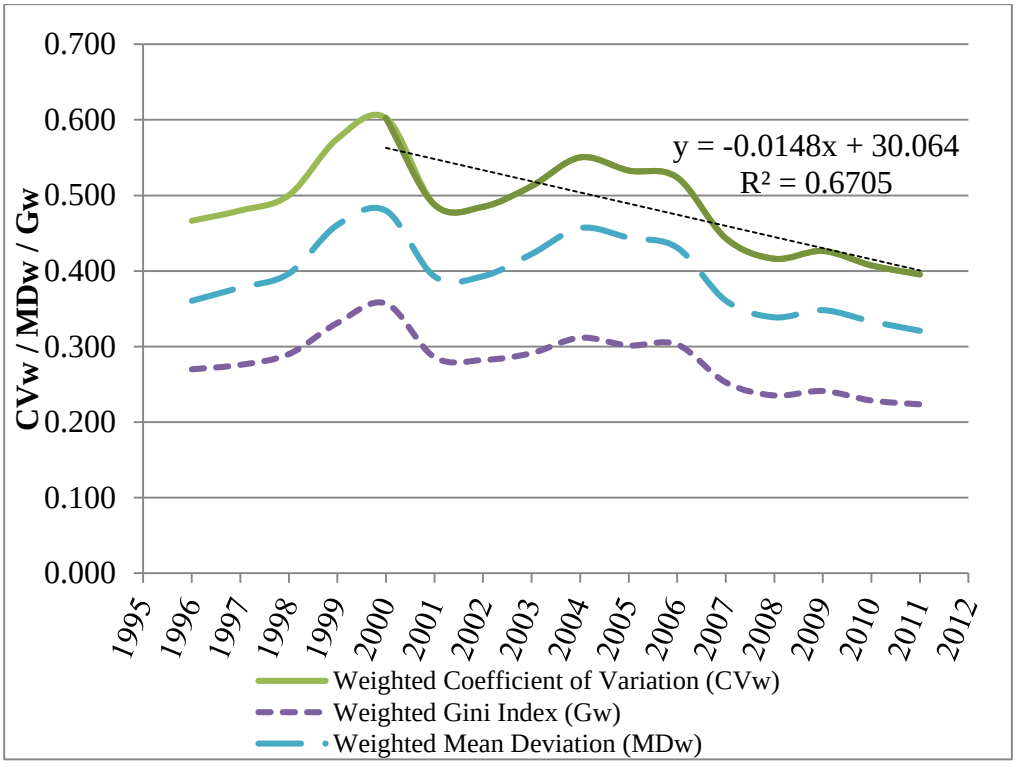
The role of space and regional equity in economic growth has become increasingly emphasized. Growth theories of the mid-nineteenth century were mostly targeted at increasing national output and achieving national economic efficiency. These theories fail to explain growth patterns observed in the 1980s and 1990s, and new theories with spatial dimensions have emerged (Barca et al., 2012; Gill, 2010; Vanthillo & Verhetsel, 2012). Two broadly defined development policy approaches exist: *Place-based* and *place-neutral*. Policies designed without explicit consideration to space represent "place-neutral" or spatially blind policies. By contrast, "Place-Based" policies explicitly target enhanced growth in particular locations.

The development problem of low income countries, such as Sri Lanka, is twofold. Firstly they have to find means of increasing national economic growth. Secondly they often have to also explore ways of overcoming socially unfavorable yet persistent regional economic disparities (Smith, 2004). Regionally balanced economic growth may seem to provide solutions for both of these goals (Aghion et al., 1999; Couttenier & Soubeyran, 2013), however few empirical studies exist aimed at identifying the most appropriate policy mix for achieving that kind of growth.

Sri Lankan Case

According to IMF and World Bank classifications, Sri Lanka is a lower middle income country (Senadhira, 2010; World Bank, 2013) with per capita income of 2,923 USD in 2012 (CBSL, 2013). Three well established regional inequality indices, namely the population weighted coefficient of variation CV_w, the population weighted Gini coefficient and population weighted mean deviation MD_w are summarized in Figure 1. Regional inequality increased between1996 and 2000, with some downward trend evident from 2000 (Wijerathna et al. (2012).

Figure 1: Regional disparity in per capita GDP



Source: Wijerathna et al (2012)

Notes:

1. $CV_w = \frac{\sqrt{\sum_1^n (Y_i - \bar{Y})^2 \frac{P_i}{P}}}{\bar{Y}}$ where Y_i = PGDP of i^{th} province, $\bar{Y}$ = national per capita GDP, P_i = population of the i^{th} province and P = national population. The value of CV varies from 0, for a perfectly equal provincial distribution, to $\sqrt{(P - P_i)/P_i}$ for a perfectly unequal distribution where a single province generates the entire national GDP.
2. $G_w = \left(\frac{1}{2\bar{Y}}\right) \sum_1^i \sum_1^j |Y_i - Y_j| \frac{P_i P_j}{P^2}$ where $\bar{Y}$ = national per capita GDP, Y_i and Y_j = per capita GPDP of i^{th} and j^{th} provinces, P_i and P_j = population of i^{th} and j^{th} provinces, P = national population and both i and j represent different provinces. G_w varies from 0, for a perfectly equal distribution to 1-(Pi/P) for a perfectly unequal distribution.
3. $MD_w = \left(\sum_1^n (|Y_i - \bar{Y}|) \frac{P_i}{P}\right) / \bar{Y}$ where Y_i = per capita GPDP of i^{th} province, $\bar{Y}$ = per capita GPDP of the country, P_i = population of i^{th} province, N = number of provinces and P = national population. MD_w has the value of 0 for a perfectly equal distribution and varies up to 2P(N-1)/ P_i for a perfectly unequal distribution.

Following the end of the civil war in 2009 analysts have focused attention on the need to enhance development while simultaneously addressing regional disparities (UNDP, 2012; Wright, 2009). A target for achieving a regionally balanced development while maintaining a steady 7% per annum national economic growth has been articulated by the government (NPD, 2010). Such regionally balanced growth strategies are aimed at reconciliation and thereby to act to reduce the possibilities for future internal conflicts.

The Analytical Approach

After reviewing methods for analyzing the regional impact of development policies, a computable general equilibrium modeling (CGE) technique was selected for this study.

There are two kinds of regional CGE models, namely top-down and bottom-up (Horridge, 2012; Wittwer & Horridge, 2010). In top-down models, optimizations takes place at the national level and the resulting national output is allocated to regions based on some externally provided fixed shares. This technique requires less data and may be appropriate for mostly homogenous regions, but it is unable to capture the variations resultant from heterogeneous regions that characterize virtually all nations (Böhringer, 1998; Pham, 2004; Sabatier, 1986; Smith, 1986). Bottom-up models can overcome this concern (Horridge et al., 2005). In this approach, regions are considered as separate sub-economies and optimizations take place regionally.

The (Australian) Enormous Regional Model (TERM) is a comparatively less complex, less data hungry bottom-up regional CGE model (Horridge, 2012). Wittwer and Horridge (2010) argue that TERM represents a good approach for adoption in a country with limited regional data and less significant regional governments. Considering the availability of data and the characteristics of

regional governments in Sri Lanka, this approach was identified as the most appropriate for this study.

Sri Lanka has experience in using CGE models for research purposes. The first Sri Lankan national CGE model was constructed by de Melo (1978) following the structure of the static level form models of the World Bank. A second CGE model for Sri Lanka was developed by Blitzer and Eckaus (1987). The first Johansen style CGE model for Sri Lanka was constructed by Bandara (1989) following the structure of the Australian ORANI model. Subsequently other authors have followed the same structure (Bandara & Coxhead, 1999; CIE, 1992; Kandiah, 1999; Liyanaarachchi, 2012; Naranpanawa, 2005; Somaratne, 1998). Naranpanawa and Bandara (2011) and Gunawardena (2012) incorporated top down regional extensions. Weerahewa (2002a, 2002b, 2004) used a GAMS based CGE model.

Sri Lankan Bottom-up Regional Model

In our Sri Lankan Bottom-up Regional CGE (SLBRCGE) model the nine provinces of Sri Lanka comprise the regions. The SLBRCGE model has 65 sectors. Calibration of the model started with an unpublished SUT and I-O table for year 2006 produced by the Department of Census and Statistics of Sri Lanka under a project funded by the Asian Development Bank.

Since our policy experiments would be best conducted with a base year that represents the post-civil war situation, the model database was systematically updated to a 2011 base. The adjuster program developed by Horridge (2004) was used in updating the 65 sector model database to the year 2011. The updated database and some other regional economic data collected from number of Sri Lankan sources, including the Central Bank of Sri Lanka, were then used as inputs in producing the database for the Sri Lankan bottom-up regional model of Australian TERM structure. Since inter-regional trade data are not readily available, the interregional trade matrix was estimated by adopting the gravity model and associated techniques of Horridge et al. (2005).

The Policy Experiment

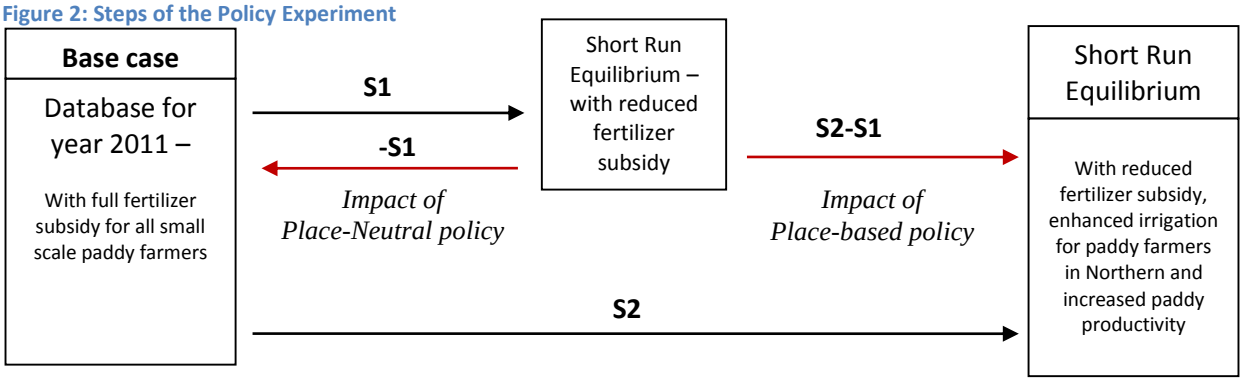
Two agricultural policies (one ongoing and another suggested) targeted primarily at the paddy sector are selected for our simulations, namely:

1. Ongoing national fertilizer subsidy scheme for all small scale rice paddy farmers.

2. Development of enhanced irrigation infrastructure in the Northern Province aimed at enhancing productivity in the small scale rice paddy farms in this region.

While the former is considered as an example of a Place-neutral policy, the latter is an example of a Place-based policy. As depicted in Figure 2, our combined policy experiment has two steps.

Figure 2: Steps of the Policy Experiment



Source: The Authors

In summary, the shocks used are:

S1: Fertilizer subsidy and paddy productivity are uniformly reduced by 36% (determined so that the saving is adequate to finance the cost of implementing in next selected policy) and 6% (based on Wijetunga et al. (2008)) respectively. Government expenditure 'saved' by reducing the subsidy is treated as a surplus income for government.

S2: With the shock of S1 already in place, government demand for construction sector output in Northern Province is additionally shocked with exactly the same amount of money saved by S1. Productivity of paddy in Northern is shocked with a 12% increase (based on Hussain et al. (2007)) to accommodate the possible productivity impact of irrigation development.

Both simulations are based on a comparative static method and a short run closure. At the macro level, household consumption, trade balance, employment and rate of return to capital are endogenous; while investments by production sectors, government consumption, production technology, capital stocks and real wages are exogenous. All nationally endogenous variables are also regionally endogenous. Real investment is fixed at the national level but is regionally endogenous. The nominal exchange rate is exogenous and the numeraire. The model was solved using GEMPACK software (Harrison et al., 2012).

Results

Key results of the policy experiment are given in Tables 1 to 3. Table 1 presents national level macro results. For easy interpretation results of S1 and S2 are reported in altered forms as "-S1" and "S2-S1". The fertilizer subsidy (36% of current level) creates a 0.083% increase in real national GDP compared to a situation with a reduced subsidy. Though the GDP outcome can be improved with the second policy to develop irrigation infrastructure in the Northern Province, it is unable to fully replace the loss of GDP associated with the subsidy cut – resulting in a 0.023 % decrease in national GDP compared to the initial base case with the current level of subsidy.

Table 1: Percent changes in National level aggregates

	S1	S2	-S1	S2-S1
Real GDP	-0.083	-0.023	0.083	0.059
Aggregate Employment	-0.124	-0.011	0.124	0.113
Real Household Income	-0.131	-0.024	0.131	0.107
Export Volume	-0.045	-0.337	0.045	-0.292
Import Volume Used	-0.057	0.082	0.057	0.139

Source: The Authors

Table 2 summarises the regional macro results of our simulations. The fertilizer subsidy policy positively contributes to GDP of all provinces, however the magnitudes vary. This variation is mostly in line with the paddy sector's contribution to the regional economies. For example the North Central province that relies on around an 8% contribution to its regional GDP from the paddy sector experiences a 0.2% positive increment in this GDP from the fertilizer subsidy. When the alternative Place-based policy is in place, expansion of the construction sector in Northern provinces negatively affects related sectors in other regions due to increasing competition for labour and other inputs. Meanwhile the regions in close proximity and those with strong linkages to the Northern Province are positively affected because of favourable trade and factor flows.

Table 3 reports values of CV_w and MD_w associated with our policy experiment. Both policies have some disparity reduction impacts however this is greater with the Place-based policy. This is because the Place-based policy contributes more to improving per capita GDP in the poorest region and its deviation from the national average.

Table 2: Regional Macro Impacts

		Real GDP	Aggregate Employment	Real Investment	Export Volume	Import Volume
-S1	Western	0.026	0.051	-0.052	0.045	0.006
	Southern	0.092	0.131	0.001	-0.080	0.069
	Sabaragamuwa	0.093	0.144	0.021	-0.093	0.089
	Central	0.080	0.130	0.023	-0.130	0.071
	Uva	0.139	0.211	0.061	-0.185	0.130
	Eastern	0.155	0.188	0.037	0.227	0.094
	North Western	0.122	0.175	0.034	-0.085	0.104
	North Central	0.329	0.423	0.177	-0.437	0.304
	Northern	0.131	0.160	0.028	-0.159	0.086
S2-S1	Western	-0.024	-0.018	-0.211	-0.292	-0.053
	Southern	-0.004	-0.003	-0.159	-0.477	-0.007
	Sabaragamuwa	-0.001	0.001	-0.146	-0.472	0.003
	Central	0.018	0.036	-0.130	-0.620	0.025
	Uva	0.014	0.028	-0.121	-0.641	0.024
	Eastern	0.014	0.028	-0.107	-0.536	0.021
	North Western	0.009	0.019	-0.136	-0.628	0.019
	North Central	0.038	0.064	-0.044	-1.011	0.080
	Northern	1.624	2.533	3.125	-2.759	4.499

Source: The authors

Table 3: Impact of selected policies on regional disparity

	CV_W	MD_W
Base case	0.40726	0.33653
Short run equilibrium after S1 (after reducing Fertilizer Subsidy)	0.40788	0.33705
Short run equilibrium after S2 (reduced subsidy and improved irrigation in Northern Province)	0.40672	0.33630
- - S1(impact of Place-neutral Fertilizer subsidy policy)	-0.00062	-0.00052
S2-S1 (impact of Place-based Northern irrigation development policy)	-0.00116	-0.00075

Source: The authors

Conclusions

Our simulations provide interesting insights. In particular they highlight the usefulness of the model in analyzing the economy-wide effects of both Place-based and Place-neutral policy scenarios. These impacts can be disaggregated by sector and by region. The simulation of the Sri Lankan fertilizer subsidy policy supports the argument that no policy can be purely Place-neutral

in terms of impact. The results from our Place-based policy of developing irrigation infrastructure in Northern Province show that even Place-based policies concentrated in a single region can have impacts on other regions via interregional linkages associated with both factor flows and trade in goods and services. Simulations using our bottom-up model can assist in identifying the order of magnitude and spatial pattern of such interregional impacts.

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