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Remittances and the Brain Drain in Ghana: A Computable General Equilibrium Approach

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Abstract

This paper presents a computable general equilibrium (CGE) framework to numerically examine the impact of remittances and the brain drain on poverty reduction as well as income inequality in Ghana. The generalized framework with the latest Ghanaian input-output table of year 2005 with 59 different production sectors provides the following results: On the impact of remittances, more remittances reduce poverty, and expand the Ghanaian economy. On the impact on income inequality, it depends on who receives more remittances. If the rural (urban) households receive more remittances, then income inequality shrinks (widens). On the impact of the brain drain, it is negative to both poverty reduction and income inequality, even if the externality effect of the brain drain is taken into account. On the overall impact of both remittances and the brain drain in Ghana, income inequality becomes more severe. On the other hand, the overall impact on poverty reduction, it depends on the amount of remittances as well as the sector where the brain drain occurs. As long as the brain drain occurs in either the education or the health sector, then the positive impact of remittances outweighs the negative impact of the brain drain. However, if the brain drain occurs in the public administration sector, then more remittances are needed to offset the negative impact of more brain drain. Furthermore, if the brain drain occurs in all sectors by more than 5 percent, then even a 30 percent increase in remittances to both rural and urban households is not large enough to offset the negative impact of the brain drain, thus, eventuating in the Ghanaian economy being damaged as a whole.

Keywords: Ghana, Remittance, Brain Drain, Poverty, Income Inequality, Computable General Equilibrium (CGE) Model, Simulation

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1 Introduction

This paper examines the impact of remittances as well as the brain drain on economic growth, poverty reduction, and income inequality in Ghana within a computable general equilibrium (CGE) framework with its latest Input-Output Table[1].

Remittances in Ghana keep increasing in accordance with an increase in the number of migrants, while they slightly decreased in year 2013 associated with the reduced number of migrants as shown in Figure 1 and 2. The increasing trend of inflows of remittances has resulted in its relatively more importance and its growing impact on the whole Ghanaian economy. While the slowdown of the growth rate of the global flows of remittances is expected in year 2015 due to weak economic growth of Europe as well as deterioration of the Russian economy, the World Bank (2015) also forecasts that the global flows of remittances will again recover in year 2016 and 2017 in line with the expected global economic recovery[2]. The increasing trend of remittances and an expectation of global economic recovery both imply that remittances will play a more important role as the Ghanaian economy stably grows in the future.

In accordance with an increasing trend of remittances, the number of emigrants from Ghana also keeps increasing as Figure 2 shows. The negative impact of emigration on the country of origin is recognized as the brain drain, particularly the impact of outflows of skilled labor on an economy of the country of origin. Djiofack et al. (2013) has recently found out in their simulations of a CGE model that the negative impact of the brain drain would be larger than the positive impact of remittances on income in Cameroon based on their parameter values estimated with the data of African countries. They also pointed out that an increase in remittances would result in an expansion of income inequality since a larger ratio of remittances will be sent to relatively richer households, which live in the urban

[1]FORTRAN programmes have been used for the numerical calculation in this paper.

[2]The World Bank (2006) also pointed out that the true size of remittances flows through formal and informal channels may be much higher than the formal size by perhaps 50 percent or more. This implies, as many researchers have recognized, that the impact of remittances on the world economy is getting more important.

area. It is often observed particularly in developing countries that income inequality tends to become larger through the process of an economic expansion. Indeed income inequality has become wider in Ghana recently (Ghana Statistical Service (2014)), while it kept decreasing until the 2005-2006 survey[3]. In the literature, it has been argued that increased remittances tend to induce a wider income inequality, while they help poverty reduction.

The expected global economic recovery would stimulate more outflows of skilled labor from Ghana, thus resulting in larger income inequality in the near future, and an analysis for the conventional argument on the trade-off between efficiency and equity would become increasingly more important for the Ghanaian government to achieve stable growth not only economically but also politically. As Agbola (2013) points out, the political stability would also be important for sustainable economic growth for Ghana.

The purpose of this paper for the Ghanaian economy is to numerically measure the magnitude of the impact not only of remittances but also of the brain drain on poverty reduction, welfare and income inequality.

In order to specifically examine the impact on income inequality, this paper explicitly considers several different inputs in production such as skilled labor, unskilled labor, capital for agriculture, general capital, and land. This paper also takes into account heterogeneity of households in the rural and urban areas. Since the latest Input-Output Table is used to specify parameter values in our CGE model, simulation results could be quite realistic. Indeed, the benchmark model can perfectly capture the actual Ghanaian economy within the model. Then the impacts of increased remittances as well as more brain drain are explored.

In addition to careful parameter estimation for our realistic benchmark model, this paper explicitly takes into account the following two key issues argued in the current literature on remittances and the brain drain: This paper explicitly considers how households use increased remittances. As Adams and Cuecuecha (2010, 2013) empirically pointed out re-

[3]All survey data conducted in the past (Ghana Living Standards Survery (GLSS) round 3 (1991/1992), 4 (1998/1999), and 5 (2005/2006) showed the Gini Coefficient improved over time until GLSS 6 (2012/2013) was produced.

cently, remittances would be used for particular goods; investment goods. The receipt of remittances can cause behavioral changes at the household level. Furthermore, on the impact of the brain drain, this paper also considers the externality effect of the brain drain, which is often called the brain effect. This positive externality effect has been argued within the endogenous growth theory that the brain drain has not only the negative but also the positive impact on the country of origin by stimulating more investments on education.

On the impact of remittances, our simulation results show as follows: On the impact on poverty reduction, as long as households treat increased remittances as an increase in disposal income and thus they do not treat them as particular income, then the impact of remittances is quite limited. However, if households treat increased remittances differently and thus they spend all only for consumption without saving out of the increased remittances, then the impact on poverty reduction is much larger. Furthermore, if households use increased remittances only for investment goods such as education, housing, and health, as Adams and Cuecuecha (2010, 2013) found, then the impact on poverty reduction is further stronger. The positive impact on poverty reduction is driven through the demand side, and more consumption generated by increased remittances stimulates production[4]. This eventuates in more income of both rural and urban households. Income of the rural households increases even when only urban households receive additional remittances due to the stimulation effect.

Regarding the impact of remittances on income inequality, it depends on who receives increased remittances. When the rural (urban) households enjoy more remittances, then income inequality becomes smaller (bigger). As Djiofack et al (2013) suggested for the Cameroon case, this is the case for Ghana as well. However, the magnitude of the impact on income inequality depends on the assumption on the saving behavior for increased remittances. If households treat increased remittances as particular income and thus they use all of increased remittances up only for additional consumption of all goods but no savings out of the increased remittances, then the magnitude of the impact is smaller. This is be-

[4] Agbola (2013) also found the same result in his empirical study.

cause more consumption strongly stimulates the Ghanaian economy, thus contributing to an increase in income of the rural households. However, if households use all of increased remittances only for investment goods such as education, housing, and health, then the magnitude of the impact on income inequality reversely becomes the largest. This implies that the positive impact of remittances to the rural households is smaller and the negative impact of remittances to the urban households is bigger. In line with what Adams and Cuecuecha (2010, 2013) found, this result suggests that remittances would result in more income inequality in Ghana. Furthermore, while more remittances to the urban households widen income inequality in the short-run, it could improve income inequality in the long-run through the wealth effect, since more remittances to the urban household strongly induce more consumption by the stimulation effect, and then income of the rural households also increases. Increased income of the rural households eventuates in more savings, and relatively more increased savings of the rural households would result in smaller income inequality in the future. An inverted U-shaped curve between remittances and inequality over time can also be suggested through the impact on savings in our CGE model.

In association with the impact of remittances, the impact of the current tax system of Ghana particularly on income inequality should also be noted. Except for the case where additional remittances are used only for investment goods, our simulation results suggest that the current tax system would possibly widen income inequality. Since the government can obtain a surplus in its budget without changing any tax policy due to the stimulation effect of remittances on the economy, the government could use the surplus for several redistribution and tax policies to improve income inequality[5].

On the impact of the brain drain on poverty reduction, the brain drain results in a decrease in GDP, and its impact is thus negative on poverty reduction. In particular, the impact of the brain drain from three key sectors such as 'public administration', 'education', and 'health' is investigated. Since the 'public administration' sectors most pays labor income

[5]This topic is substantially examined in Dadson and Kato (2015).

to skilled labor, the impact of the brain drain from the 'public administration' sector is negatively the largest. If a 10% of the skilled worker outflows from the 'public administration' sector, then GDP would decrease by 4.73%. On the other hand, the negative impact of the brain drain from the 'health' sector on the Ghanaian economy is quite small. This result suggests that the negative impact of outflows of medical doctors from Ghana on the economy is limited at least in the short-run. This is the same result as what Docquier and Rapoport (2012) pointed out for African countries.

On the impact of the brain drain on income inequality, the brain drain generates more income inequality. However, the magnitude of the negative impact on income inequality is quite small.

Furthermore, if externality of the brain drain is taken into account, the negative impact of the brain drain on both poverty reduction and income inequality is weaken. However, our simulation results suggest that under a realistic assumption on the magnitude of externality the positive effect of externality is limited, and the overall impact of the brain drain is negative to both poverty reduction and income inequality. This implies that the Ghanaian economy has been damaged and income inequality has become worse by the brain drain.

On the overall impact of remittances and the brain drain at the same time, income inequality becomes more severe by both effects. While the negative impact of both remittances and the brain drain is weaken if the externality effect of the brain drain is taken into account, the direction of the impact does not change. Regarding the overall impact on poverty reduction, it depends on the amount of remittances and the sector where the brain drain occurs. As long as the brain drain occurs in either the education or the health sector, then the positive impact of remittances outweighs the negative impact of the brain drain on the Ghanaian economy. However, if the brain drain occurs in the public administration sector, then more remittances are needed to offset the negative impact of more brain drain. Furthermore, if the brain drain occurs in all sectors by more than 5%, then even a 30% increase in remittances to both rural and urban households is not large enogh to offset the negative impact of the brain drain, thus, eventuating in the Ghanaian economy being damaged as a whole.

The paper is organized as follows. The next section reviews the literature on remittances and the brain drain, and then Section 3 explains the data and benchmark model. Section 4 simulates several scenarios with results and evaluations. Section 5 concludes the paper.

2 The Literature

The impact of international remittances and migration on economic growth, poverty, and income inequality in the countries of origin has growingly received great attention in the literature. By distinguishing remittances from migration, Rapoport et al (2006) surveyed the literature from macro and micro perspectives. They pointed out that the full impact of remittances on economic growth, capital accumulation, and income inequality is very complicated, and also that remittances have direct and indirect effects as well as different impact over time. Adams (2011) also surveyed the recent empirical literature which is based on the household survey data, and he summarized the impact of remittances on poverty, income inequality, health, investment, labor supply, and economic growth. As both Rapoport et al (2006) and Adams (2011) pointed out, the results are quite mixed while a number of research have been conducted.

On the impact of remittances on poverty reduction, however, it is rather more straightforward: Remittances seem to reduce poverty. Adams and Page (2005) concluded with a wide range of the data set of 71 developing countries that remittances reduce poverty in developing countries, and also provided a suggestion that the government should implement a policy to decrease the transaction cost of remittances, so that increased remittances would reduce more poverty in developing countries[6]. Acosta et al (2008) investigated the impact

[6]Freund and Spatafora (2008) argued the impact of the transaction cost on remittances, and they found out that the higher transaction cost would result in the smaller amount of remittances. They also pointed out a possibility of the negative impact of the higher transaction cost to use more informal channels of sending remittances to the countries of origin.

of international remittances on poverty reduction in Latin American and Caribbean countries, and they also concluded that remittances reduce poverty in such countries. Gupta et al (2009) explored the impact of remittances on poverty reduction in Sub-Saharan African countries, and they also found the positive effect of remittances on poverty reduction. They also pointed out the positive impact of remittances for the development of financial sectors[7] as well as the bad influence of the high transaction cost in the formal financial sector for remittances in Sub-Saharan Africa. Adams and Cuecuecha (2013) studied the impact of remittances on investment and poverty in Ghana with 2005-6 Ghana Living Standard Survey (GLSS 5), and they also concluded the positive impact on poverty reduction. They explicitly distinguished remittances between internal and international ones, and were concerned how to spend remittances. They found out that households in Ghana would spend more at the margin on three investment goods: education, housing, and health. Adams and Cuecuecha (2010) also investigated the same topic for Guatemala, and they reached the same result: Remittances would be spent more on investment goods. As Rapoport et al (2006) pointed out the importance of how to spend remittances[8], more expenditure of remittances on investment goods would lead to higher economic growth, which would also result in further poverty reduction in the future.

In terms of the impact of remittances on income inequality, results are really mixed (Lipton (1980), Stark et al (1988), and Taylor (1992)). While Lipton (1980) pointed out a possibility of the effect of remittances on an expansion of inequality between rural and urban areas, Stark et al (1988) argued the sensitivity of results of the effect of remittances on inequality by using their extended Gini Index. Taylor (1992) explicitly took into account the indirect and the long run effects to investigate the full impact of remittances on inequality, and they found an inverted U-shaped curve between remittances and inequality over

[7]Mamun et al (2015) recently argued that the development of the financial sector is important for stimulating remittances. They also empirically found no evidence of the negative impact of remittances on labor productivity.

[8]Kabki et al (2004) investigated the behavior of households regarding how to spend remittances for Netherlands-based Ghanaian migrants based on interviews, and they also concluded that remittances would be spent mainly on investment goods such as housing and family business in the country of origin.

time[9]: Due to both the direct and the indirect effects in the short run, inequality would expand at the beginning, but the externality effect starts to reduce inequality in the long run[10]. As Barham and Boucher (1998) pointed out, the results of impact of remittances on income inequality would depend on two key issues; the specific economic question and the econometric or statistical techniques. They studied the impact of remittances on income inequality for Nicaragua, and they reached their conclusion that the result differs depending upon the specific economic question: They estimated two cases when remittances are simply treated as exogenous transfers and also when they are treated as a potential substitute for home earnings, and in the former case remittances reduces inequality, while in the latter case they would oppositely increase inequality. Acosta et al (2008) found out the sensitivity of the impact of remittances on inequality among different Latin American and Caribbean countries, and they argued that the difference among countries matters for the impact on inequality while they also found a small positive effect of remittances on inequality.

The impact of migration of skilled workers from developing countries, which is the so-called brain drain, has also been explored in the literature. While there is no one-to-one relationship between international remittances and the brain drain, as clearly mentioned by Rapoport et al (2006), both should be obviously related to each other very closely: The arguments of the impact of the brain drain are often associated with economic growth. Docquier and Rapoport (2012) reviewed four decades of economic research on the brain drain particularly related to development issues. They summarized the literature consisting of three waves over time, and argued that the first wave dated back to the late 1960s when the early contributions generally concluded that the impact of the brain drain on the countries of origin was essentially neutral. Then, the second wave started in the 1970s, and the literature

[9]While the context is different, Adams (2009) found an inverted U-shaped relationship between per capita GDP and per capita remittances by using the 76 developing country data. Adams (2009) investigated the reason why the amount of remittaces differs among different developing countries, and found out that more skilled (educated) migrants remit less. Faini (2007) also obtained the same result in his paper where he also investigated the negative impact of migration of skilled workers (the so-called brain drain).

[10]Mckenzie anf Rapoport (2007) explicitly studied the network effect, which is smiliar to the externality effect in Taylor (1992), and they also found an inverted U-shaped curve between the number of migrants and inequality.

obtained the conclusion of the negative impact of the drain brain on international inequality. The last wave, starting in the late 1990s with the development of the endogenous growth theory, consists of several arguments within the endogenous growth framework that the brain drain would eventually generate the positive impact on economic growth through its positive externality. For instance, Beine et al (2001) introduced a positive effect (brain effect) of education on a source country caused by an uncertainty in the migration opportunity as well as the conventional negative effect (drain effect) into the endogenous growth model, and they empirically found out that the former positive effect would be much larger than the latter negative effect among 37 developing countries. However, Faini (2007) argued the relationship between remittances and the brain drain, and found out empirically that the brain drain was associated with a smaller propensity to remit. This implies that more skilled workers would remit less, and the net negative impact of the brain drain would be larger even if the positive impact of remittance inflows is taken into account[11]. Beine et al (2008) re-examined what Beine et al (2001) found by using a broader range of the data set of 127 developing countries, and concluded that the overall impact of the positive brain effect and the negative drain effect differs depending on the existing human capital level among developing countries, while the positive brain effect would outweigh the negative drain effect as a whole among developing countries. However, they also found out that the number of countries (losers) where the net effect of migration is negative would be larger than that of countries (winners) where the net effect is positive among developing countries they considered, and also that the situation is more severe particularly in Sub-Saharan Africa and Central America.

Regarding the research on Ghana and Africa in terms of remittances and the brain drain, in addition to Gupta et al (2009) and Adams and Cuecuecha (2013), Agbola (2013) and Djiofack et al (2013) should be noted. Agbola (2013) empirically found out the positive impact of remittances on economic growth as well as the crowding out effect of the conventional government policy on the private activities in Ghana, and he argued that the government

[11] Docquier et al (2007) estimated the determinants of the brain drain, and they argued that not only the physical distance but also political instability would be key elements.

spending should be shifted onto more production-enhancing sectors such as education and health related sectors. Djiofack et al (2013) constructed a computable general equilibrium (CGE) model[12] for Cameroon with parameter values estimated with the African country data set, and presented several suggestive results for African countries. In particular, they concluded that the negative impact of the brain drain on productivity outweighs the positive impact of remittances on increased income in African countries, and thus outflows of skilled workers (brain drain) would ultimately reduce income in Africa. They also found out that the effect of remittances on poverty reduction is quite limited, and further that remittances would result in an expansion of income inequality due to the fact that the amount of remittances sent by skilled workers abroad is much larger than that by unskilled workers and also that the larger amount of remittances by skilled workers will be sent to the urban area rather than the rural area. Since households living in the urban area are richer than those in the rural area, remittances would further widen the income gap between the urban and rural areas.

This paper tries to develop a computable general equilibrium (CGE) model to numerically measure the impact of remittances and the brain drain on welfare, poverty reduction, and income inequality for Ghana. While the literature above consists of studies basically with econometrics techniques, this paper employs a multisector general equilibrium model. While Djiofack et al (2013) econometrically estimated parameter values for Cameroon with the African country data set, this paper uses the latest Input-Output table of Ghana with 59 private sectors for parameter specification, so that the benchmark model can perfectly re-produce the actual Ghanaian economy within our model. Any simulations cannot be convincing without a good-fitted benchmark model. Then this paper uses the well-fitted benchmark model to simulate several scenarios about remittances and the brain drain in Ghana to explore the impact of remittances and the brain drain on poverty reduction, welfare,

[12] Guha (2013) constructed a DSGE model to investigate the Dutch Disease effect of remittnaces, and presented channels that remittances generates the similar impact on an economy, where a tradable good industry would negatively be affected by its spending effect on the exchange rate and the resource movement effect on the tradable good industry.

and income inequality.

In addition to the difference in the method and the data set for estimation of parameter values from Djiofack et al (2013), this paper explicitly takes into account the following two key issues argued in the current literature on remittances and the brain drain: This paper explicitly considers how households use increased remittances. As Adams and Cuecuecha (2010, 2013) empirically pointed out recently, remittances would be used for particular goods; investment goods. The receipt of remittances can cause behavioral changes at the household level. Furthermore, on the impact of the brain drain, this paper also considers the externality effect of the brain drain, which is often called the brain effect. This positive externality effect has been argued within the endogenous growth theory that the brain drain has not only the negative but also the positive impact on the country of origin by stimulating more investments on education.

3 Numerical Analysis

In order to obtain numerical effects of international remittances, and the brain drain, this paper uses the latest input-output table of Ghana within a general equilibrium framework, in order to make the simulation analysis realistic. By using the actual input-output table of Ghana, the paper has successfully realized the real economy within the model. This paper employs the conventional static computable general equilibrium (CGE) model with the actual input-output table of Ghana of year 2005. Note that all parameter values in the model are calculated by using the actual data, so that the calculated values of endogenous variables obtained within the model also become quite realistic.

3.1 Data

The latest input-output table of Ghana of year 2005 with 59 different intermediate sectors has been used in order to construct the social accounting matrix (SAM), which is given in

Appendix 2.

The World Bank (2006) points out that the true size of international remittances flows through formal and informal channels may be much higher than the formal size by perhaps 50 % or more. The Bank of Ghana reported that the total size of private transfers in year 2005 was 1549.76 million US dollars, and also that more than 80 % of the amount of received remittances was sent privately and only 13 % was carried out through banks or money transfer agencies. In the latest input-output table of Ghana of year 2005, while there are items of official international remittances to rural and urban households through banks and money transfer agencies, the values of these items are relatively too small compared to the reported value by the Bank of Ghana. Then private transfers from abroad are categorized in exports of sector 51 in the input-output table, and it is assumed in this paper that the amount of private transfers is also included in international remittances, in order to capture the true size of international remittances[13]. Table 1 shows the amount of international remittances obtained from the input-output table of Ghana of year 2005 after the modification of the treatment of exports of sector 51. As the table shows, the amount of international remittances to the urban households is much higher than that to the rural households, and the total income per capita in the urban area is also much higher than that in the rural area, as shown in Table 2. This implies, as Djiofack et al (2013) pointed in the Cameroon case, that more international remittances would result in more income inequality, since the more amount of remittances would be sent to richer households in the urban area.

3.2 Benchmark Calibration

The general equilibrium model consists of 59 different production sectors, heterogenous households, and the government. Each of 59 production sectors uses self-employed, unskilled labor, skilled labor, land, agriculture specific capital, general capital, land, and intermediate

[13]The total value of exports of sector 51 was 7492.086 billion in GHC (old Ghana Cedis), which is equal to 173.21 million US dollors, in the original input-output table of year 2005. This size is relatively very large compared to the amount of exports of other sectors due to the fact that it contains private transfers from abroad. Then, this amount is assumed to be treated as informal remittances in the paper.

production goods in its production in order to maximize its profits. Each production sector optimally determines how much it exports its own good, how much it imports goods for its production, and how much it sells its own good domestically.

Households are heterogenous, depending on the place where they live; the rural area household, and the urban area household. Each household maximizes its utility which is defined over 59 different goods produced by 59 different production sectors. Disposal income of rural and urban households consists of after tax labor and capital income, transfers from the government, and remittances. Remittances include internal (from Ghana) and international (from abroad) remittances, both of which are treated separately. The government imposes taxes and tariffs on and gives subsidies to 59 different production sectors. The government also imposes a labor income tax on the households in the rural and urban areas, and gives transfers to them. The total tax revenue is used for its expenditure. 59 different commodity markets, and factor markets are all fully competitive, so that all prices are determined at the fully competitive level. 59 different production sectors and the heterogenous households take all prices, tax rates, and subsidy rates as given. The detailed explanation about the employed model is given in Appendix 1.

The benchmark case should reflect the real Ghanaian economy in order to make the subsequent simulation scenarios realistic. Thus, the benchmark model should carefully be calibrated until the calculated values of all endogenous variables within the model become close to the actual values. Table 3-1 to 3-9 show the calculated model values as well as the corresponding actual values in year 2005. Note that the tax rates shown in Table 4-1 to 4-4 have been calculated by using the actual amount of taxes collected, so that they can be interpreted as the average proportional rates. Table 5-1 to 5-7 present parameter values for the benchmark model.

4 Simulation Analysis

Since the benchmark case successfully re-produces the actual Ghanaian economy, it is now used to compare the current Ghanaian economy with possible situations regarding remittances and the brain drain. Obviously, remittances and the brain drain are closely related to each other. International remittances are money transfers by emigrants who have currently been living abroad. Among emigrants, outflows of skilled labor from the country of origin are particularly called the brain drain, and more brain drain is expected to induce more international remittances. More outflows of skilled labor is expected to have a negative impact on the country of origin in terms of productivity, while an increased number of outflows of skilled labor results in more money transfers to their home country. However, as Faini (2007) and Adams (2009) pointed out, more skilled labor tends to remit less, and the relationship between remittances and the brain drain seems complicated. Furthermore, recent studies argue that the brain drain has two contrary effects: The direct effect on productivity in the country of origin negatively works on the economy of origin. This negative effect is often called the 'drain effect', and it reduces productivity in the short-run. On the other hand, in association with such a negative effect in the short-run, it stimulates more investments on education in the country of origin in the long-run. This positive effect is often called 'brain effect', and this positive effect of externality results in higher economic growth in the long-run.

While remittances and the brain drain are closely related to each other, the overall impact of these elements on the actual economy is indeed complicated and mixed. Thus, the impacts of remittances and the brain drain are separately explored in this paper. On the impact of remittances on poverty reduction, it seems more straightforward; more remittances directly stimulates an economy, and thus reduces poverty. However, on the impact of remittances on income inequality, it seems more complicated. In the literature, it is argued that the direct and short-run effect is negative and thus remittances induces more income inequality. However, remittances also have a positive and long-run effect on income inequality, and several empirical studies found an inverted U-shaped pattern between income inequality and remittances over time.

The impact of the brain drain is more complicated even on poverty reduction due to positive externality. The overall impact on poverty reduction depends on the relative magnitude of the drain (negative and direct) effect and the brain (positive and indirect) effect over time. The impact of the brain drain on income inequality seems much more complicated, and the results are mixed in the literature.

In the following simulation analysis, the successful benchmark model is compared with several scenario cases in order to decompose the overall impact of remittances and the brain drain into several key elements, and also to numerically present the magnitude of each effect.

4.1 The Impact of Remittances (Simulation I)

In order to capture the pure impact of remittances on GDP, poverty reduction, income inequality, and welfare, it is assumed that only the amount of remittances increases in the following simulations. This implies that outflows of skilled labor, namely the brain drain, remains unchanged. In particular, the impact of increased remittances on income inequality depends on several complicated channels: It depends on to the extent how much they are transferred to rural and urban households. As Djiofack et al (2013) pointed out, more remittances to households in the urban area would induce more income inequality, since households in the urban area are richer than those in the rural area. Thus, the impact of an increase in remittances are separately examined in the following simulations, depending on whether remittances are sent to rural or urban households.

It also depend on how long the impact lasts over time; direct (short-run) and indirect (long-run) effects. As it has been argued in the literature, more remittances would result in more income inequality in the short-run, while they might induce a more equal society in the long-run through the network effect, which results in more opportunities for other poor households. However, if more remittances also generate the wealth effect, then the latter positive effect of remittances on income distribution in the long-run would be weaken through an increase in wealth of richer households by increased remittances. While the framework employed in this paper is static, the impact in the long-run is explored by examining the impact on savings (the wealth effect).

Furthermore, the treatment of increased remittances also matters. In the literature there is an argument on how households use remittances; for consumption of usual goods, or of particular goods. If the former case happens in Ghana, then increased remittances can be treated simply as an increase in disposal income. On the other hand, if the latter case is observed in Ghana, then increased remittances should be treated differently, resulting in more consumption of particular goods. As Adams and Cuecuecha (2010, 2013) empirically pointed out recently, remittances would be used for particular goods; investment goods. They found out in their research (2013) that remittances would be used particularly for education, housing, and health in Ghana. Thus, simulations are conducted based on two assumptions. In the first several simulations, it is assumed that increased remittances are simply treated as an increase in disposal income. Then, similar simulations are conducted again by assuming that increased remittances are used only for more investments on education, housing, and health.

Table 6-1 shows the simulation results (Simulation I-1) under the assumption that increased remittances are simply treated as an increase in disposal income. This implies that increased disposal income generated by more remittances is used for more savings and more consumption of all goods. Note that the impact of an increase in remittances is separately examined, depending on whose remittances increase; rural or urban households. Note also that the item of "government deficits" shows how much the total government revenue changes from the current level when the amount of remittances changes. If the value is positive (negative), it implies that the total government revenue decreases (increases). While all tax rates remain unchanged, the total tax revenue changes since each household changes the optimal consumption level when remittances increase[14]. According to changes in consumption, all production sectors also change their optimal production levels, resulting in changes in tax revenue from taxes imposed on the production sectors as well. The equivalent variation denoted by EV is used for measuring the welfare change, which is defined by:

$$EV = e\left(\widetilde{p_0}, U_1\right) - e\left(\widetilde{p_0}, U_0\right),$$

where $e\left(\widetilde{p}, U\right)$ denotes the expenditure function. $\widetilde{p_i}$ and U_i denote the price vector and utility, respectively, and the index $i = 0, 1$ shows the current situation and simulated situation, respectively. Note that the equivalent variation is calculated for rural and urban households, respectively, and it is expressed in the money term. Thus, it can express the magnitude of welfare changes caused by an increase in remittances in the financial term.

The crucial differences between increased remittances to rural and urban households are as follows: Firstly, while income inequality widens when urban households receive more remittances, it reversely shrinks when rural households do, as Djiofack et al (2013) suggested. Gini Coefficient improves to 34.86 from the current level of 39.40 when international remittances only to rural households increases by 30 %. This improvement corresponds to a 11.5105 % increase in Gini Coefficient from the current level. On the other hand, if international remittances only to urban households increase by 30 %, then income inequality reversely widen from 39.40 to 48.27 in Gini Coefficient, which is a 22.515% increase in income inequality. Secondly, while more international remittances only to urban households widen income inequality due to the fact that income in urban households is higher, increased remittances to the urban households increase welfare not only of the urban households, but also of the rural households. For instance, if remittances to the urban households increase by 30%, then welfare of the urban households increases by 0.2366 millions USD, and that of the rural households also increases by 0.0341 million USD. This is because more remittances to the urban households stimulate their consumption, thus resulting in more production. Then,

[14]It is assumed in this paper that the government expenditure remains unchanged in all simulations.

income of the rural households eventually increases as well. Thirdly, the impact on GDP is larger when more remittances are given to the urban households as well. While the impact on GDP is quite small even when a 30% increase in remittances to the rural households happens, the same increase in remittances to the urban households results in a 0.1263% increase in GDP. This implies that the impact on poverty reduction is much larger when remittances are given to the urban households. Fourthly, due to the above reason, savings increase more when the urban households receive remittances. When the urban households receive more remittances by 30%, then savings by them increase nearly by 4%. It is notable that savings by the rural households also increase, since their income also increases. Since savings of the urban households increases more than those of the rural households, the wealth effect of remittances can be observed. This suggests that a wider income gap (more income inequality) would be observed in the long-run, if the urban households receive more remittances. Fifthly, when more remittances are transferred to the urban households, then the total amount of income tax paid by them decreases under the current Ghanaian tax system. This implies that taxable income of the urban households decreases, while disposal income increases by an increase in remittances. Note that under the current tax system remittances are not taxed, which is also assumed in this paper. Note also that the total amount of taxes paid by the rural households increases since their taxable income increases due to the fact that the Ghanaian economy is stimulated by an increase in remittances to the urban households. This implies that the current tax system operates to widen more income inequality when remittances are transferred to the urban households. Finally, since more remittances stimulate the Ghanaian economy, tax revenue increases. If the urban households receive more remittances by 30%, then the government can expect additional tax revenue of 2.804 millions USD without changing any tax rate. Thus, the current Ghanaian tax system can enjoy more tax revenue as a whole, but it re-distributes income between the rural and urban households to result in more income inequality when more remittances are transferred to the urban households. The results show that the impact of remittances on poverty reduction and income inequality depends on who receives them; rural or urban households. If the rural households receive more remittances, then an income gap shrinks. However, its impact on poverty reduction is quite limited. On the other hand, if the urban households receive more remittances, then income inequality widen, but its impact on poverty reduction is much larger, and even welfare of the rural households increases.

Note that the above simulation results (Simulation I-1) have been obtained under the assumption that increased remittances are treated as an increase in disposal income so that a part of increased remittances is saved based on their saving behavior. However, it is often argued that increased remittances are treated differently from other income. Then what would happen if households do not save out of increased remittances at all, and then use all for more consumption of all goods? This case is examined in Simulation I-2, which results are shown in Table 6-2. Note that the difference between Table 6-1 (Simulation I-1) and Table 6-2 (Simulation I-2) is found only in the assumption on the saving behavior for increased remittances. In Simulation I-1 it is assumed that households in both the rural and urban areas save a part of increased remittances according to their saving behavior, but in Simulation I-2 it is assumed that households use all of increased remittances only for more consumption so that they do not save out of increased remittances at all. The comparison between Table 6-1 and 6-2 indicates that the positive impact on poverty reduction and GDP is larger when households use all up only for consumption, simply because households consume more, thus resulting in more stimulation to the Ghanaian economy. If the urban households use all of a 30% increase in remittances only for more consumption, then GDP would increase by 3.3363%, which would be 0.1263% when households simply treat increased remittances as an increase in disposal income. Secondly, due to its positive impact on the economy, welfare of both the rural and urban households is more improved. When the urban households receive more remittances by 30%, then the improvement in welfare is 0.4537 millions USD for the urban households and 0.2801 millions USD for the rural households. Furthermore, the improvement in welfare for the rural households is more than a half of that for the urban households, while it was nearly one-eighth in Simulation I-1. Thirdly, the impact on income inequality is different between two simulations. The direction does not change, but the magnitude differs. While the impact on income inequality is nearly the same when only rural households receive more remittances, the negative impact on income inequality is smaller in Simulation I-2 when only urban households receive more remittances. This is because much more income of the rural households increases caused by more increased consumption, resulting in lower income inequality. Fourthly, in Simulation I-2 the total amount of income tax paid by the urban households increases when more remittances are transferred to the urban households. This is opposite to Simulation I-1. However, the total amount of income tax paid by the rural households still increases more than that of the urban households. For instance, if the urban household receive more remittances by 30%, then the total amount of income tax paid by the rural households increases by 4.2926%, while that by the urban households only increases by 3.1743%. This implies that the current tax system still widens an income gap irrespective of a different treatment of saving behavior for remittances. Fifthly, tax revenue increases much more in Simulation I-2 in comparison with Simulation I-1. For instance, if remittances to the urban households increases by 30%, then the government could enjoy a surplus of 30.995 millions USD in its budget, which is more than ten times as much as the case in Simulation I-1. Finally, while households do not save out of increased remittances at all in Simulation I-2, savings eventually increase due to the fact that other income increases through the stimulation effect on the economy with more consumption. In particular the rural households save more even when only urban households receive more remittances, compared to Simulation I-1. This result shows how much the stimulation effect by more consumption is strong in the Ghanaian economy. This also implies that the negative impact on income inequality would be weaken through the wealth effect in the long-run.

It has been recently argued in the literature that remittances are used only for particular goods. Adams and Cuecuecha (2010, 2013) empirically pointed out that remittances would be used particularly for investment goods. They found out in their research (2013) that remittances would be used for education, housing, and health in Ghana. Simulation I-3 was conducted to see to the extent how much such consumption behavior affects the Ghanaian economy. In Simulation I-3 it is assumed that increased remittances are used only for consumption of education, housing, and health. It is also assumed that increased remittances are not saved at all, so that the difference between Simulation I-2 and I-3 is only the consumption pattern. In Simulation I-2, households in the rural and urban areas use increased remittances for consumption of all goods, while in Simulation I-3 they use them for consumption of only education, housing, and health. Table 6-3 shows the results of Simulation I-3. Firstly, the impact on income inequality is the worst among three simulations. While income inequality still shrinks when only rural households receive increased remittances, the improvement is the smallest. When the urban households receive a 30% increase in remittances, then the Gini Coefficient increases from 39.4 to 50.58, which corresponds to a 28.37% increase in income inequality. Secondly, however, the impact on poverty reduction is the largest, and GDP would increase by 4.716% if the urban households enjoy a 30% increase in remittances. Thirdly, savings also increase most. Since savings by the rural households increase more than those by the urban households, the wealth effect would be weaken, so that income inequality would be smaller in the long-run. This is consistent to an inverted U-shaped curve between remittances and inequality over time: In the short-run income inequality becomes bigger, but in the long-run it would become smaller. Finally, While the impact on GDP is the largest, households cannot enjoy the benefits so much. The improvement in welfare of both rural and urban households is nearly the same as Simulation I-2, but the government can enjoy the highest surplus in its budget.

The results from the above three simulations are summarized as follows: On the impact on poverty reduction, as long as households treat increased remittances as an increase in disposal income and thus they do not treat them as particular income, then the impact of remittances is quite limited. However, if households treat increased remittances differently and thus they spend all only for consumption with saving nothing out of the increased remittances, then the impact on poverty reduction is much larger. Furthermore, if households use increased remittances only for investment goods such as education, housing, and health, as Adams and Cuecuecha (2010, 2013) found, then the impact on poverty reduction is further stronger. The positive impact on poverty reduction is driven through the demand side. More consumption generated by increased remittances stimulates production, and eventuates in more income of both rural and urban households. Income of the rural households increases even when only urban households receive additional remittances due to the stimulation effect.

Regarding the impact on income inequality, it depends on who receives increased remittances. When the rural (urban) households enjoy more remittances, then income inequality becomes smaller (bigger). As Djiofack et al (2013) suggested for the Cameroon case, this is the case for Ghana as well. However, the magnitude of the impact on income inequality depends on the assumption on the saving behavior for increased remittances. If households treat increased remittances as particular income and thus they use all of increased remittances up only for additional consumption of all goods but no savings out of the increased remittances, then the magnitude of the impact is smaller. This is because more consumption strongly stimulates the Ghanaian economy, thus contributing to an increase in income of the rural households. However, if households use all of increased remittances only for investment goods such as education, housing, and health, then the magnitude of the impact on income inequality reversely becomes the largest. This implies that the positive impact of remittances to the rural households is smaller and the negative impact of remittances to the urban households is bigger. In line with what Adams and Cuecuecha (2010, 2013) found, this result suggests that remittances would result in more income inequality in Ghana. Furthermore, while more remittances to the urban households widen income inequality in the short-run, it could improve income inequality in the long-run through the wealth effect, since more remittances to the urban household strongly induce more consumption by the stimulation effect, and then income of the rural households also increases. Increased income of the rural households eventuates in more savings, and relatively more increased savings of the rural households would result in smaller income inequality in the future. An inverted U-shaped curve between remittances and inequality over time can also be suggested through the impact on savings in our CGE model.

Finally, the impact of the current tax system of Ghana particularly on income inequality should also be noted. Except for the case where additional remittances are used only for investment goods, our simulation results suggest that the current tax system would possibly widen income inequality. Since the government can obtain a surplus in its budget without changing any tax policy due to the stimulation effect of remittances on the economy, the government can use the surplus to reduce a tax imposed on a particular sector in order for the rural households to enjoy more benefits from the tax reform.

4.2 The Impact of the Brain Drain (Simulation II)

Recent studies argue that the brain drain has two contrary effects: The direct effect negatively works on productivity in the economy of origin. This negative effect is often called the 'drain effect', and it reduces productivity in the short-run. On the other hand, in association with such a negative effect in the short-run, it stimulates more investments on education in the country of origin in the long-run. Individuals invest more on education since they expect to obtain more opportunities to emigrate their home country if they are more educated. However, if some of them cannot leave their home country against their expectation, then they could contribute to the improvement in productivity in their home country. This positive effect is often called 'brain effect', and this positive effect of externality results in higher economic growth in the long-run.

Since these two effects work in the opposite directions on the country of origin, two separate simulations are conducted in this paper. Firstly, it is assumed that skilled labor leaves Ghana without any positive externality. This case is examined in Simulation II-1. Then, in Simulation II-2 the impact of positive externality is taken into account when skilled labor leaves Ghana. In Simulation II-2, it is assumed that externality happens in the following way: When skilled labor leaves a production sector in Ghana, then unskilled labor in the same sector can fully replace the skilled labor who left the country. This implies that the marginal productivity of unskilled labor increases up to that of skilled labor. For instance, this assumption implies that if a 30% of skilled labor leaves a sector then exactly a 30% of unskilled labor in the same sector becomes skilled. Then, a 70% of unskilled labor still remains unskilled in the sector. Since it is assumed that all prices are determined in corresponding fully competitive markets, newly skilled labor receives higher labor income. This assumption is called 'perfect' externality in this paper, and it seems unrealistic. In reality, even though positive externality is observed, the actual situation could be between Simulation II-1 and Simulation II-2. However, since it seems quite difficult to determine to the extent how much positive externality exists in actual Ghana, it is simply assumed that perfect externality exists in Simulation II-2, in order to be compared with Simulation II-1.

Table 7 shows top ten sectors which labor income of skilled labor is the highest in Ghana based on the Input-Output Table of year 2005. The impact of outflows of medical doctors from Ghana on the Ghanaian economy is one of the most important issues in Ghana. Thus, in the following simulations, the brain drain from 'public administration (sector 57)', 'education (sector 58)', and 'health (sector 59)' is particularly focused on.

Table 8-1 shows the results of Simulation II-1, where there is no externality. In Table 8-1, the case when the brain drain occurs in all 59 sectors is also shown. Firstly, GDP decreases as the brain drain gets severe, and the impact on poverty reduction is negative. Welfare of both rural and urban households decreases. In accordance with their relative sizes of income, the negative impact of the brain drain from the 'public administration' sector on GDP is most severe. Secondly, on the other hand, the negative impact of the brain drain from the 'health' sector is limited, as Docquier and Rapoport (2012) pointed out. While the magnitude of the negative impact of the brain drain from the 'public administration' sector on GDP is 4.73% when a 10% of skilled labor outflows from Ghana, it would be only 0.359%

when a 10% of skilled labor in the 'health' sector leaves Ghana[15]. Thirdly, regarding the impact on income inequality, it is also negative, while the magnitude is much smaller than the case of remittances. The direct 'drain effect' eventuates in an economy being shrunk, and income of both rural and urban households decreases. Table 8-1 shows that income of the rural households decreases more than that of the urban households by the direct 'drain effect'. Fourthly, savings of the rural households are more negatively affected than those of the urban households except for the brain drain from the 'health' sector. This suggests that the brain drain would generate more income inequality in the future through the wealth effect over time. Finally, the government faces its deficits, since the economy shrinks by the brain drain. If a 10% of skilled labor in the 'public administration' sector leaves the country, then the government deficits of 18.01 million USD will be calculated.

Table 8-2 now shows the results when 'perfect' externality exits in the Ghanaian economy generated by the brain drain. This positive impact is called 'brain effect'. Due to the strong externality effect, the brain drain eventually stimulates the economy slightly, and the impact on poverty reduction is positive. Secondly, the brain drain results in the slight improvement in income inequality. Thirdly, the stimulated economy by perfect externality results in the government receiving a slight surplus in its budget. However, such results have been obtained based on the strong assumption of perfect externality. Since the positive impact on poverty reduction as well as income inequality is quite limited even under the strong assumption on externality, the overall impact of the brain drain even with externality on poverty reduction and income inequality seems negative. For instance, the magnitude of the overall impact of a 10% brain drain in the 'public administration' sector on GDP is only a 0.3431% increase, even though perfect externality is assumed in the sector. On the other hand, if there is no externality, then the overall impact induces a 4.73% decrease in GDP. In reality, even if some externality exists, the actual Ghanaian economy would be the case between Simulation II-1

[15]There are obviously other negative impacts of the brain drain from the 'health' sector on the country of origin such as the hygiene level and the mortality rate of the country. Such impacts cannot be included in our analysis.

(Table 8-1) and Simulation II-2 (Table 8-2). Note also that the results in Table 8-2 have been obtained under the strong assumption of perfect externality. Thus, the actual Ghanaian economy is likely to suffer from the brain drain even though externality is considered.

4.3 The Overall Impact of Remittances and the Brain Drain

This section tries to combine the results obtained in the above two sections in order to numerically measure the overall impact of remittances and the brain drain on poverty reduction as well as income inequality. Djiofack et al (2013) found out that the negative impact of the brain drain would outweigh the positive impact of remittances on the Cameroon economy. While more brain drain is associated with more remittances, Faini (2007) and Adams (2009) pointed out that more skilled workers tend to remit less.

Table 9-1 and 9-2 show the results. Note that according to Adams and Cuecuecha (2010, 2013) the results in both tables have been obtained based on the assumption that increased remittances are used only for more consumption of education, housing, and health. In Table 9-1, the brain drain is assumed to have no externality at all, and it is assumed to have perfect externality in Table 9-2. Thus, Table 9-1 shows the combined results of Simulation I-3 and Simulation Simulation II-1, and Table 9-2 shows the combined result of Simulation I-3 and Simulaiton II-2. Both tables show the overall impact of remittances and the brain drain on GDP and the Gini Coefficient. Since it is realistic to assume that both rural and urban households receive remittances at the same time, both tables also show the case when rural and urban households receive remittances at the same time. First of all, both tables show that income inequality becomes wider as long as both rural and urban households receive more remittances. Even though perfect externality is taken into account, this is the case, while the magnitute of the negative overall impact is slightly weaken when perfect externality is assumed. Since the assumption of perfect externality is very strong, the actual case would be closer to Table 9-1 rather than Table 9-2 result. This implies that income inequality in the actual Ghanaian economy is likely to become wider by remittances and the brain drain. Secondly, the overall impact on GDP depends on the assumtion on the degree of externality. If perfect externality is assumed, then the positive impact of remittances outweighs the negative impact of the brain drain, as Table 9-2 shows. Thirdly, however, if the actual case would be closer to Table 9-1 result, then the result depends on the amount of remittances and the sector where the brain drain occurs. Finally, as long as both rual and urban households receive remittances at the same time, the overall impact seems more clear. As long as the brain drain occurs in either the education or the health sector, the positive impact of remittances outweighs the negative impact of the brain drain on GDP, as shown in Table 9-1. However, if it occurs in the public administration sector, the overall impact depends on both the degree of the brain drain and the amount of remittances. If remittances increase by 10% to both rural and urban households, then more than 5% brain drain results in the Ghanaian economy being damanged. If a 30% of skilled labor leaves the public administration sector, then a 30% increase in remittances to both rural and urban households is needed to outweigh the negative impact of the brain drain on the Ghanaian economy. Furthermore, even a big increase in remittances to both rural and urban households by 30% is not large enough to offset the negative impact of the brain drain, if more than 5% brain drain occurs in all 59 sectors at the same time.

5 Concluding Remarks

This paper has presented a computable general equilibrium (CGE) framework to numerically examine the impact of remittances and the brain drain on poverty reduction, welfare, and income inequality in Ghana. This paper has used the latest Input-Output table of Ghana of year 2005 with 59 different production sectors to reproduce the actual Ghanaian economy within the model.

The results obtained in this paper are as follows: On the impact of remittances, more remittances reduce poverty, and expand the Ghanaian economy. On the impact on income inequality, it depends on who receives more remittances. If the rural (urban) households receive more remittances, then income inequality shrinks (widens). On the magnitude of the impact of remittances, it depends on the assumption on the savings behavior for increased remittances. If increased remittances are treated simply as an increase in disposal income, then the magnitude is relatively small. However, if households use all up only for consumption and thus they do not save out of increased remittances, then the magnitude of the impact on the economy becomes much larger through its strong stimulation impact on consumption. Furthermore, as Adams and Cuecuecha (2013) found, if households in Ghana use increased remittances for investment goods such as education, housing, and health, then the magnitude of the impact becomes more larger. This implies that remittances resulted in more poverty reduction and more income inequality in Ghana.

On the impact of the brain drain, it is negative to poverty reduction and income inequality in Ghana. The Ghanaian economy has been damaged, and income inequality has been widen by the brain drain. Our simulation results show this is likely even if the externality effect is taken into account.

On the overall impact of remittances and the brain drain, income inequality becomes more severe by both effects. While the negative impact of both remittances and the brain drain is weaken if the externality effect of the brain drain is taken into account, the direction of the impact does not change. Regarding the overall impact on poverty reduction, it depends on the amount of remittances and the sector where the brain drain occurs. As long as the brain drain occurs in either the education or the health sector, then the positive impact of remittances outweighs the negative impact of the brain drain. However, if the brain drain occurs in the public administration sector, then more remittances are needed to offset the negative impact of more brain drain. Furthermore, if the brain drain occurs in all sectors by more than 5%, then even a 30% increase in remittances to both rural and urban households is not large enogh to offset the negative impact of the brain drain, thus, eventuating in the Ghanaian economy being damaged as a whole.

While this paper has used the Ghanaian input-output table, it would be notable to mention that it is applicable to all other countries in Africa in order to investigate the effect of remittances and the brain drain. Furthermore, the model can easily be generalized by incorporating policy instruments to examine the impact of policy changes such as tax reforms.

Finally drawbacks of this paper should be mentioned: The model is static, and it seems difficult to fully investigate the impact over time. As argued in the literature, the overall impact of remittances lasts over time. This implies that the framework is expected to be dynamic. It has also been assumed that labor supply is completely inelastic and immobile among different production sectors so that the framework cannot capture the impact of the brain drain from a particular sector. While the assumption of immobile labor could be justified and be adequate for a static and thus short-run framework, particularly skilled labor moves among different sectors if the brain drain is severe.

However, by using the latest Input-Output Table of Ghana, this paper has developed a well-fitted benchmark model within a CGE framework, and it has numerically argued the impact of remittances and the brain drain on poverty reduction and income inequality within a theoretical framework. It has also taken into account two key issues in the literature; behavioral changes towards remittances, and externality of the brain drain. Since the benchmark model has successfully reproduced the real Ghanaian economy within the model, the numerical results also seem realistic.

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Appendix 1: Model

The computable general equilibrium model of this paper employs the conventional static model[16]. The Ghanaian economy is assumed to consist of 59 different production sectors, two different types of households, the government, and the investment firm sector. All 59 industries are allowed to have intermediate production processes, and they are assumed to maximize their profit. Each production sector employs 6 factors in its production; self-employed labor (Ls), unskilled employed labor ($Lusk$), skilled employed labor (Lsk), capital specific for agriculture (Ka), general capital (Kn), and land (La). households are divided into two groups based on their living place indexed by h; the household living in the rural area ($h = a$) and the household living in the urban area ($h = b$). While households in different areas are different, households living in the same area are assumed to be identical. The household is assumed to maximize its utility over 59 different consumption goods.

The government is assumed to determine its tax revenue, its imports, its exports, income transfers to households, and its consumption in order to satisfy its budget constraint. The economy is assumed to be fully competitive, so that all prices are determined in the relevant markets in order to equate the amount of demand to the amount of supply at its fully competitive price level in equilibrium. Note that the model is static and thus the short-run effect is only investigated. Thus, it is assumed for simplicity that factor inputs are not mobile among different sectors in the short-run. All parameter values are presented in Table 6.

<household>

[16] In terms of the conventional static model, see Ballard et al (1985), Shoven and Whalley (1992), and Scarf and Shoven (2008). In particular, the model used in this paper is similar to Hosoe et al (2004). Regarding the dynamic model, it is conventional to employ an overlapping generations model In terms of computable overlapping generations model within a general equilibrium framework, see Auerbach and Kotlikoff (1987). Kato (1998, 2002a, 2002b), and Ihori et al (2006, 2011) also apply the dyanamic model to several policies in Japan.

Utility of the household indexed by h based on his/her living area is given by:

$$U^h\left(X_1^h, X_2^h, \cdots, X_{59}^h\right) = \alpha_i^h \sum_{i=1}^{59} \log\left(X_i^h\right); \qquad (1)$$
$$h = a, b,$$

where X_i^h denotes consumption of good i consumed by type h. $\sum_{i=1}^{59} \alpha_i^h = 1$ is assumed for both types of $h\,(= a$ and $b)$.

The household of type h is assumed to maximize (1) with respect to its consumption goods subject to its budget constraint such that:

$$\sum_{i=1}^{59} p_i X_i^h = B^h = I^h - S_p^h; \quad h = a, b$$

where p_i and I^h denote the price of good i and disposal income of type h, respectively. S_p^h denotes the total amount of savings, and the household is assumed to save the constant amount relative to its disposal income such that:

$$S_p^h = s_p^h I^h; \quad h = a, b$$

where the constant ratio, s_p^h, or the private saving rate, is given exogenously[17]. The value of s_p^h has been calculated by using the actual SAM. Then disposal income is given by

$$\begin{aligned} I^h &= GTrans^h + Trans^h + Rm^h \\ &+ \sum_{j=1}^{59} \left\{ \begin{array}{c} \left(1-\tau_r^a\right) r_j^a \overline{Ka}_j^h + \left(1-\tau_r^n\right) r_j^n \overline{Kn}_j^h + \left(1-\tau_w^s\right) w_j^s \overline{Ls}_j^h \\ + \left(1-\tau_w^{us}\right) w_j^{us} \overline{Lusk}_j^h + + \left(1-\tau_w^{sk}\right) w_j^{sk} \overline{Lsk}_j^h + \left(1-\tau_L\right) LP_j \overline{La}_j^h \end{array} \right\}, \\ h &= a, b \end{aligned}$$

[17]The assumption that the ratio is exogenously given is made only for the model to be consistent to the actual social accounting matrix, and this assumption is very common in the literature.

where $GTrans^h$,$Trans^h$, and Rm^h denote the government income transfers, net income transfers from the other type of the household, and the remittance sent from the rest of the world, respectively[18]. r_j^a, and r_j^n, denote the rental cost of capital specific for agriculture (Ka), and general capital (Kn) in sector j $(= 1, 2, \cdots, 59)$, respectively. w_j^s, w_j^{us} and w_j^{sk} denote the wage rate of self-employed labor (Ls), unskilled employed labor ($Lusk$), and skilled employed labor (Lsk) employed in sector j $(= 1, 2, \cdots, 59)$, respectively. LP_j denotes the unit price of land (La). Each type is assumed to have endowments of $\overline{Ka}_j^h, \overline{Kn}_j^h, \overline{Ls}_j^h, \overline{Lusk}_j^h, \overline{Lsk}_j^h$, and $\overline{La}_j^h$ in sector j $(= 1, 2, \cdots, 59)$. Both types are also assumed to pay taxes, and $\tau_r^a, \tau_r^n, \tau_w^s, \tau_w^{us}, \tau_w^{sk}$, and τ_L denote the capital income tax rate for agriculture, the capital income tax rate for others, the wage income tax rate for self-employed worker, the wage income tax rate for unskilled employed worker, the wage income tax rate for skilled employed worker, and the land tax rate, respectively. Note that all taxes are assumed to be proportional, and the tax rates have been calculated by using the actual social accounting matrix. The tax rate can be negative in the simulations if the effect of the case when the government subsidizes a particular factor input is explored. Note also that all factors are assumed to be immobile between different production sectors by assumption. The value of factor payments can be obtained from the actual social accounting matrix[19].

The first order conditions yield the demand functions such that:

$$X_i^h = X_i^h \left(\widetilde{p}, r_j^a, r_j^n, w_j^s, w_j^{us}, w_j^{sk}, LP_j; \tau_r^a, \tau_r^n, \tau_w^s, \tau_w^{us}, \tau_w^{sk}, \tau_L\right) \tag{2a}$$

$$= \frac{\alpha_i^h I^h \left(1 - s_p^h\right)}{p_i}, \tag{2b}$$

$$i = 1, 2, \cdots, 59, \quad h = a, b \tag{2c}$$

[18]Preciously speaking, $Trans^h$ also includes self-consumption within the same group.

[19]The total number of self-employed as well as employed workers in each production sector can be obtained from the IO table of year 2005. Since per capita wage income of employed workers and total wage income can also be obtained from the IO table of year 2005, $w_{j,h}L_h^j$ can be calculated for both $h = sw$ and $h = ew$. On $r_{j,h}\overline{K}_h^j$, the ratio of the number of each type of workers has simply been used to divide the total capital income of each production sector.

where $\widetilde{p} = (p_1, p_2, \cdots, p_{59})$. Note that α_i^h can be calculated by using (2b) and the actual social accounting matrix so that:

$$\alpha_i^h = \frac{p_i X_i^h}{I^h \left(1 - s_p^h\right)}; \quad h = a, b$$

where both the values of the denominator and the numerator can be obtained from the actual social accounting matrix.

<Production Sector>

Following the conventional assumption, the multiple decisions by each firm are described by the tree structure, where each firm is assumed to make a decision over several different items. In the tree structure, the optimal behavior of each firm which makes a decision over different items is described as if the firm always makes a decision over two different items at different steps. Each firm makes a decision over different items; exports of its own product, the amount of imported goods and intermediate goods used for its production, and labor and capital. This assumption simplifies a complicated decision over several items by each firm. Each step is also shown in Figure 3.

At step 1, a private firm, i, is assumed to use labor and capital to produce its composite goods, Y_i. Then, the firm is assumed to produce its domestic goods, Z_i, by using its own Y_i and $X_{i,k}$ at the second step. $X_{i,k}$ denotes the final consumption goods produced by firm k used by firm i for its production. Thus, $X_{i,k}$ is the amount of the final consumption goods produced by firm k for the intermediate production process of firm i. At the third step, the firm is assumed to decompose its domestic goods, Z_i, into exported goods, E_i, and final domestic goods, D_i. This step is concerned about its optimal decision over the amount of its product to be exported. At the final step (the fourth step), the firm is assumed to produce its final consumption goods, Q_i, by using its final domestic goods, D_i, and imported goods, M_i. This step corresponds to its optimal decision over how much it uses imported goods, M_i, and its own goods, D_i, to produce its final consumption goods, Q_i, which are consumed by domestic households. The assumption of this tree structure in terms of different decisions can incorporate firm's complicated decisions over exports of its own product, the amount of imported goods and intermediate goods which the firm uses in its production process, and the amount of factor inputs into the model in a tractable way.

Note that all market clearing conditions are used to determine all prices endogenously in their corresponding markets, and also that at each step the private firm is assumed to determine the amount of relevant variables in order to maximize its profit.

By the assumption of the above tree structure, all decision making processes can be simplified, and the optimal behavior about all different decisions can be incorporated as follows:

Step 1: The production of composite goods

Each firm is assumed to produce its composite goods by using capital and labor. Each firm is assumed to maximize its profit given by:

$$\begin{aligned}\pi_i = {} & p_i^Y Y_i\left(Ka_i, Kn_i, Ls_i, Lusk_i, Lsk_i, La_i\right) \\ & - \sum_h \left(r_i^a Ka_i^h + r_i^n Kn_i^h + w_i^s Ls_i^h + w_i^{us} Lusk_i^h + w_i^{sk} Lsk_i^h + LP_i La_i^h\right), \qquad (3)\end{aligned}$$

where Y_i and p_i^Y denote the composite goods produced by firm i and its price, respectively. The production technology is given by:

$$\begin{aligned} & Y_i\left(Ka_i, Kn_i, Ls_i, Lusk_i, Lsk_i, La_i\right) && (4) \\ & = Ka_i^{\beta_{Ka,i}} Kn_i^{\beta_{Kn,i}} Ls_i^{\beta_{Ls,i}} Lusk_i^{\beta_{Lusk,i}} Lsk_i^{\beta_{Lsk,i}} La_i^{\beta_{La,i}}, && (5) \\ & i = 1, 2, \cdots, 59, && (6) \end{aligned}$$

where $\beta_{Ka,i} + \beta_{Kn,i} + \beta_{Ls,i} + \beta_{Lusk,i} + \beta_{Lsk,i} + \beta_{La,i} = 1$ is assumed for all $i = 1, 2, \cdots, 59$. It is also assumed such that:

$$\sum_h Ka_i^h = Ka_i,\ \sum_h Kn_i^h = Kn_i,\ \sum_h Ls_i^h = Ls_i,$$
$$\sum_h Lusk_i^h = Lusk_i,\ \sum_h Lsk_i^h = Lsk_i,\ \sum_h La_i^h = La_i.$$

Each firm is assumed to maximize (3) with respect to labor and capital subject to (4), and the first order conditions yield the demand functions such that:

$$\begin{aligned}
Ka_i &= Ka_i\left(p_i^Y, r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}, LP_i; \beta_{Ka,i}, \beta_{Kn,i}, \beta_{Ls,i}, \beta_{Lusk,i}, \beta_{Lsk,i}, \beta_{La,i}\right) && \text{(7a)}\\
&= \frac{\beta_{Ka,i}}{r_i^a} p_i^Y Y_i, && \text{(7b)}\\
Kn_i &= Kn_i\left(p_i^Y, r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}, LP_i; \beta_{Ka,i}, \beta_{Kn,i}, \beta_{Ls,i}, \beta_{Lusk,i}, \beta_{Lsk,i}, \beta_{La,i}\right) && \text{(7c)}\\
&= \frac{\beta_{Kn,i}}{r_i^n} p_i^Y Y_i, && \text{(7d)}\\
Ls_i &= Ls_i\left(p_i^Y, r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}, LP_i; \beta_{Ka,i}, \beta_{Kn,i}, \beta_{Ls,i}, \beta_{Lusk,i}, \beta_{Lsk,i}, \beta_{La,i}\right), &&\\
&= \frac{\beta_{Ls,i}}{w_i^s} p_i^Y Y_i, && \text{(7e)}\\
Lusk_i &= Lusk_i\left(p_i^Y, r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}, LP_i; \beta_{Ka,i}, \beta_{Kn,i}, \beta_{Ls,i}, \beta_{Lusk,i}, \beta_{Lsk,i}, \beta_{La,i}\right), && \text{(7f)}\\
&= \frac{\beta_{Lusk,i}}{w_i^{us}} p_i^Y Y_i, && \text{(7g)}\\
Lsk_i &= Lsk_i\left(p_i^Y, r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}, LP_i; \beta_{Ka,i}, \beta_{Kn,i}, \beta_{Ls,i}, \beta_{Lusk,i}, \beta_{Lsk,i}, \beta_{La,i}\right), && \text{(7h)}\\
&= \frac{\beta_{Lsk,i}}{w_i^{sk}} p_i^Y Y_i, && \text{(7i)}\\
La_i &= La_i\left(p_i^Y, r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}, LP_i; \beta_{Ka,i}, \beta_{Kn,i}, \beta_{Ls,i}, \beta_{Lusk,i}, \beta_{Lsk,i}, \beta_{La,i}\right), && \text{(7j)}\\
&= \frac{\beta_{La,i}}{LP_i} p_i^Y Y_i, && \text{(7k)}\\
i &= 1, 2, \cdots, 59 && \text{(7l)}
\end{aligned}$$

Note that parameter values can be calculated by using from (7b) to (7k), and the actual social accounting matrix so that:

$$\beta_{Ka,i} = \frac{r_i^a Ka_{i,}}{p_i^Y Y_i},\ \beta_{Kn,i} = \frac{r_i^n Kn_{i,}}{p_i^Y Y_i},\ \beta_{Ls,i} = \frac{w_i^s Ls_i}{p_i^Y Y_i},$$
$$\beta_{Lusk,i} = \frac{w_i^{ys} Lusk_i}{p_i^Y Y_i},\ \beta_{Lsk,i} = \frac{w_i^{sk} Lsk_i}{p_i^Y Y_i},\ \beta_{La,i} = \frac{LP_i La_i}{p_i^Y Y_i},$$
$$i = 1, 2, \cdots, 59$$

The estimated values of $\beta_{K,i,h}$ and $\beta_{L,i,h}$ are given in Table 6.

Step 2: The production of domestic goods

Each firm is assumed to produce domestic goods, Z_i, by using intermediate goods and its own composite goods, which production has been described at step 1. The optimal behavior of each firm in terms of the production of domestic goods can be described such that:

$$\underset{Y_i, X_{i,j}}{Max}\ \pi_i = p_i^Z Z_i - \left(p_i^Y Y_i - \sum_k^{59} p_k^X X_{i,k} \right),$$
$$st \quad Z_i = \min\left(\frac{X_{i,k}}{ax_{i,k}}, \frac{Y_i}{ay_i} \right),\ i = 1, 2, \cdots, 59,$$

where $X_{i,k}$ and p_k^X denote an intermediate good k used by firm i and its price, respectively. p_i^Z is the price of Z_i. $ax_{i,k}$ denotes the amount of an intermediate good k used for producing one unit of a domestic good of firm i , and ay_i denotes the amount of its own composite good for producing one unit of its domestic good. The estimated values of ay_i are given in Table 5-2[20]. Note that the production function at this step is assumed to be the Leontief type. Using $ax_{i,k}$ and ay_i, and assuming that the market is fully competitive, the zero-profit condition can be written by:

$$p_i^Z = p_i^Y ay_i + \sum_k^{59} p_k^X ax_{i,k},\ i = 1, 2, \cdots, 59.$$

Step 3: Decomposition of Domestic Goods into Exported Goods and Final

[20]The estimated values of $ax_{i,k}$ are not presented in Table 5-2, since the number of $ax_{i,k}$ reaches 11,449. The estimated values are given upon request.

Domestic Goods

The optimal decision made by firm i in terms of the amount of exports of its own goods is described as the decomposition of Z_i $(i = 1, 2, \cdots, 59)$ into exported goods, E_i, and final domestic goods, D_i. Each firm is assumed to maximize its profit such that:

$$\pi_i = p_i^e \left(1 - \tau_i^e\right) E_i + p_i^d D_i - \left(1 + \tau_i^p\right) p_i^Z Z_i, \tag{8}$$

where p_i^e and p_i^d denote the price when the domestic goods are sold abroad, and the price when the domestic goods are sold domestically, respectively. Note that p_i^e is measured in the domestic currency. τ_i^p and τ_i^e are the tax rates of a production tax imposed on the production of Z_i, and the tax rate on exports, respectively. The values of τ_i^p and τ_i^e are calculated by using the actual social accounting matrix, and the calculated values are given in Table 2-1 and 2-2. The decomposition is assumed to follow the Cobb-Douglas technology such that:

$$Z_i = E_i^{\kappa_i^e} D_i^{\kappa_i^d}, \ i = 1, 2, \cdots, 59, \tag{9}$$

where $\kappa_i^d + \kappa_i^e = 1$ ($i = 1, 2, \cdots, 59$) is assumed. Each firm is assumed to maximize (8) with respect to E_i and D_i subject to (9), and the first order conditions yield

$$E_i = E_i\left(p_i^e, p_i^d, p_i^Z; \tau_i^p, \tau_i^s, \kappa_i^d, \kappa_i^e\right) = \frac{\kappa_i^e \left(1 + \tau_i^p\right) p_i^Z Z_i}{p_i^e \left(1 - \tau_i^e\right)}, \tag{10a}$$

$$D_i = D_i\left(p_i^e, p_i^d, p_i^Z; \tau_i^p, \tau_i^s, \kappa_i^d, \kappa_i^e\right) = \frac{\kappa_i^d \left(1 + \tau_i^p\right) p_i^Z Z_i}{p_i^d}, \ i = 1, 2, \cdots, 59. \tag{10b}$$

Note that κ_i^e and κ_i^d can be calculated by using (10a), (10b), and the actual social accounting matrix so that:

$$\kappa_i^e = \frac{p_i^e \left(1 - \tau_i^e\right) E_i}{\left(1 + \tau_i^p\right) p_i^Z Z_i},$$

$$\kappa_i^d = \frac{p_i^d D_i}{\left(1 + \tau_i^p\right) p_i^Z Z_i}, \ i = 1, 2, \cdots, 59,$$

where $p_i^e E_i$, $p_i^d D_i$, $p_i^Z Z_i$, $\tau_i^s p_i^Z Z_i$, and $\tau_i^e p_i^e E_i$ can be obtained from the actual social accounting matrix. The estimated values of κ_i^e and κ_i^d are given in Table 2.

Step 4: The Production of the final goods

Denote the final consumption goods by Q_i $(i = 1, 2, \cdots, 59)$. The final consumption goods are assumed to be produced by using the final domestic goods, D_i, and the imported goods, M_i. This step corresponds to the optimal decision making behavior of each firm in terms of the amount of imported goods which are used in its production process. The production technology at this final step is given by the following Cobb-Douglas function:

$$Q_i = M_i^{\gamma_i^m} D_i^{\gamma_i^d}, \ i = 1, 2, \cdots, 59, \tag{11}$$

where $\gamma_i^m + \gamma_i^d = 1$ ($i = 1, 2, \cdots, 59$) is assumed. Each firm is assumed to maximize its profit with respect to M_i and D_i subject to (11). Its profit is given by:

$$\pi_i = p_i^Q Q_i - (1 + \tau_i^m) p_i^m M_i - p_i^d D_i, \ i = 1, 2, \cdots, 59,$$

where p_i^Q and τ_i^m denote the price of its final consumption goods, Q_i, and the import tariff rate, respectively. The import tariff rate is calculated by using the actual social accounting matrix, and it is given in Table 2-4. Then, the first order conditions yield

$$M_i = M_i \left(p_i^m, p_i^d, p_i^Q; \tau_i^m, \gamma_i^m, \gamma_i^d\right) = \frac{\gamma_i^m p_i^Q Q_i}{(1 + \tau_i^m) p_i^m}_{i}, \tag{12a}$$

$$D_i = D_i \left(p_i^m, p_i^d, p_i^Q; \tau_i^m, \gamma_i^m, \gamma_i^d\right) = \frac{\gamma_i^d p_i^Q Q_i}{p_i^d}, \ i = 1, 2, \cdots, 59. \tag{12b}$$

Note that γ_i^m and γ_i^d can be calculated by using (12a), (12b), and the actual social accounting matrix so that:

$$\gamma_i^m = \frac{(1+\tau_i^m)\, p_i^m M_i}{p_i^Q Q_i},$$
$$\gamma_i^d = \frac{p_i^d D_i}{p_i^Q Q_i},\ i = 1, 2, \cdots, 59,$$

where $p_i^m M_i$, $p_i^d D_i$, $p_i^Q Q_i$ and $\tau_i^m p_i^m M_i$ can be obtained from the actual social accounting matrix. The estimated values of γ_i^m and γ_i^d are given in Table 6.

<The Government>

The government is assumed to impose several taxes to satisfy its budget constraint. Its budget constraint is given by:

$$\sum_{i=1}^{59} p_i^Q X_i^g + S^g + Gimp + GTrans = T^I + T^p + T^m + T^e + Gex,$$

where the left hand side is the total government expenditure, and the right hand side is the total government revenue. X_i^g and S^g denote government consumption of a final consumption good i, and government savings, respectively. $GTrans$ denotes the total amount of income transfers to both types of h such that:

$$GTrans = \sum_h GTrans^h.$$

$Gimp$ and Gex denote direct imports and exports by the government, respectively. The total tax revenue is given by:

$$
\begin{aligned}
T^{I} &= \sum_{i=1}^{59} \sum_{h} \left(\tau_{w}^{s} w_{i}^{s} Ls_{i}^{h} + \tau_{w}^{us} w_{i}^{us} Lusk_{i}^{h} + \tau_{w}^{sk} w_{i}^{sk} Lsk_{i}^{h} \right) \\
&+ \sum_{i=1}^{59} \sum_{h} \left(\tau_{r}^{a} r_{i}^{a} Ka_{i}^{h} + \tau_{w}^{n} r_{i}^{n} Kn_{i}^{h} \right), \\
T^{L} &= \sum_{i=1}^{59} \sum_{h} \left(\tau_{L} LP_{i} La_{i}^{h} \right), \\
T^{p} &= \sum_{i=1}^{59} \tau_{i}^{p} \left(p_{i}^{Z} Z_{i} \right), \\
T^{m} &= \sum_{i=1}^{59} \tau_{i}^{m} \left(p_{i}^{m} M_{i} \right), \\
T^{e} &= \sum_{i=1}^{59} \tau_{i}^{e} \left(p_{i}^{e} E_{i} \right)
\end{aligned}
$$

where T^I, T^L, T^p, T^m, and T^e denote the total income tax revenue, the total land tax revenue, the total production tax revenue, the total import tariff revenue, and the total export tax revenue, respectively. The government is assumed to save the constant amount relative to the total amount of tax revenue, and the government savings are assumed to be given by

$$S^{g} = s^{g} \left(T^{I} + T^{p} + T^{m} + Gex \right),$$

where the constant ratio, s^g, is given exogenously, and .its value has been calculated by using the actual SAM.

<**Equilibrium Conditions**>

There are two factor inputs, labour and capital. Since the model is static and thus the short-run effect is explored, it is assumed that each factor cannot move among different sectors (industries) in the short-run. This implies the equilibrium conditions of factor markets such that

$$\overline{Ka}_i^a + \overline{Ka}_i^b = Ka_i, \tag{13a}$$

$$\overline{Kn}_i^a + \overline{Kn}_i^b = Kn_i, \tag{13b}$$

$$\overline{Ls}_i^a + \overline{Ls}_i^b = Ls_i, \tag{13c}$$

$$\overline{Lusk}_i^a + \overline{Lusk}_i^b = Lusk_i \tag{13d}$$

$$\overline{Lsk}_i^a + \overline{Lsk}_i^b = Lsk_i \tag{13e}$$

$$\overline{La}_i^a + \overline{La}_i^b = La, \tag{13f}$$

$$i = 1, 2, \cdots, 59 \tag{13g}$$

Note that $r_i^a, r_i^n, w_i^s, w_i^{us}, w_i^{sk}$, and LP_i $(i = 1, 2, \cdots, 59)$ are determined in order to satisfy (13a) to (13f), respectively.

In terms of the market clearing condition of a good i $(i = 1, 2, \cdots, 59)$, a private investment sector is introduced in order to close the economy in this paper[21]. Denoting the amount of a good i consumed by the private investment sector by X_i^s, the market clearing condition of a good i is given by:

$$Q_i = X_i^a + X_i^b + X_i^g + X_i^s + \sum_k^{59} X_{i,k}, \; i = 1, 2, \cdots, 59, \tag{14}$$

where the left hand side is the total supply, and the right hand side is the total demand for a good i. p_i^Q $(i = 1, 2, \cdots, 59)$ is determined in order to satisfy (14). Note that the budget constraint of the private investment sector is given by:

$$\sum_{i=1}^{59} p_i^Q X_i^s = S^g + S_p^a + S_p^b + S^f,$$

where the left hand side is the total amount of its consumption, and the right hand side is the total amount of its income. S^f denotes the total amount of savings by the foreign sector,

[21]This is also the conventional assumption in the literature.

or the deficits in the current account, and it is given by subtracting exports from imports[22]. Since both the amount of exports and the amount of imports can be obtained from the actual social accounting matrix, S^f can be calculated from the actual social accounting matrix, and thus it is exogenously given in the model. Furthermore, the foreign trade balance is given by

$$\sum_{i=1}^{59} p_i^{w,e} E_i + S^f + Gex + \sum_h Rm^h = \sum_{i=1}^{59} p_i^{w,m} M_i + Gimp,$$

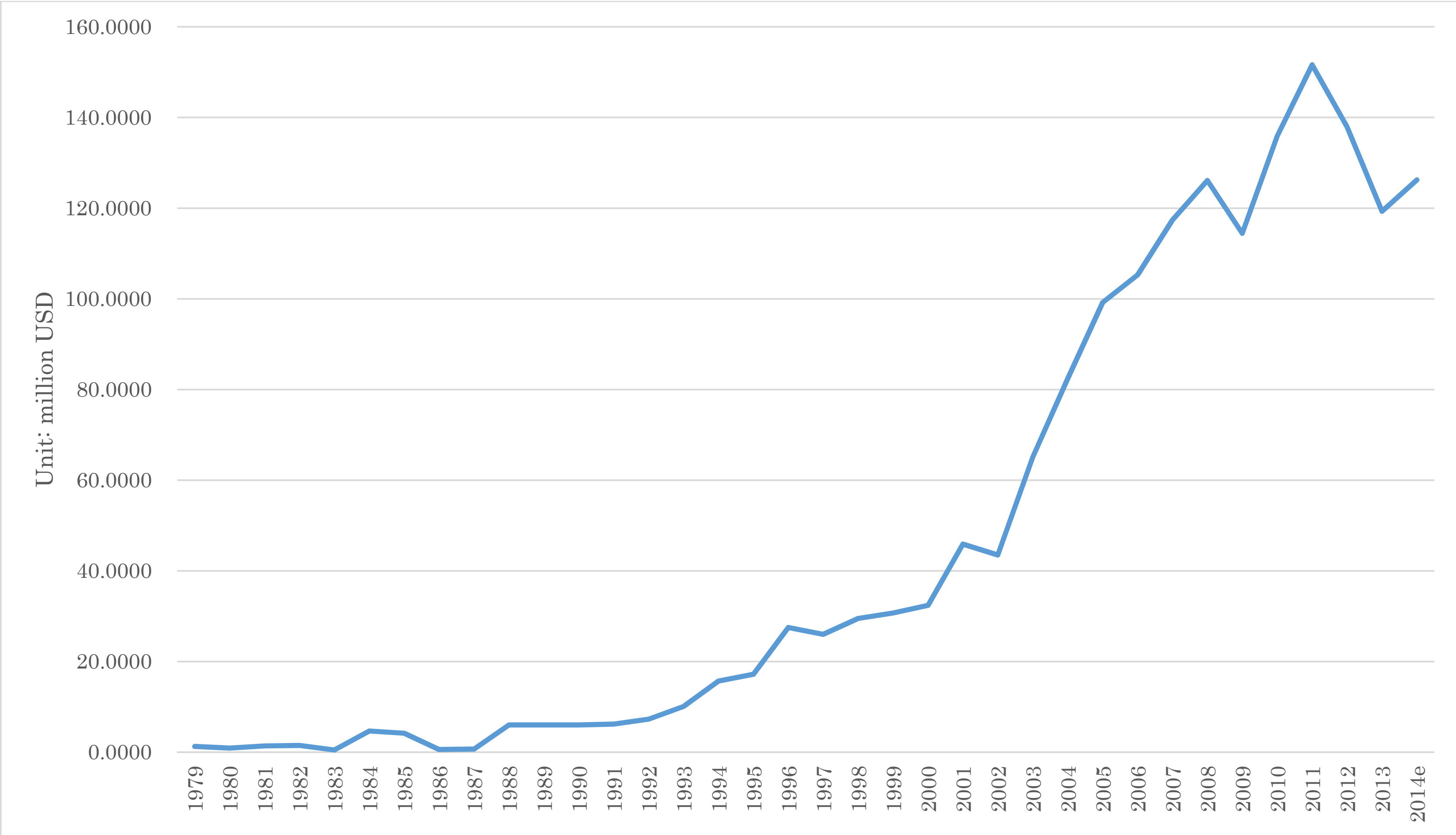
where $p_i^{w,e}$ and $p_i^{w,m}$ denote the world price of an export good, and an import good of i, respectively, and both of them are assumed to be given exogenously. Since p_i^e and p_i^m are both measured in the domestic currency, they are also expressed such that:

$$p_i^e = \varepsilon p_i^{w,e},$$
$$p_i^m = \varepsilon p_i^{w,m},\ i = 1, 2, \cdots, 59,$$

where ε denotes the exchange rate. Note that the exogeneity assumption on the world prices implies that the exchange rate is endogenously determined within the model.

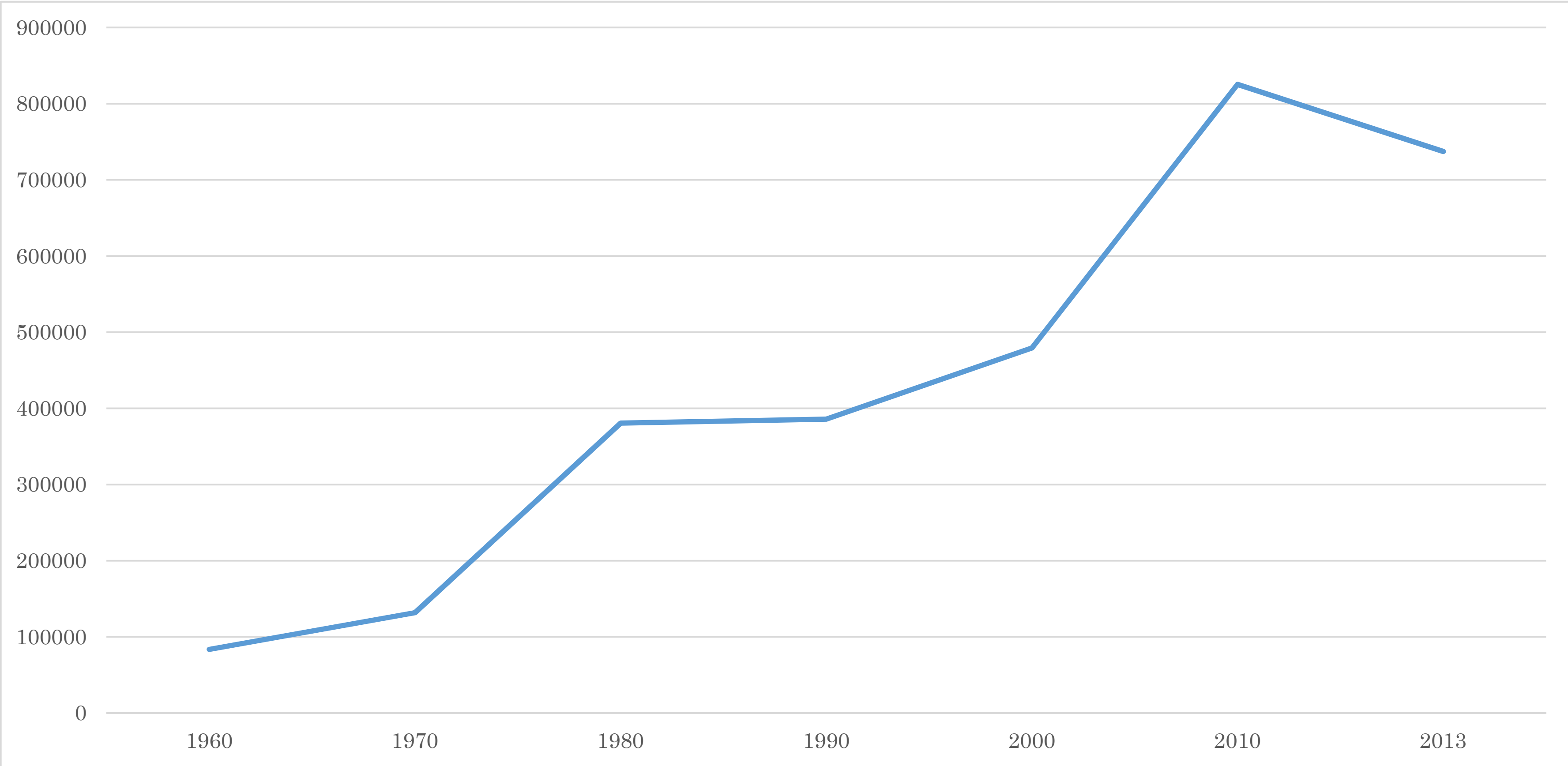
[22]The FDI is assumed to be negligible in this paper.

Figure 1: International Remittances



Data Source: World Bank

Figure 2: The Number of Emigrants from Ghana



Data Source: World Bank

Table 1: International Remittances in year 2005 based on the IO Table year 2005

Unit: million USD

		Formal	Informal	Total
To	Rural houeholds	45.11181696	168.34958	213.46139
	Urban households	175.726162	655.77995	831.50611
	total	220.8379789	824.12952	1044.9675
		Per a million population		
To	Rural houeholds	3.268972244	12.199245	15.468217
	Urban households	20.91978119	78.069041	98.988822
	total	24.18875343	90.268286	114.45704

Source: Input-Output Table of Year 2005
The amout of informal remittances is obtained based on the assumption that the amount of exports in sector 51 is treated as informal international remittances

Table 2: Income and Population in year 2005

Income: in million USD, and Population in million

	Population	Income
Rural houeholds	13.8	5054.3708
Urban households	8.4	5850.3813
total	22.2	10904.752
	Per a million population	
Rural houeholds		366.25876
Urban households		423.94068
total		790.19943

Source: Input-Output Table Year 2005 and GLSS 5

Table 3-1: Economic Values of Final Consumption Goods by the Rural Household in the Benchmark Model, $P_i^Q Q_i;\ i = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	161.3466	181.0993	164.7513	3.5397	243.5304	246.1961	49.3526	23.5462	0.7045	29.1376	51.7212	0.0000	23.7231	0.0000	350.0597	0.0000	139.3511	0.0000	13.4950	0.0000
actual	161.3466	181.0993	164.7513	3.5397	243.5304	246.1961	49.3526	23.5462	0.7045	29.1376	51.7212	0.0000	23.7231	0.0000	350.0597	0.0000	139.3511	0.0000	13.4950	0.0000

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	46.5567	33.4926	38.3056	20.9585	58.7158	0.0000	137.0186	0.0000	326.8628	151.7803	11.3400	28.4616	253.5878	79.4779	207.1868	69.3121	35.5209	9.1542	0.0000	26.1875
actual	46.5567	33.4926	38.3056	20.9585	58.7158	0.0000	137.0186	0.0000	326.8628	151.7803	11.3400	28.4616	253.5878	79.4779	207.1868	69.3121	35.5209	9.1542	0.0000	26.1875

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	9.2716	143.8824	31.3530	244.9696	32.1250	316.4404	0.0000	0.4894	122.9051	0.0000	235.0137	67.2638	36.1436	19.8688	75.2528	91.3408	0.7734	2.1138	15.7557
actual	9.2716	143.8824	31.3530	244.9696	32.1250	316.4404	0.0000	0.4894	122.9051	0.0000	235.0137	67.2638	36.1436	19.8688	75.2528	91.3408	0.7734	2.1138	15.7557

Table 3-2: Economic Values of Final Consumption Goods by the Urban Household in the Benchmark Model, $P_i^Q Q_i;\ i = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	54.8043	198.6549	13.7817	4.3154	118.0666	220.2583	31.0591	16.3610	0.0097	13.7614	18.1908	0.0000	46.1061	0.0000	223.3785	0.0000	86.8935	0.0000	2.8668	0.0000
actual	54.8043	198.6549	13.7817	4.3154	118.0666	220.2583	31.0591	16.3610	0.0097	13.7614	18.1908	0.0000	46.1061	0.0000	223.3785	0.0000	86.8935	0.0000	2.8668	0.0000

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	58.8608	58.6503	69.4302	35.9050	41.3304	0.0000	128.9009	0.0000	417.2806	173.8144	15.1842	67.3249	175.3232	92.1036	242.9253	82.6421	79.8833	23.6569	0.0000	95.4730
actual	58.8608	58.6503	69.4302	35.9050	41.3304	0.0000	128.9009	0.0000	417.2806	173.8144	15.1842	67.3249	175.3232	92.1036	242.9253	82.6421	79.8833	23.6569	0.0000	95.4730

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	24.1693	55.6489	1.3699	250.3509	30.5753	550.0410	0.0000	0.9181	255.0649	0.0000	776.6547	140.6510	114.0056	51.7732	177.2926	167.4242	2.2056	3.6677	14.7460
actual	24.1693	55.6489	1.3699	250.3509	30.5753	550.0410	0.0000	0.9181	255.0649	0.0000	776.6547	140.6510	114.0056	51.7732	177.2926	167.4242	2.2056	3.6677	14.7460

Table 3-3: Labor Income of Self-Employed Worker in the Benchmark Model, $w_j^s L_{sj}$; $j = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	105.8925	38.4763	73.8565	0.0000	180.1520	195.9985	29.2284	11.5242	4.7339	32.9612	35.0544	9.6803	28.0700	11.2050	251.8190	3.5449	73.0213	283.0253	6.9436	5.9172
actual	105.8925	38.4763	73.8565	0.0000	180.1520	195.9985	29.2284	11.5242	4.7339	32.9612	35.0544	9.6803	28.0700	11.2050	251.8190	3.5449	73.0213	283.0253	6.9436	5.9172

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	0.6707	21.8156	35.3879	42.8736	48.8370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.6707	21.8156	35.3879	42.8736	48.8370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 3-4: Labor Income of Unskilled Worker in the Benchmark Model, $w_j^{us} Lusk_j$; $j = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	32.0739	11.6541	22.3705	0.0000	54.5664	59.3662	8.8530	3.4906	1.4339	9.9837	10.6177	2.9321	9.5731	3.8214	73.5411	1.0353	24.9034	235.6325	2.3681	2.0180
actual	32.0739	11.6541	22.3705	0.0000	54.5664	59.3662	8.8530	3.4906	1.4339	9.9837	10.6177	2.9321	9.5731	3.8214	73.5411	1.0353	24.9034	235.6325	2.3681	2.0180

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	0.2880	9.3678	10.0627	12.1914	25.8928	384.7704	110.0018	128.3078	23.0544	88.1841	5.6232	19.6924	81.9941	15.1783	56.8272	29.4589	83.0274	11.3766	0.0000	10.9324
actual	0.2880	9.3678	10.0627	12.1914	25.8928	384.7704	110.0018	128.3078	23.0544	88.1841	5.6232	19.6924	81.9941	15.1783	56.8272	29.4589	83.0274	11.3766	0.0000	10.9324

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	9.3545	0.2570	0.0000	34.3712	40.9948	49.9234	590.9863	4.3730	77.3390	419.8873	44.1981	190.8424	78.3951	36.0783	126.4153	80.3944	634.1366	27.8624	12.0627
actual	9.3545	0.2570	0.0000	34.3712	40.9948	49.9234	590.9863	4.3730	77.3390	419.8873	44.1981	190.8424	78.3951	36.0783	126.4153	80.3944	634.1366	27.8624	12.0627

Table 3-5: Labor Income of Skilled Worker in the Benchmark Model, $w_j^{sk} Lsk_j;\ j = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	0.0000	0.0000	0.0000	0.0000	0.0000	19.4127	69.7719	30.8172	0.3714	0.0000	20.0733	6.8262	0.0000	0.0000	0.0000	0.0000	0.0000	3.9142	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	19.4127	69.7719	30.8172	0.3714	0.0000	20.0733	6.8262	0.0000	0.0000	0.0000	0.0000	0.0000	3.9142	0.0000	0.0000

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	0.0000	0.0000	0.0000	11.7311	0.0000	12.7006	87.6512	5.0142	36.2130	9.9256	0.8788	11.0618	21.8410	48.1011	0.0000	45.1715	377.3795	180.6854	49.0762
actual	0.0000	0.0000	0.0000	11.7311	0.0000	12.7006	87.6512	5.0142	36.2130	9.9256	0.8788	11.0618	21.8410	48.1011	0.0000	45.1715	377.3795	180.6854	49.0762

Table 3-6: Capital Income in the Agriculture in the Benchmark Model, $r_j^a Ka_j;\ j = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	5.4798	2.7494	4.2129	0.0000	12.2215	21.4011	5.1579	1.8536	0.2564	2.3531	2.7171	2.2538	3.6592	1.4935	10.8366	0.3078	7.3163	19.5665	0.4618	0.8966
actual	5.4798	2.7494	4.2129	0.0000	12.2215	21.4011	5.1579	1.8536	0.2564	2.3531	2.7171	2.2538	3.6592	1.4935	10.8366	0.3078	7.3163	19.5665	0.4618	0.8966

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	0.2097	6.6148	6.3125	7.5228	10.9965	128.7726	31.8345	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.2097	6.6148	6.3125	7.5228	10.9965	128.7726	31.8345	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 3-7: General Capital Income in the Benchmark Model, $r_j^n Kn_j;\ j = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	328.9445	11.9689	14.5565	15.8624	14.5749	38.1160	3.8420	17.6739	8.0831	26.0721	6.4357	0.0000	23.0972
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	328.9445	11.9689	14.5565	15.8624	14.5749	38.1160	3.8420	17.6739	8.0831	26.0721	6.4357	0.0000	23.0972

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	19.7005	0.5417	0.0000	42.1319	33.2258	37.1404	358.4916	7.9680	146.4867	103.4885	18.5759	87.2785	85.0319	69.2978	119.4375	78.5519	241.9299	56.5929	17.0303
actual	19.7005	0.5417	0.0000	42.1319	33.2258	37.1404	358.4916	7.9680	146.4867	103.4885	18.5759	87.2785	85.0319	69.2978	119.4375	78.5519	241.9299	56.5929	17.0303

Table 3-8: Income for the Land Owner in the Benchmark Model, $LP_j\ La_j;\ j = 1,2,\cdots,59$

Unit: a million USD

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
model	56.9210	22.7400	38.9151	0.0000	104.2933	172.6834	33.1007	11.9708	0.3161	14.3378	15.1372	11.6548	31.7892	12.5514	96.7849	2.6807	34.2172	74.8302	4.0150	6.3113
actual	56.9210	22.7400	38.9151	0.0000	104.2933	172.6834	33.1007	11.9708	0.3161	14.3378	15.1372	11.6548	31.7892	12.5514	96.7849	2.6807	34.2172	74.8302	4.0150	6.3113

i	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

i	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
model	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
actual	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 3-9: Economic Values of the Benchmark Model

Unit: a million USD (except for Gini Coefficient)

	model	actual
Savings		
Private Sector		
Rural households	231.8894	231.8894
Urban households	138.6556	138.6556
Government Sector	745.4039	745.4039
Foreign Sector	1,986.8083	1,986.8084
Total Tax Revenue		
Income Tax		
from Rural households	88.7185	88.7185
from Urban households	261.2955	261.2955
Production Tax	1,133.3940	1,133.3940
Export Tax	119.8080	119.8080
Import Tarrif	387.6275	387.6275
GDP	11,429.3131	11,429.3131
Gini Coefficient	39.4	39.4

Table 4-1: Calculated Production Tax Rates

$$TAUP(i) = \tau_i^p ;\ i = 1,2,\cdots,59 \quad \text{(Production Tax Rate)}$$

TAUP(1)	TAUP(2)	TAUP(3)	TAUP(4)	TAUP(5)	TAUP(6)	TAUP(7)	TAUP(8)	TAUP(9)	TAUP(10)	TAUP(11)	TAUP(12)	TAUP(13)	TAUP(14)	TAUP(15)
0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

TAUP(16)	TAUP(17)	TAUP(18)	TAUP(19)	TAUP(20)	TAUP(21)	TAUP(22)	TAUP(23)	TAUP(24)	TAUP(25)	TAUP(26)	TAUP(27)	TAUP(28)	TAUP(29)	TAUP(30)
0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	49.3897%	0.0000%

TAUP(31)	TAUP(32)	TAUP(33)	TAUP(34)	TAUP(35)	TAUP(36)	TAUP(37)	TAUP(38)	TAUP(39)	TAUP(40)	TAUP(41)	TAUP(42)	TAUP(43)	TAUP(44)	TAUP(45)
0.0000%	13.4050%	4.6211%	31.9420%	11.4741%	8.4731%	4.6619%	19.9327%	0.0000%	62.9687%	57.3219%	0.0000%	22.7483%	9.2110%	5.1310%

TAUP(46)	TAUP(47)	TAUP(48)	TAUP(49)	TAUP(50)	TAUP(51)	TAUP(52)	TAUP(53)	TAUP(54)	TAUP(55)	TAUP(56)	TAUP(57)	TAUP(58)	TAUP(59)
19.3405%	0.1454%	15.9753%	0.0000%	16.0479%	0.6022%	2.3914%	1.6026%	11.9926%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

Table 4-2: Calculated Export Tax Rates

$$TAUPE(i) = \tau_i^e ;\ i = 1,2,\cdots,59 \quad \text{(Export Tax Rate)}$$

TAUPE(1)	TAUPE(2)	TAUPE(3)	TAUPE(4)	TAUPE(5)	TAUPE(6)	TAUPE(7)	TAUPE(8)	TAUPE(9)	TAUPE(10)	TAUPE(11)	TAUPE(12)	TAUPE(13)	TAUPE(14)	TAUPE(15)
0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

TAUPE(16)	TAUPE(17)	TAUPE(18)	TAUPE(19)	TAUPE(20)	TAUPE(21)	TAUPE(22)	TAUPE(23)	TAUPE(24)	TAUPE(25)	TAUPE(26)	TAUPE(27)	TAUPE(28)	TAUPE(29)	TAUPE(30)
0.0000%	0.0000%	14.1960%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

TAUPE(31)	TAUPE(32)	TAUPE(33)	TAUPE(34)	TAUPE(35)	TAUPE(36)	TAUPE(37)	TAUPE(38)	TAUPE(39)	TAUPE(40)	TAUPE(41)	TAUPE(42)	TAUPE(43)	TAUPE(44)	TAUPE(45)
0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

TAUPE(46)	TAUPE(47)	TAUPE(48)	TAUPE(49)	TAUPE(50)	TAUPE(51)	TAUPE(52)	TAUPE(53)	TAUPE(54)	TAUPE(55)	TAUPE(56)	TAUPE(57)	TAUPE(58)	TAUPE(59)
0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

Table 4-3: Calculated Import Tariff Rates

$$TAUM\left(i\right)=\tau_i^m;\ i=1,2,\cdots,59\quad \text{(Import Tariff Rate)}$$

TAUM(1)	TAUM(2)	TAUM(3)	TAUM(4)	TAUM(5)	TAUM(6)	TAUM(7)	TAUM(8)	TAUM(9)	TAUM(10)	TAUM(11)	TAUM(12)	TAUM(13)	TAUM(14)	TAUM(15)
0.0000%	20.5630%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

TAUM(16)	TAUM(17)	TAUM(18)	TAUM(19)	TAUM(20)	TAUM(21)	TAUM(22)	TAUM(23)	TAUM(24)	TAUM(25)	TAUM(26)	TAUM(27)	TAUM(28)	TAUM(29)	TAUM(30)
0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	18.8998%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	5.5151%	0.0000%

TAUM(31)	TAUM(32)	TAUM(33)	TAUM(34)	TAUM(35)	TAUM(36)	TAUM(37)	TAUM(38)	TAUM(39)	TAUM(40)	TAUM(41)	TAUM(42)	TAUM(43)	TAUM(44)	TAUM(45)
0.0000%	28.7187%	6.1523%	32.2464%	7.1560%	35.1581%	0.0000%	39.1748%	0.0000%	0.0000%	0.0000%	0.8349%	10.4219%	4.9250%	2.7157%

TAUM(46)	TAUM(47)	TAUM(48)	TAUM(49)	TAUM(50)	TAUM(51)	TAUM(52)	TAUM(53)	TAUM(54)	TAUM(55)	TAUM(56)	TAUM(57)	TAUM(58)	TAUM(59)
5.1803%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%

Table 4-4: Calculated Income Tax Rates

	Rural Household	Urban Household
Income Tax Rate	1.9330%	5.5051%

Table 5-1: Parameter Values

$$ALPHA(i, j) = \alpha_{ij}\,;\; i = 1(rural),\ 2(urban),\ j = 1,2,\cdots,59$$

ALPHA(1, 1)	ALPHA(1, 2)	ALPHA(1, 3)	ALPHA(1, 4)	ALPHA(1, 5)	ALPHA(1, 6)	ALPHA(1, 7)	ALPHA(1, 8)	ALPHA(1, 9)	ALPHA(1, 10)	ALPHA(1, 11)	ALPHA(1, 12)	ALPHA(1, 13)	ALPHA(1, 14)	ALPHA(1, 15)
0.034620	0.038859	0.035351	0.000760	0.052255	0.052827	0.010590	0.005052	0.000151	0.006252	0.011098	0.000000	0.005090	0.000000	0.075113

ALPHA(1,16)	ALPHA(1,17)	ALPHA(1,18)	ALPHA(1,19)	ALPHA(1,20)	ALPHA(1,21)	ALPHA(1,22)	ALPHA(1,23)	ALPHA(1,24)	ALPHA(1,25)	ALPHA(1,26)	ALPHA(1,27)	ALPHA(1,28)	ALPHA(1,29)	ALPHA(1,30)
0.000000	0.029901	0.000000	0.002896	0.000000	0.009990	0.007187	0.008219	0.004497	0.012599	0.000000	0.029400	0.000000	0.070136	0.032568

ALPHA(1,31)	ALPHA(1,32)	ALPHA(1,33)	ALPHA(1,34)	ALPHA(1,35)	ALPHA(1,36)	ALPHA(1,37)	ALPHA(1,38)	ALPHA(1,39)	ALPHA(1,40)	ALPHA(1,41)	ALPHA(1,42)	ALPHA(1,43)	ALPHA(1,44)	ALPHA(1,45)
0.002433	0.006107	0.054413	0.017054	0.044457	0.014872	0.007622	0.001964	0.000000	0.005619	0.001989	0.030873	0.006727	0.052564	0.006893

ALPHA(1,46)	ALPHA(1,47)	ALPHA(1,48)	ALPHA(1,49)	ALPHA(1,50)	ALPHA(1,51)	ALPHA(1,52)	ALPHA(1,53)	ALPHA(1,54)	ALPHA(1,55)	ALPHA(1,56)	ALPHA(1,57)	ALPHA(1,58)	ALPHA(1,59)
0.067899	0.000000	0.000105	0.026372	0.000000	0.050427	0.014433	0.007755	0.004263	0.016147	0.019599	0.000166	0.000454	0.003381

ALPHA(2, 1)	ALPHA(2, 2)	ALPHA(2, 3)	ALPHA(2, 4)	ALPHA(2, 5)	ALPHA(2, 6)	ALPHA(2, 7)	ALPHA(2, 8)	ALPHA(2, 9)	ALPHA(2, 10)	ALPHA(2, 11)	ALPHA(2, 12)	ALPHA(2, 13)	ALPHA(2, 14)	ALPHA(2, 15)
0.009922	0.035964	0.002495	0.000781	0.021374	0.039875	0.005623	0.002962	0.000002	0.002491	0.003293	0.000000	0.008347	0.000000	0.040440

ALPHA(2,16)	ALPHA(2,17)	ALPHA(2,18)	ALPHA(2,19)	ALPHA(2,20)	ALPHA(2,21)	ALPHA(2,22)	ALPHA(2,23)	ALPHA(2,24)	ALPHA(2,25)	ALPHA(2,26)	ALPHA(2,27)	ALPHA(2,28)	ALPHA(2,29)	ALPHA(2,30)
0.000000	0.015731	0.000000	0.000519	0.000000	0.010656	0.010618	0.012569	0.006500	0.007482	0.000000	0.023336	0.000000	0.075543	0.031467

ALPHA(2,31)	ALPHA(2,32)	ALPHA(2,33)	ALPHA(2,34)	ALPHA(2,35)	ALPHA(2,36)	ALPHA(2,37)	ALPHA(2,38)	ALPHA(2,39)	ALPHA(2,40)	ALPHA(2,41)	ALPHA(2,42)	ALPHA(2,43)	ALPHA(2,44)	ALPHA(2,45)
0.002749	0.012188	0.031740	0.016674	0.043978	0.014961	0.014462	0.004283	0.000000	0.017284	0.004376	0.010074	0.000248	0.045323	0.005535

ALPHA(2,46)	ALPHA(2,47)	ALPHA(2,48)	ALPHA(2,49)	ALPHA(2,50)	ALPHA(2,51)	ALPHA(2,52)	ALPHA(2,53)	ALPHA(2,54)	ALPHA(2,55)	ALPHA(2,56)	ALPHA(2,57)	ALPHA(2,58)	ALPHA(2,59)
0.099577	0.000000	0.000166	0.046176	0.000000	0.140603	0.025463	0.020639	0.009373	0.032096	0.030310	0.000399	0.000664	0.002670

Table 5-2: Parameter Values

$$AY(i) = ay_i;\ i = 1,2,\cdots,59$$

AY(1)	AY(2)	AY(3)	AY(4)	AY(5)	AY(6)	AY(7)	AY(8)	AY(9)	AY(10)	AY(11)	AY(12)	AY(13)	AY(14)	AY(15)
0.699884	0.540301	0.759805	0.000000	0.682745	0.705417	0.599342	0.697051	0.675917	0.624411	0.661131	0.678051	0.782935	0.753102	0.720244

AY(16)	AY(17)	AY(18)	AY(19)	AY(20)	AY(21)	AY(22)	AY(23)	AY(24)	AY(25)	AY(26)	AY(27)	AY(28)	AY(29)	AY(30)
0.539582	0.468256	0.704063	0.643535	0.565900	0.138829	0.326635	0.548247	0.803117	0.684946	0.697141	0.497900	0.564314	0.254799	0.262551

AY(31)	AY(32)	AY(33)	AY(34)	AY(35)	AY(36)	AY(37)	AY(38)	AY(39)	AY(40)	AY(41)	AY(42)	AY(43)	AY(44)	AY(45)
0.259156	0.513813	0.321418	0.317804	0.619382	0.402791	0.326870	0.430966	0.000000	0.075780	0.081231	0.032583	0.000000	0.370204	0.144098

AY(46)	AY(47)	AY(48)	AY(49)	AY(50)	AY(51)	AY(52)	AY(53)	AY(54)	AY(55)	AY(56)	AY(57)	AY(58)	AY(59)
0.128848	0.704713	0.341918	0.354115	0.453133	0.092407	0.205930	0.713995	0.734131	0.654150	0.423139	0.706415	0.647720	0.695860

Table 5-3: Parameter Values

$$GAMMAM(i) = \gamma_i^M;\ i = 1,2,\cdots,59$$

GAMMAM(1)	GAMMAM(2)	GAMMAM(3)	GAMMAM(4)	GAMMAM(5)	GAMMAM(6)	GAMMAM(7)	GAMMAM(8)	GAMMAM(9)	GAMMAM(10)	GAMMAM(11)	GAMMAM(12)	GAMMAM(13)	GAMMAM(14)	GAMMAM(15)
0.043988	0.660226	0.000000	0.956640	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

GAMMAM(16)	GAMMAM(17)	GAMMAM(18)	GAMMAM(19)	GAMMAM(20)	GAMMAM(21)	GAMMAM(22)	GAMMAM(23)	GAMMAM(24)	GAMMAM(25)	GAMMAM(26)	GAMMAM(27)	GAMMAM(28)	GAMMAM(29)	GAMMAM(30)
0.000000	0.000000	0.000000	0.321173	0.000000	0.931915	0.000000	0.328860	0.119340	0.181125	0.000000	0.000000	0.000000	0.732532	0.000000

GAMMAM(31)	GAMMAM(32)	GAMMAM(33)	GAMMAM(34)	GAMMAM(35)	GAMMAM(36)	GAMMAM(37)	GAMMAM(38)	GAMMAM(39)	GAMMAM(40)	GAMMAM(41)	GAMMAM(42)	GAMMAM(43)	GAMMAM(44)	GAMMAM(45)
0.000000	0.144923	0.393919	0.627147	0.705475	0.448160	0.000000	0.363574	0.956491	0.000000	0.000000	0.927479	0.874091	0.634572	0.256170

GAMMAM(46)	GAMMAM(47)	GAMMAM(48)	GAMMAM(49)	GAMMAM(50)	GAMMAM(51)	GAMMAM(52)	GAMMAM(53)	GAMMAM(54)	GAMMAM(55)	GAMMAM(56)	GAMMAM(57)	GAMMAM(58)	GAMMAM(59)
0.786090	0.000000	0.000000	0.009678	0.000000	0.318108	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Table 5-4: Parameter Values

$$GAMMAD(i) = \gamma_i^D ;\ i = 1,2,\cdots,59$$

GAMMAD(1)	GAMMAD(2)	GAMMAD(3)	GAMMAD(4)	GAMMAD(5)	GAMMAD(6)	GAMMAD(7)	GAMMAD(8)	GAMMAD(9)	GAMMAD(10)	GAMMAD(11)	GAMMAD(12)	GAMMAD(13)	GAMMAD(14)	GAMMAD(15)
0.956012	0.339774	1.000000	0.043360	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

GAMMAD(16)	GAMMAD(17)	GAMMAD(18)	GAMMAD(19)	GAMMAD(20)	GAMMAD(21)	GAMMAD(22)	GAMMAD(23)	GAMMAD(24)	GAMMAD(25)	GAMMAD(26)	GAMMAD(27)	GAMMAD(28)	GAMMAD(29)	GAMMAD(30)
1.000000	1.000000	1.000000	0.678827	1.000000	0.068085	1.000000	0.671140	0.880660	0.818875	1.000000	1.000000	1.000000	0.267468	1.000000

GAMMAD(31)	GAMMAD(32)	GAMMAD(33)	GAMMAD(34)	GAMMAD(35)	GAMMAD(36)	GAMMAD(37)	GAMMAD(38)	GAMMAD(39)	GAMMAD(40)	GAMMAD(41)	GAMMAD(42)	GAMMAD(43)	GAMMAD(44)	GAMMAD(45)
1.000000	0.855077	0.606081	0.372853	0.294525	0.551840	1.000000	0.636426	0.043509	1.000000	1.000000	0.072521	0.125909	0.365428	0.743830

GAMMAD(46)	GAMMAD(47)	GAMMAD(48)	GAMMAD(49)	GAMMAD(50)	GAMMAD(51)	GAMMAD(52)	GAMMAD(53)	GAMMAD(54)	GAMMAD(55)	GAMMAD(56)	GAMMAD(57)	GAMMAD(58)	GAMMAD(59)
0.213910	1.000000	1.000000	0.990322	1.000000	0.681892	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

Table 5-5: Parameter Values

$$KAPPAE(i) = \kappa_i^E ;\ i = 1,2,\cdots,59$$

KAPPAE(1)	KAPPAE(2)	KAPPAE(3)	KAPPAE(4)	KAPPAE(5)	KAPPAE(6)	KAPPAE(7)	KAPPAE(8)	KAPPAE(9)	KAPPAE(10)	KAPPAE(11)	KAPPAE(12)	KAPPAE(13)	KAPPAE(14)	KAPPAE(15)
0.000000	0.000000	0.000000	0.000000	0.005308	0.017796	0.000000	0.000000	0.000000	0.382504	0.081414	0.632704	0.000000	0.840759	0.000000

KAPPAE(16)	KAPPAE(17)	KAPPAE(18)	KAPPAE(19)	KAPPAE(20)	KAPPAE(21)	KAPPAE(22)	KAPPAE(23)	KAPPAE(24)	KAPPAE(25)	KAPPAE(26)	KAPPAE(27)	KAPPAE(28)	KAPPAE(29)	KAPPAE(30)
0.785853	0.000000	0.831646	0.000000	0.775302	0.000000	0.000000	0.000000	0.000000	0.000000	0.809406	0.239925	0.959524	0.000000	0.000000

KAPPAE(31)	KAPPAE(32)	KAPPAE(33)	KAPPAE(34)	KAPPAE(35)	KAPPAE(36)	KAPPAE(37)	KAPPAE(38)	KAPPAE(39)	KAPPAE(40)	KAPPAE(41)	KAPPAE(42)	KAPPAE(43)	KAPPAE(44)	KAPPAE(45)
0.653942	0.000000	0.221131	0.077101	0.011299	0.007872	0.566074	0.002323	0.000000	0.000000	0.000000	0.000000	0.000000	0.023014	0.000000

KAPPAE(46)	KAPPAE(47)	KAPPAE(48)	KAPPAE(49)	KAPPAE(50)	KAPPAE(51)	KAPPAE(52)	KAPPAE(53)	KAPPAE(54)	KAPPAE(55)	KAPPAE(56)	KAPPAE(57)	KAPPAE(58)	KAPPAE(59)
0.098547	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Table 5-6: Parameter Values

$$KAPPAD(i) = \kappa_i^D ;\ i = 1,2,\cdots,59$$

KAPPAD(1)	KAPPAD(2)	KAPPAD(3)	KAPPAD(4)	KAPPAD(5)	KAPPAD(6)	KAPPAD(7)	KAPPAD(8)	KAPPAD(9)	KAPPAD(10)	KAPPAD(11)	KAPPAD(12)	KAPPAD(13)	KAPPAD(14)	KAPPAD(15)
1.000000	1.000000	1.000000	1.000000	0.994692	0.982204	1.000000	1.000000	1.000000	0.617496	0.918586	0.367296	1.000000	0.159241	1.000000

KAPPAD(16)	KAPPAD(17)	KAPPAD(18)	KAPPAD(19)	KAPPAD(20)	KAPPAD(21)	KAPPAD(22)	KAPPAD(23)	KAPPAD(24)	KAPPAD(25)	KAPPAD(26)	KAPPAD(27)	KAPPAD(28)	KAPPAD(29)	KAPPAD(30)
0.214147	1.000000	0.168354	1.000000	0.224698	1.000000	1.000000	1.000000	1.000000	1.000000	0.190594	0.760075	0.040476	1.000000	1.000000

KAPPAD(31)	KAPPAD(32)	KAPPAD(33)	KAPPAD(34)	KAPPAD(35)	KAPPAD(36)	KAPPAD(37)	KAPPAD(38)	KAPPAD(39)	KAPPAD(40)	KAPPAD(41)	KAPPAD(42)	KAPPAD(43)	KAPPAD(44)	KAPPAD(45)
0.346058	1.000000	0.778869	0.922899	0.988701	0.992128	0.433926	0.997677	1.000000	1.000000	1.000000	1.000000	1.000000	0.976986	1.000000

KAPPAD(46)	KAPPAD(47)	KAPPAD(48)	KAPPAD(49)	KAPPAD(50)	KAPPAD(51)	KAPPAD(52)	KAPPAD(53)	KAPPAD(54)	KAPPAD(55)	KAPPAD(56)	KAPPAD(57)	KAPPAD(58)	KAPPAD(59)
0.901453	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

Table 5-7: Parameter Values

$$BETA(i,\ j) = \beta_j^i,\ i = 1(selfemploed),\ 2(unskilled),\ 3(skilled),\ 4(capital\ in\ agriculture),\ 5(general\ capital),\ 6(land),\ \ j = 1,2,\cdots,59$$

BETA(1 1)	BETA(1 2)	BETA(1 3)	BETA(1 4)	BETA(1 5)	BETA(1 6)	BETA(1 7)	BETA(1 8)	BETA(1 9)	BETA(1 10)	BETA(1 11)	BETA(1 12)	BETA(1 13)	BETA(1 14)	BETA(1 15)
0.528492	0.508813	0.529988	0.000000	0.512913	0.436086	0.382871	0.399602	0.702333	0.552709	0.551809	0.365006	0.384039	0.385432	0.581593
BETA(1 16)	BETA(1 17)	BETA(1 18)	BETA(1 19)	BETA(1 20)	BETA(1 21)	BETA(1 22)	BETA(1 23)	BETA(1 24)	BETA(1 25)	BETA(1 26)	BETA(1 27)	BETA(1 28)	BETA(1 29)	BETA(1 30)
0.468365	0.523607	0.461664	0.503579	0.390750	0.574042	0.577159	0.683650	0.685016	0.569685	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(1 31)	BETA(1 32)	BETA(1 33)	BETA(1 34)	BETA(1 35)	BETA(1 36)	BETA(1 37)	BETA(1 38)	BETA(1 39)	BETA(1 40)	BETA(1 41)	BETA(1 42)	BETA(1 43)	BETA(1 44)	BETA(1 45)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(1 46)	BETA(1 47)	BETA(1 48)	BETA(1 49)	BETA(1 50)	BETA(1 51)	BETA(1 52)	BETA(1 53)	BETA(1 54)	BETA(1 55)	BETA(1 56)	BETA(1 57)	BETA(1 58)	BETA(1 59)	
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
BETA(2 1)	BETA(2 2)	BETA(2 3)	BETA(2 4)	BETA(2 5)	BETA(2 6)	BETA(2 7)	BETA(2 8)	BETA(2 9)	BETA(2 10)	BETA(2 11)	BETA(2 12)	BETA(2 13)	BETA(2 14)	BETA(2 15)
0.160075	0.154115	0.160529	0.000000	0.155357	0.132087	0.115968	0.121036	0.212730	0.167411	0.167138	0.110557	0.130974	0.131449	0.169848
BETA(2 16)	BETA(2 17)	BETA(2 18)	BETA(2 19)	BETA(2 20)	BETA(2 21)	BETA(2 22)	BETA(2 23)	BETA(2 24)	BETA(2 25)	BETA(2 26)	BETA(2 27)	BETA(2 28)	BETA(2 29)	BETA(2 30)
0.136781	0.178573	0.384358	0.171743	0.133263	0.246499	0.247837	0.194400	0.194788	0.302040	0.721956	0.519837	0.262888	0.651351	0.858318
BETA(2 31)	BETA(2 32)	BETA(2 33)	BETA(2 34)	BETA(2 35)	BETA(2 36)	BETA(2 37)	BETA(2 38)	BETA(2 39)	BETA(2 40)	BETA(2 41)	BETA(2 42)	BETA(2 43)	BETA(2 44)	BETA(2 45)
0.135307	0.479209	0.682658	0.798006	0.762770	0.784692	0.761025	0.523629	0.000000	0.321261	0.321958	0.321742	0.000000	0.389545	0.552337
BETA(2 46)	BETA(2 47)	BETA(2 48)	BETA(2 49)	BETA(2 50)	BETA(2 51)	BETA(2 52)	BETA(2 53)	BETA(2 54)	BETA(2 55)	BETA(2 56)	BETA(2 57)	BETA(2 58)	BETA(2 59)	
0.500413	0.569829	0.251973	0.297413	0.787336	0.694362	0.659937	0.423144	0.235073	0.514191	0.393863	0.505915	0.105085	0.154315	
BETA(3 1)	BETA(3 2)	BETA(3 3)	BETA(3 4)	BETA(3 5)	BETA(3 6)	BETA(3 7)	BETA(3 8)	BETA(3 9)	BETA(3 10)	BETA(3 11)	BETA(3 12)	BETA(3 13)	BETA(3 14)	BETA(3 15)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(3 16)	BETA(3 17)	BETA(3 18)	BETA(3 19)	BETA(3 20)	BETA(3 21)	BETA(3 22)	BETA(3 23)	BETA(3 24)	BETA(3 25)	BETA(3 26)	BETA(3 27)	BETA(3 28)	BETA(3 29)	BETA(3 30)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.036425	0.329722	0.063141	0.010493	0.000000
BETA(3 31)	BETA(3 32)	BETA(3 33)	BETA(3 34)	BETA(3 35)	BETA(3 36)	BETA(3 37)	BETA(3 38)	BETA(3 39)	BETA(3 40)	BETA(3 41)	BETA(3 42)	BETA(3 43)	BETA(3 44)	BETA(3 45)
0.483009	0.166115	0.000000	0.000000	0.000000	0.000000	0.000000	0.180157	0.000000	0.000000	0.000000	0.000000	0.000000	0.132955	0.000000
BETA(3 46)	BETA(3 47)	BETA(3 48)	BETA(3 49)	BETA(3 50)	BETA(3 51)	BETA(3 52)	BETA(3 53)	BETA(3 54)	BETA(3 55)	BETA(3 56)	BETA(3 57)	BETA(3 58)	BETA(3 59)	
0.127306	0.084513	0.288915	0.139260	0.018612	0.013807	0.038252	0.117889	0.313409	0.000000	0.221301	0.301074	0.681470	0.627821	
BETA(4 1)	BETA(4 2)	BETA(4 3)	BETA(4 4)	BETA(4 5)	BETA(4 6)	BETA(4 7)	BETA(4 8)	BETA(4 9)	BETA(4 10)	BETA(4 11)	BETA(4 12)	BETA(4 13)	BETA(4 14)	BETA(4 15)
0.027349	0.036358	0.030231	0.000000	0.034796	0.047616	0.067565	0.064275	0.038035	0.039458	0.042771	0.084982	0.050063	0.051373	0.025028
BETA(4 16)	BETA(4 17)	BETA(4 18)	BETA(4 19)	BETA(4 20)	BETA(4 21)	BETA(4 22)	BETA(4 23)	BETA(4 24)	BETA(4 25)	BETA(4 26)	BETA(4 27)	BETA(4 28)	BETA(4 29)	BETA(4 30)
0.040671	0.052462	0.031916	0.033491	0.059209	0.179460	0.175003	0.121950	0.120196	0.128274	0.241620	0.150441	0.000000	0.000000	0.000000
BETA(4 31)	BETA(4 32)	BETA(4 33)	BETA(4 34)	BETA(4 35)	BETA(4 36)	BETA(4 37)	BETA(4 38)	BETA(4 39)	BETA(4 40)	BETA(4 41)	BETA(4 42)	BETA(4 43)	BETA(4 44)	BETA(4 45)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(4 46)	BETA(4 47)	BETA(4 48)	BETA(4 49)	BETA(4 50)	BETA(4 51)	BETA(4 52)	BETA(4 53)	BETA(4 54)	BETA(4 55)	BETA(4 56)	BETA(4 57)	BETA(4 58)	BETA(4 59)	
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
BETA(5 1)	BETA(5 2)	BETA(5 3)	BETA(5 4)	BETA(5 5)	BETA(5 6)	BETA(5 7)	BETA(5 8)	BETA(5 9)	BETA(5 10)	BETA(5 11)	BETA(5 12)	BETA(5 13)	BETA(5 14)	BETA(5 15)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(5 16)	BETA(5 17)	BETA(5 18)	BETA(5 19)	BETA(5 20)	BETA(5 21)	BETA(5 22)	BETA(5 23)	BETA(5 24)	BETA(5 25)	BETA(5 26)	BETA(5 27)	BETA(5 28)	BETA(5 29)	BETA(5 30)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.673971	0.338156	0.141682
BETA(5 31)	BETA(5 32)	BETA(5 33)	BETA(5 34)	BETA(5 35)	BETA(5 36)	BETA(5 37)	BETA(5 38)	BETA(5 39)	BETA(5 40)	BETA(5 41)	BETA(5 42)	BETA(5 43)	BETA(5 44)	BETA(5 45)
0.381684	0.354677	0.317342	0.201994	0.237230	0.215308	0.238975	0.296214	0.000000	0.678739	0.678042	0.678258	0.000000	0.477500	0.447663
BETA(5 46)	BETA(5 47)	BETA(5 48)	BETA(5 49)	BETA(5 50)	BETA(5 51)	BETA(5 52)	BETA(5 53)	BETA(5 54)	BETA(5 55)	BETA(5 56)	BETA(5 57)	BETA(5 58)	BETA(5 59)	
0.372281	0.345658	0.459112	0.563327	0.194053	0.291831	0.301811	0.458967	0.451519	0.485809	0.384836	0.193012	0.213445	0.217865	
BETA(6 1)	BETA(6 2)	BETA(6 3)	BETA(6 4)	BETA(6 5)	BETA(6 6)	BETA(6 7)	BETA(6 8)	BETA(6 9)	BETA(6 10)	BETA(6 11)	BETA(6 12)	BETA(6 13)	BETA(6 14)	BETA(6 15)
0.284084	0.300714	0.279252	0.000000	0.296935	0.384211	0.433596	0.415087	0.046902	0.240423	0.238282	0.439456	0.434923	0.431745	0.223531
BETA(6 16)	BETA(6 17)	BETA(6 18)	BETA(6 19)	BETA(6 20)	BETA(6 21)	BETA(6 22)	BETA(6 23)	BETA(6 24)	BETA(6 25)	BETA(6 26)	BETA(6 27)	BETA(6 28)	BETA(6 29)	BETA(6 30)
0.354183	0.245358	0.122061	0.291187	0.416777	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(6 31)	BETA(6 32)	BETA(6 33)	BETA(6 34)	BETA(6 35)	BETA(6 36)	BETA(6 37)	BETA(6 38)	BETA(6 39)	BETA(6 40)	BETA(6 41)	BETA(6 42)	BETA(6 43)	BETA(6 44)	BETA(6 45)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
BETA(6 46)	BETA(6 47)	BETA(6 48)	BETA(6 49)	BETA(6 50)	BETA(6 51)	BETA(6 52)	BETA(6 53)	BETA(6 54)	BETA(6 55)	BETA(6 56)	BETA(6 57)	BETA(6 58)	BETA(6 59)	
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	

Table 6-1: The Impact of Remittances (Simulation I-1)

Unit: a million USD (except for Gini Coefficient)

Unit: a million USD except Gini Coeffficient	benchmark	increase in remittances to the RURAL household only				increase in remittances to the URBAN household only			
		5% increase	10% increase	20% increase	30% increase	5% increase	10% increase	20% increase	30% increase
Tax Revenue									
income tax from rural household	88.7185	88.7330	88.7587	88.8225	88.9005	88.7803	88.8943	89.1298	89.3696
income tax from urban household	261.2955	261.2105	261.1022	260.9004	260.7204	261.0222	260.7981	260.3551	259.9120
production tax	1133.3940	1133.4925	1133.5591	1133.7161	1133.8901	1133.8622	1134.3601	1135.3600	1136.3632
export tax	119.8080	119.8080	119.8080	119.8426	119.9899	119.9277	120.2873	121.0221	121.7536
import tariff	387.6275	387.5408	387.5107	387.4487	387.4022	387.5266	387.5184	387.4988	387.4771
Government Deficits		0.0409	0.0729	0.0789	-0.0413	-0.1916	-0.7056	-1.7541	-2.8040
Savings									
rural household	231.8894	232.4301	232.9979	234.1632	235.3624	232.0381	232.3121	232.8786	233.4553
urban household	138.6556	138.6199	138.5744	138.4895	138.4139	139.5588	140.4827	142.3326	144.1824
Welfare (Equivalent Variation)									
rural household	0.0000	0.0156	0.0320	0.0653	0.0996	0.0024	0.0087	0.0214	0.0341
urban household	0.0000	-0.0026	-0.0053	-0.0105	-0.0153	0.0392	0.0794	0.1587	0.2366
GDP	11429.3131	11429.6411	11429.0421	11428.8074	11429.8454	11429.1468	11431.8223	11437.6802	11443.7534
Gini Coefficient	39.40	38.69	37.94	36.41	34.86	41.00	42.48	45.40	48.27
		% increase from the benchmark value				% increase from the benchmark value			
		5% increase	10% increase	20% increase	30% increase	5% increase	10% increase	20% increase	30% increase
Tax Revenue									
income tax from rural household		0.0163%	0.0453%	0.1173%	0.2051%	0.0697%	0.1981%	0.4637%	0.7340%
income tax from urban household		-0.0325%	-0.0740%	-0.1512%	-0.2201%	-0.1046%	-0.1904%	-0.3599%	-0.5295%
production tax		0.0087%	0.0146%	0.0284%	0.0438%	0.0413%	0.0852%	0.1735%	0.2620%
export tax		0.0000%	0.0000%	0.0288%	0.1518%	0.0999%	0.4001%	1.0134%	1.6239%
import tariff		-0.0224%	-0.0301%	-0.0461%	-0.0581%	-0.0260%	-0.0281%	-0.0332%	-0.0388%
Savings									
rural household		0.2332%	0.4780%	0.9805%	1.4977%	0.0641%	0.1823%	0.4266%	0.6753%
urban household		-0.0258%	-0.0586%	-0.1198%	-0.1743%	0.6514%	1.3177%	2.6518%	3.9860%
GDP		0.0029%	-0.0024%	-0.0044%	0.0047%	-0.0015%	0.0220%	0.0732%	0.1263%
Gini Coefficient		-1.7948%	-3.7142%	-7.5958%	-11.5105%	4.0628%	7.8284%	15.2374%	22.5152%

Table 6-2: The Impact of Remittances (Simulation I-2)

Unit a million USD (except for Gini Coefficient)

Unit: a million USD except Gini Coeffficient	benchmark	increase in remittances to the RURAL household only				increase in remittances to the URBAN household only			
		5% increase	10% increase	20% increase	30% increase	5% increase	10% increase	20% increase	30% increase
Tax Revenue									
income tax from rural household	88.7185	88.7848	88.9173	89.2709	89.6295	89.1960	89.8364	91.1745	92.5268
income tax from urban household	261.2955	261.4033	261.6487	262.3066	262.9707	262.3683	263.7531	266.6543	269.5897
production tax	1133.3940	1133.6308	1133.9917	1134.8902	1135.7975	1134.9759	1136.8716	1140.7946	1144.7480
export tax	119.8080	119.8080	119.8216	120.2065	120.5983	120.2604	121.0827	122.7419	124.4355
import tariff	387.6275	387.9286	388.5115	389.9147	391.3291	389.8630	392.6315	398.3502	404.1126
Government Deficits		-0.4951	-1.4237	-3.9955	-6.5938	-4.0475	-9.2713	-20.0786	-30.9950
Savings									
rural household	231.8894	232.0488	232.3675	233.2178	234.0802	233.0378	234.5778	237.7955	241.0475
urban household	138.6556	138.7009	138.8041	139.0806	139.3597	139.1066	139.6886	140.9080	142.1419
Welfare (Equivalent Variation)									
rural household	0.0000	0.0209	0.0467	0.1045	0.1620	0.0367	0.0848	0.1833	0.2801
urban household	0.0000	0.0020	0.0075	0.0220	0.0365	0.0715	0.1490	0.3033	0.4537
GDP	11429.3131	11436.3513	11448.6235	11481.5581	11514.8899	11478.8940	11542.6728	11675.9143	11810.6238
Gini Coefficient	39.40	38.68	37.88	36.20	34.52	40.98	42.34	44.92	47.41
		% increase from the benchmark value				% increase from the benchmark value			
		5% increase	10% increase	20% increase	30% increase	5% increase	10% increase	20% increase	30% increase
Tax Revenue									
income tax from rural household		0.0747%	0.2241%	0.6227%	1.0269%	0.5383%	1.2601%	2.7683%	4.2926%
income tax from urban household		0.0413%	0.1352%	0.3870%	0.6411%	0.4106%	0.9405%	2.0508%	3.1743%
production tax		0.0209%	0.0527%	0.1320%	0.2121%	0.1396%	0.3068%	0.6530%	1.0018%
export tax		0.0000%	0.0114%	0.3326%	0.6597%	0.3776%	1.0639%	2.4488%	3.8624%
import tariff		0.0777%	0.2280%	0.5900%	0.9549%	0.5767%	1.2909%	2.7662%	4.2528%
Savings									
rural household		0.0687%	0.2062%	0.5729%	0.9448%	0.4952%	1.1593%	2.5469%	3.9493%
urban household		0.0327%	0.1071%	0.3065%	0.5078%	0.3252%	0.7450%	1.6245%	2.5143%
GDP		0.0616%	0.1690%	0.4571%	0.7487%	0.4338%	0.9918%	2.1576%	3.3363%
Gini Coefficient		-1.8360%	-3.8496%	-8.1242%	-12.3736%	4.0139%	7.4511%	14.0135%	20.3197%

Table 6-3: The Impact of Remittances (Simulation I-3)

Unit a million USD (except for Gini Coefficient)

Unit: a million USD except Gini Coeffficient	benchmark	increase in remittances to the RURAL household only				increase in remittances to the URBAN household only			
		5% increase	10% increase	20% increase	30% increase	5% increase	10% increase	20% increase	30% increase
Tax Revenue									
income tax from rural household	88.7185	88.8055	88.9522	89.3304	89.7158	89.3113	90.0713	91.6599	93.2540
income tax from urban household	261.2955	261.7172	262.2794	263.5564	264.8426	263.4530	265.9488	271.1136	276.2775
production tax	1133.3940	1133.6839	1134.0920	1135.0740	1136.0685	1135.0481	1137.0312	1141.1597	1145.2923
export tax	119.8080	119.8080	119.8080	120.1122	120.4451	120.0792	120.7297	122.0764	123.4359
import tariff	387.6275	387.8899	388.4274	389.7278	391.0437	389.6774	392.2899	397.7353	403.1822
Government Deficits		-0.7378	-1.8884	-4.8383	-7.8391	-4.6771	-10.5896	-22.8809	-35.1880
Savings									
rural household	231.8894	232.0986	232.4515	233.3609	234.2878	233.3150	235.1426	238.9627	242.7960
urban household	138.6556	138.8329	139.0692	139.6059	140.1466	139.5625	140.6115	142.7824	144.9529
Welfare (Equivalent Variation)									
rural household	0.0000	0.0225	0.0479	0.1007	0.1497	0.0430	0.0968	0.2050	0.3092
urban household	0.0000	0.0077	0.0189	0.0439	0.0686	0.0820	0.1625	0.3084	0.4376
GDP	11429.3131	11443.1396	11461.8917	11507.2452	11553.1977	11504.2694	11594.1791	11781.1238	11968.3522
Gini Coefficient	39.40	38.88	38.31	37.06	35.82	41.55	43.45	47.10	50.58
		% increase from the benchmark value				% increase from the benchmark value			
		5% increase	10% increase	20% increase	30% increase	5% increase	10% increase	20% increase	30% increase
Tax Revenue									
income tax from rural household		0.0980%	0.2635%	0.6897%	1.1242%	0.6682%	1.5249%	3.3154%	5.1122%
income tax from urban household		0.1614%	0.3765%	0.8653%	1.3575%	0.8257%	1.7808%	3.7575%	5.7337%
production tax		0.0256%	0.0616%	0.1482%	0.2360%	0.1459%	0.3209%	0.6852%	1.0498%
export tax		0.0000%	0.0000%	0.2539%	0.5318%	0.2263%	0.7694%	1.8934%	3.0281%
import tariff		0.0677%	0.2063%	0.5418%	0.8813%	0.5288%	1.2028%	2.6076%	4.0128%
Savings									
rural household		0.0902%	0.2424%	0.6346%	1.0343%	0.6148%	1.4029%	3.0503%	4.7034%
urban household		0.1278%	0.2983%	0.6854%	1.0753%	0.6540%	1.4106%	2.9763%	4.5416%
GDP		0.1210%	0.2850%	0.6819%	1.0839%	0.6558%	1.4425%	3.0781%	4.7163%
Gini Coefficient		-1.3250%	-2.7760%	-5.9338%	-9.0825%	5.4444%	10.2910%	19.5457%	28.3720%

Table 7: Labor Income of Skilled Worker in Top 10 Sectors

Unit a million USD

Rank	1	2	3	4	5	6	7	8	9	10
Sector No.	57	58	47	27	59	54	56	49	28	53
Name	Public administration	Education	Construction	Fishing	Health	Business services	Community services	Electricity	Mining	Communication
Amount	377.379533	180.6853936	87.65120828	69.77185017	49.07618621	48.10106664	45.17145256	36.21301909	30.81719029	21.84097033

Table 8-1: The Impact of the Brain Drain (Simulation II-1: with no externality)

Unit a million USD (except for Gini Coefficient)

Unit: a million USD except Gini Coefficient	benchmark	increase in the Brain Drain from the Public Administration Sector (Sector 57) only				increase in the Brain Drain from the Education Sector (Sector 58) only				increase in the Brain Drain from the Health Sector (Sector 59) only				increase in the Brain Drain from All 59 Sectors			
		1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase
Tax Revenue																	
income tax from rural household	88.7185	88.5346	88.0574	87.6017	86.5546	88.6675	88.4986	88.3351	87.9889	88.7147	88.6893	88.6588	88.5828	88.1707	86.9788	85.8438	83.2580
income tax from urban household	261.2955	260.7234	259.3797	258.0916	255.0511	261.1006	260.5656	260.0560	258.9333	261.2677	261.1662	261.0552	260.7779	259.6997	256.3780	253.2148	245.9129
production tax	1133.3940	1132.8948	1131.5363	1130.2549	1127.3440	1133.3022	1132.7868	1132.3185	1131.3518	1133.4621	1133.3820	1133.2809	1133.0469	1130.7488	1125.2281	1120.0323	1108.3211
export tax	119.8080	119.7598	119.1847	118.6242	117.3859	119.8080	119.7037	119.5152	119.0937	119.8080	119.8080	119.8080	119.8080	119.3114	117.8473	116.4653	113.3271
import tariff	387.6275	386.7415	384.7437	382.8637	378.6074	387.3553	386.5925	385.9067	384.5006	387.6045	387.4759	387.3228	386.9715	385.3218	380.5985	376.1479	366.0955
Government Deficits		1.5227	5.5230	9.3240	18.0123	0.4242	1.8752	3.2770	6.2417	-0.0094	0.2240	0.4993	1.1520	5.2792	16.5604	27.2191	51.4131
Savings																	
rural household	231.8894	231.4471	230.2998	229.2039	226.6859	231.7669	231.3607	230.9675	230.1350	231.8804	231.8193	231.7458	231.5630	230.5722	227.7060	224.9766	218.7583
urban household	138.6556	138.4152	137.8504	137.3090	136.0309	138.5737	138.3488	138.1346	137.6627	138.6440	138.6013	138.5546	138.4381	137.9849	136.5887	135.2591	132.1900
Welfare (Equivalent Variation)																	
rural household	0.0000	-0.0150	-0.0524	-0.0884	-0.1727	-0.0049	-0.0186	-0.0319	-0.0602	-0.0018	-0.0056	-0.0098	-0.0200	-0.0516	-0.1623	-0.2701	-0.5263
urban household	0.0000	-0.0144	-0.0462	-0.0769	-0.1498	-0.0057	-0.0185	-0.0307	-0.0574	-0.0018	-0.0054	-0.0091	-0.0180	-0.0459	-0.1397	-0.2309	-0.4490
GDP	11429.3131	11374.3623	11255.4284	11143.1025	10888.6990	11410.2064	11365.7017	11325.0675	11241.4757	11426.7094	11417.4880	11408.4567	11388.1787	11272.3687	10959.0031	10666.1859	10015.0625
Gini Coefficient	39.40	39.45	39.69	39.92	40.38	39.38	39.42	39.46	39.51	39.39	39.38	39.37	39.36	39.63	40.27	40.89	42.28
		% increase from the benchmark value				% increase from the benchmark value				% increase from the benchmark value				% increase from the benchmark value			
		1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase
Tax Revenue																	
income tax from rural household		-0.2073%	-0.7451%	-1.2588%	-2.4390%	-0.0575%	-0.2478%	-0.4321%	-0.8224%	-0.0042%	-0.0329%	-0.0673%	-0.1530%	-0.6174%	-1.9609%	-3.2402%	-6.1549%
income tax from urban household		-0.2189%	-0.7332%	-1.2262%	-2.3898%	-0.0746%	-0.2793%	-0.4744%	-0.9040%	-0.0106%	-0.0495%	-0.0920%	-0.1981%	-0.6107%	-1.8820%	-3.0926%	-5.8871%
production tax		-0.0441%	-0.1639%	-0.2770%	-0.5338%	-0.0081%	-0.0536%	-0.0949%	-0.1802%	0.0060%	-0.0011%	-0.0100%	-0.0306%	-0.2334%	-0.7205%	-1.1789%	-2.2122%
export tax		-0.0402%	-0.5202%	-0.9881%	-2.0216%	0.0000%	-0.0871%	-0.2444%	-0.5962%	0.0000%	0.0000%	0.0000%	0.0000%	-0.4145%	-1.6365%	-2.7900%	-5.4094%
import tariff		-0.2286%	-0.7440%	-1.2290%	-2.3270%	-0.0702%	-0.2670%	-0.4439%	-0.8067%	-0.0059%	-0.0391%	-0.0786%	-0.1692%	-0.5948%	-1.8133%	-2.9615%	-5.5548%
Savings																	
rural household		-0.1907%	-0.6855%	-1.1581%	-2.2440%	-0.0529%	-0.2280%	-0.3976%	-0.7566%	-0.0039%	-0.0302%	-0.0619%	-0.1408%	-0.5680%	-1.8040%	-2.9811%	-5.6627%
urban household		-0.1734%	-0.5808%	-0.9712%	-1.8930%	-0.0591%	-0.2213%	-0.3758%	-0.7161%	-0.0084%	-0.0392%	-0.0729%	-0.1569%	-0.4837%	-1.4907%	-2.4496%	-4.6631%
GDP		-0.4808%	-1.5214%	-2.5042%	-4.7301%	-0.1672%	-0.5566%	-0.9121%	-1.6435%	-0.0228%	-0.1035%	-0.1825%	-0.3599%	-1.3732%	-4.1149%	-6.6769%	-12.3739%
Gini Coefficient		0.1203%	0.7317%	1.3109%	2.4881%	-0.0432%	0.0469%	0.1520%	0.2831%	-0.0315%	-0.0623%	-0.0758%	-0.1122%	0.5882%	2.2116%	3.7931%	7.3209%

Table 8-2: The Impact of the Brain Drain (Simulation II-2: with perfect externality)

Unit a million USD (except for Gini Coefficient)

Unit: a million USD except Gini Coefficient	benchmark	increase in the Brain Drain from the Public Administration Sector (Sector 57) only				increase in the Brain Drain from the Education Sector (Sector 58) only				increase in the Brain Drain from the Health Sector (Sector 59) only				increase in the Brain Drain from All 59 Sectors			
		1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase
Tax Revenue																	
income tax from rural household	88.7185	88.7327	88.7612	88.7899	88.8661	88.7253	88.7389	88.7526	88.7868	88.7203	88.7240	88.7277	88.7370	88.7580	88.8406	88.9256	89.1386
income tax from urban household	261.2955	261.2550	261.1738	261.0927	260.8913	261.2761	261.2373	261.1984	261.1013	261.2902	261.2797	261.2691	261.2428	261.1828	260.9584	260.7327	260.1583
production tax	1133.3940	1133.4689	1133.4689	1133.4688	1133.4686	1133.4689	1133.4689	1133.4689	1133.4688	1133.4689	1133.4689	1133.4689	1133.4689	1133.6061	1133.9009	1134.2030	1134.8731
export tax	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080	119.8080
tariff	387.6275	387.6275	387.6275	387.6266	387.6229	387.6275	387.6275	387.6275	387.6271	387.6275	387.6275	387.6275	387.6275	387.6275	387.6239	387.6200	387.6187
Government Deficits		-0.0338	0.0029	0.0400	0.1298	-0.0433	-0.0258	-0.0082	0.0358	-0.0497	-0.0449	-0.0402	-0.0283	-0.0966	-0.2005	-0.3100	-0.5238
Savings																	
rural household	231.8894	231.9237	231.9921	232.0613	232.2443	231.9058	231.9386	231.9714	232.0537	231.8939	231.9028	231.9117	231.9340	231.9846	232.1832	232.3875	232.8997
urban household	138.6556	138.6386	138.6045	138.5704	138.4857	138.6475	138.6311	138.6148	138.5740	138.6534	138.6490	138.6445	138.6335	138.6082	138.5139	138.4191	138.1776
Welfare (Equivalent Variation)																	
rural household	0.0000	0.0007	0.0029	0.0051	0.0106	0.0000	0.0010	0.0020	0.0045	-0.0006	-0.0009	-0.0011	-0.0016	0.0017	0.0064	0.0112	0.0238
urban household	0.0000	-0.0012	-0.0027	-0.0042	-0.0081	-0.0009	-0.0017	-0.0025	-0.0045	-0.0008	-0.0013	-0.0018	-0.0031	-0.0033	-0.0086	-0.0141	-0.0272
GDP	11429.3131	11434.2407	11441.8318	11449.3233	11468.5256	11432.2604	11435.8913	11439.5220	11448.5500	11431.0511	11432.0430	11433.0353	11435.4568	11430.6725	11430.6845	11431.1365	11431.4839
Gini Coefficient	39.40	39.33	39.18	39.03	38.65	39.36	39.29	39.22	39.05	39.39	39.37	39.35	39.30	39.19	38.77	38.35	37.27
		% increase from the benchmark value				% increase from the benchmark value				% increase from the benchmark value				% increase from the benchmark value			
		1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase	1% Increase	3% Increase	5% increase	10% increase
Tax Revenue																	
income tax from rural household		0.0161%	0.0481%	0.0805%	0.1663%	0.0077%	0.0231%	0.0384%	0.0770%	0.0021%	0.0063%	0.0104%	0.0209%	0.0446%	0.1377%	0.2335%	0.4736%
income tax from urban household		-0.0155%	-0.0466%	-0.0776%	-0.1547%	-0.0074%	-0.0223%	-0.0372%	-0.0743%	-0.0020%	-0.0061%	-0.0101%	-0.0202%	-0.0431%	-0.1290%	-0.2154%	-0.4352%
production tax		0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0066%	0.0187%	0.0447%	0.0714%	0.1305%
export tax		0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
tariff		0.0000%	0.0000%	-0.0002%	-0.0012%	0.0000%	0.0000%	0.0000%	-0.0001%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	-0.0009%	-0.0020%	-0.0023%
Savings																	
rural household		0.0148%	0.0443%	0.0741%	0.1530%	0.0071%	0.0212%	0.0353%	0.0708%	0.0019%	0.0058%	0.0096%	0.0192%	0.0410%	0.1267%	0.2148%	0.4357%
urban household		-0.0123%	-0.0369%	-0.0615%	-0.1225%	-0.0059%	-0.0177%	-0.0294%	-0.0589%	-0.0016%	-0.0048%	-0.0080%	-0.0160%	-0.0342%	-0.1022%	-0.1706%	-0.3447%
GDP		0.0431%	0.1095%	0.1751%	0.3431%	0.0258%	0.0576%	0.0893%	0.1683%	0.0152%	0.0239%	0.0326%	0.0538%	0.0119%	0.0120%	0.0160%	0.0190%
Gini Coefficient		-0.1878%	-0.5634%	-0.9406%	-1.9115%	-0.0899%	-0.2697%	-0.4496%	-0.8999%	-0.0244%	-0.0733%	-0.1221%	-0.2442%	-0.5218%	-1.5877%	-2.6730%	-5.4097%

Table 9-1: The Overall Impact of Remittances and the Brain Drain (no externality in the Brain Drain)

			increase in the Brain Drain from the Public Administration Sector (Sector 57) only			increase in the Brain Drain from the Education Sector (Sector 58) only			increase in the Brain Drain from the Health Sector (Sector 59) only			increase in the Brain Drain from All 59 Sectors		
			3% Increase	5% increase	10% increase	3% Increase	5% increase	10% increase	3% Increase	5% increase	10% increase	3% Increase	5% increase	10% increase
GDP														
(% change from the benchmark level)	increase in remittances to BOTH the RURAL and URBAN households	30% increase	4.2788%	3.2960%	1.0701%	5.2436%	4.8881%	4.1567%	5.6967%	5.6177%	5.4403%	1.6853%	-0.8767%	-6.5737%
		20% increase	2.2386%	1.2558%	-0.9701%	3.2034%	2.8479%	2.1165%	3.6565%	3.5775%	3.4001%	-0.3549%	-2.9169%	-8.6139%
		10% increase	0.2061%	-0.7767%	-3.0025%	1.1710%	0.8154%	0.0841%	1.6241%	1.5450%	1.3676%	-2.3874%	-4.9494%	-10.6464%
	increase in remittances to the URBAN household only	30% increase	3.1949%	2.2121%	-0.0138%	4.1597%	3.8042%	3.0728%	4.6128%	4.5338%	4.3564%	0.6013%	-1.9606%	-7.6576%
		20% increase	1.5568%	0.5740%	-1.6519%	2.5216%	2.1661%	1.4347%	2.9747%	2.8957%	2.7182%	-1.0368%	-3.5988%	-9.2957%
		10% increase	-0.0789%	-1.0617%	-3.2876%	0.8859%	0.5304%	-0.2010%	1.3390%	1.2600%	1.0826%	-2.6725%	-5.2344%	-10.9314%
	increase in remittances to the RURAL household only	30% increase	-0.4375%	-1.4203%	-3.6461%	0.5274%	0.1718%	-0.5596%	0.9805%	0.9014%	0.7240%	-3.0310%	-5.5930%	-11.2900%
		20% increase	-0.8395%	-1.8223%	-4.0482%	0.1253%	-0.2302%	-0.9616%	0.5784%	0.4994%	0.3220%	-3.4331%	-5.9951%	-11.6920%
		10% increase	-1.2363%	-2.2191%	-4.4450%	-0.2715%	-0.6270%	-1.3584%	0.1816%	0.1026%	-0.0749%	-3.8299%	-6.3919%	-12.0888%
Gini Coefficient														
(benchmark level is 39.40)	increase in remittances to BOTH the RURAL and URBAN households	30% increase	47.2883	47.5165	47.9804	47.0185	47.0600	47.1116	46.9755	46.9702	46.9558	47.8714	48.4946	49.8845
		20% increase	45.0514	45.2796	45.7434	44.7816	44.8230	44.8747	44.7386	44.7332	44.7189	45.6345	46.2576	47.6475
		10% increase	42.6492	42.8774	43.3412	42.3794	42.4208	42.4725	42.3364	42.3310	42.3167	43.2323	43.8554	45.2453
	increase in remittances to the URBAN household only	30% increase	50.8668	51.0950	51.5589	50.5970	50.6385	50.6901	50.5540	50.5487	50.5343	51.4499	52.0731	53.4630
		20% increase	47.3893	47.6175	48.0813	47.1195	47.1609	47.2126	47.0765	47.0712	47.0568	47.9724	48.5955	49.9855
		10% increase	43.7429	43.9711	44.4350	43.4731	43.5145	43.5662	43.4301	43.4248	43.4104	44.3260	44.9492	46.3391
	increase in remittances to the RURAL household only	30% increase	36.1098	36.3380	36.8018	35.8400	35.8814	35.9331	35.7970	35.7916	35.7773	36.6929	37.3160	38.7059
		20% increase	37.3504	37.5786	38.0424	37.0806	37.1220	37.1736	37.0375	37.0322	37.0179	37.9335	38.5566	39.9465
		10% increase	38.5945	38.8227	39.2866	38.3247	38.3662	38.4178	38.2817	38.2764	38.2620	39.1776	39.8008	41.1907

Table 9-2: The Overall Impact of Remittances and the Brain Drain (perfect externality in the Brain Drain)

			increase in the Brain Drain from the Public Administration Sector (Sector 57) only			increase in the Brain Drain from the Education Sector (Sector 58) only			increase in the Brain Drain from the Health Sector (Sector 59) only			increase in the Brain Drain from All 59 Sectors		
			3% Increase	5% increase	10% increase	3% Increase	5% increase	10% increase	3% Increase	5% increase	10% increase	3% Increase	5% increase	10% increase
GDP														
(% change from the benchmark level)	increase in remittances to BOTH the RURAL and URBAN households	30% increase	5.9097%	5.9753%	6.1433%	5.8578%	5.8895%	5.9685%	5.8241%	5.8328%	5.8540%	5.8122%	5.8162%	5.8192%
		20% increase	3.8695%	3.9351%	4.1031%	3.8176%	3.8493%	3.9283%	3.7839%	3.7926%	3.8138%	3.7720%	3.7760%	3.7790%
		10% increase	1.8371%	1.9026%	2.0706%	1.7851%	1.8168%	1.8958%	1.7514%	1.7601%	1.7813%	1.7395%	1.7435%	1.7465%
	increase in remittances to the URBAN household only	30% increase	4.8258%	4.8914%	5.0594%	4.7738%	4.8056%	4.8846%	4.7402%	4.7489%	4.7700%	4.7283%	4.7322%	4.7353%
		20% increase	3.1877%	3.2532%	3.4212%	3.1357%	3.1675%	3.2465%	3.1020%	3.1107%	3.1319%	3.0901%	3.0941%	3.0971%
		10% increase	1.5520%	1.6176%	1.7856%	1.5000%	1.5318%	1.6108%	1.4664%	1.4750%	1.4962%	1.4545%	1.4584%	1.4615%
	increase in remittances to the RURAL household only	30% increase	1.1935%	1.2590%	1.4270%	1.1415%	1.1732%	1.2522%	1.1078%	1.1165%	1.1377%	1.0959%	1.0999%	1.1029%
		20% increase	0.7914%	0.8569%	1.0249%	0.7394%	0.7712%	0.8502%	0.7057%	0.7144%	0.7356%	0.6939%	0.6978%	0.7009%
		10% increase	0.3946%	0.4601%	0.6281%	0.3426%	0.3744%	0.4534%	0.3089%	0.3176%	0.3388%	0.2970%	0.3010%	0.3040%
Gini Coefficient														
(benchmark level is 39.40)	increase in remittances to BOTH the RURAL and URBAN households	30% increase	46.7781	46.6295	46.2469	46.8938	46.8229	46.6455	46.9712	46.9520	46.9038	46.3745	45.9469	44.8686
		20% increase	44.5411	44.3925	44.0100	44.6568	44.5860	44.4086	44.7342	44.7150	44.6669	44.1376	43.7099	42.6317
		10% increase	42.1389	41.9903	41.6078	42.2546	42.1838	42.0064	42.3320	42.3128	42.2647	41.7354	41.3077	40.2295
	increase in remittances to the URBAN household only	30% increase	50.3566	50.2079	49.8254	50.4723	50.4014	50.2240	50.5497	50.5304	50.4823	49.9530	49.5254	48.4471
		20% increase	46.8791	46.7304	46.3479	46.9947	46.9239	46.7465	47.0722	47.0529	47.0048	46.4755	46.0478	44.9696
		10% increase	43.2327	43.0840	42.7015	43.3484	43.2775	43.1001	43.4258	43.4065	43.3584	42.8291	42.4015	41.3232
	increase in remittances to the RURAL household only	30% increase	35.5995	35.4509	35.0684	35.7152	35.6444	35.4670	35.7926	35.7734	35.7253	35.1960	34.7683	33.6901
		20% increase	36.8401	36.6915	36.3090	36.9558	36.8850	36.7075	37.0332	37.0140	36.9659	36.4365	36.0089	34.9307
		10% increase	38.0843	37.9357	37.5531	38.2000	38.1291	37.9517	38.2774	38.2582	38.2100	37.6807	37.2531	36.1748

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
		cmaiz	crice	csorg	cogrn	ccass	cyams	ccyam	ccpea	csbea	cpoil	cgnut	conut	cfrud	cfrue	cvegd	cvege	cplan	ccoco	cocro	coexp	cchik	ceggs	cbeef	cgoat	coliv	cfore
		amaiz	arice	asorg		acass	ayams	acyam	acpea	asbea	apoil	agnut	aonut	afrud	afrue	avegd	avege	aplan	acoco	aocro	aoexp	achik	aeggs	abeef	agoat	aoliv	afore
1	cmaiz	70.375935	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	9.638533	305.945409	42.345166	4.608819	105.352278	0.000000
2	crice	0.000000	47.098838	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3	csorg	0.000000	0.000000	37.831281	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4	cogrn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5	ccass	0.000000	0.000000	0.000000	0.000000	761.318219	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
6	cyams	0.000000	0.000000	0.000000	0.000000	0.000000	890.399357	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
7	ccyam	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	214.215272	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8	ccpea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	13.327865	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	csbea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	11.982786	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.615928	40.663950	0.000000	0.000000	0.000000	0.000000
10	cpoil	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	71.238308	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11	cgnut	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	58.629670	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
12	conut	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	13.736526	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
13	cfrud	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	16.645344	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
14	cfrue	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
15	cvegd	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	61.426113	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
16	cvege	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
17	cplan	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	650.729070	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
18	ccoco	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	402.113180	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
19	cocro	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	4.387584	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
20	coexp	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
21	cchik	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
22	ceggs	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	3.181020	99.971626	0.000000	0.000000	0.000000	0.000000
23	cbeef	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
24	cgoat	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	148.804772	0.000000	0.000000	0.000000
25	coliv	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	15.794772	0.000000	0.000000
26	cfore	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	10.839134	0.000000
27	cfish	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.624019	51.778424	0.000000	0.000000	0.000000	0.000000
28	cmine	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
29	cforf	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
30	clocf	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
31	ccopr	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
32	cdair	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
33	cmeat	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
34	ctext	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
35	cclth	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
36	cfoot	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
37	cwood	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
38	cpapr	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
39	coils	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
40	cpetr	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
41	cdies	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2.178807	0.000000	0.000000	0.856782	0.000000	0.000000	0.000000	0.000000	0.000000
42	cfuel	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
43	cfert	163.537543	130.834716	44.705994	0.000000	0.000000	0.000000	25.461824	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	12.507131	496.236852	7.586540	0.000000	705.199683	11.211234	14.215480	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
44	cchem	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	3.546214	0.000000	1.384131	0.000000	0.000000	0.000000	1.733528	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
45	cmetl	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
46	ccapt	109.627121	41.673314	19.573168	0.000000	36.140360	2.431995	6.111164	9.818275	2.207690	73.132504	45.180363	14.498222	0.000000	0.000000	144.019145	23.242608	101.258279	381.244090	2.928387	38.916227	0.000000	0.000000	0.000000	0.000000	0.000000	772.795998
47	ccons	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
48	cwatr	0.000000	43.409819	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	6.025567	0.000000	0.243527	7.766129	24.119141	2.540248	11.059677	123.126027
49	celec	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.211958	0.000000	0.057836	0.000000	0.000000	0.000000	0.138070	0.007411	0.244746	0.000000	0.000000	0.000000	0.000000
50	ctrad	313.252754	156.033179	215.426384	0.000000	477.529459	578.876555	155.236650	65.505658	11.229828	131.802587	138.781688	61.853790	123.547759	51.954534	589.365815	19.503464	467.016720	516.586649	29.878711	36.947146	4.630310	139.570575	105.298449	81.233591	158.250067	545.372072
51	cosrv	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
52	ctran	118.275643	56.739340	82.953946	0.000000	208.736767	234.572175	62.911335	25.293483	3.959263	49.930502	53.418011	24.389650	44.027296	18.423526	237.840098	6.936971	220.692599	335.259934	10.635730	13.652088	1.654077	50.441999	37.970009	29.516507	59.170258	285.403315
53	ccomm	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	126.932677
54	cbusi	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	123.042567
55	creal	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	128.159687
56	ccsrv	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.381356	11.995767	8.386411	0.892526	0.000000	0.000000
57	cadmn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
58	ceduc	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
59	cheal	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	trc	6.014399	109.109161	0.000000	3.757453	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	4.366585	0.000000	42.054774	0.000000	20.827685	4.897752	13.796876	0.000000
Factors	labself	962.659201	349.784616	671.422651	0.000000	1,637.745311	1,781.804793	265.712691	104.765660	43.035461	299.647699	318.676604	88.002943	255.181777	101.863586	2,289.263458	32.226509	663.829861	2,572.956917	63.123836	53.792797	6.097295	198.323254	321.708282	389.760151	443.972906	0.000000
	labunsk	291.580749	105.946591	203.367837	0.000000	496.058215	539.692526	80.481967	31.732569	13.035051	90.760573	96.524256	26.655294	87.028105	34.739921	668.555141	9.411410	226.394907	2,142.113355	21.527979	18.345688	2.618234	85.161806	91.479544	110.830472	235.389200	3,497.912631
	labskll	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	176.479380
	capa	49.816543	24.994674	38.298900	0.000000	111.104977	194.555502	46.890201	16.851200	2.330574	21.391691	24.700790	20.489110	33.265356	13.577149	98.514657	2.798437	66.511669	177.877550	4.198144	8.151078	1.906166	60.134647	57.386810	68.389006	99.968096	1,170.660450
	capn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	land	517.463914	206.726950	353.774025	0.000000	948.120709	1,569.849360	300.915450	108.825446	2.873921	130.343795	137.611054	105.952942	288.992322	114.103227	879.863112	24.370048	311.065726	680.274215	36.500356	57.375837	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Consumption	hrur																										
	hurb																										
	gov																										
	s-i																										
Taxes	dtax																										
	stax	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	mtax	0.000000	421.679392	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	166.463210	0.000000	0.000000	0.000000	0.000000	0.000000
	etax	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1,089.163687	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	imports	119.751532	2,050.668551	0.000000	82.899065	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	92.157971	0.000000	880.768472	0.000000	420.582067	96.005637	251.667175	0.000000

27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
cfish	cmine	cforf	clocf	ccopr	cdair	cmeat	ctext	cclth	cfoot	cwood	cpapr	coils	cpetr	cdies	cfuel	cfert	cchem	cmetl	ccapt	ccons	cwatr	celec	ctrad	cosrv	ctran
afish	amine	aforf	alocf	acopr	adair	ameat	atext	aclth	afoot	awood	apapr		apetr	adies	afuel		achem	ametl	acapt	acons	awatr	aelec	atrad	aosrv	atran
0.000000	0.000000	7.843293	155.608260	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	55.629031	0.000000
0.000000	0.000000	6.478499	155.310488	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	83.500282	0.000000
0.000000	0.000000	6.495497	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	15.246855	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	603.366809	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	558.208541	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	212.705573	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	29.899246	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	74.910473	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	108.211800	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	116.866126	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	142.568755	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	54.663219	0.000000
0.000000	0.000000	15.082687	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	40.799324	0.000000
0.000000	0.000000	0.000000	148.946963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	41.636233	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	27.307615	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	930.543598	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	39.690924	0.000000	0.000000	0.000000	0.000000	94.119995	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	54.661705	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	165.400096	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	111.182823	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	244.057796	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	55.434192	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	110.825204	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	27.899207	0.000000
0.000000	0.000000	7.613738	0.000000	0.000000	163.968868	264.619353	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	27.957706	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	12.900359	0.000000	0.000000	1,300.866575	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	7.613871	0.000000	0.000000	0.000000	307.267509	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	150.929428	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	72.371629	245.875180	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	25.239590	0.000000	0.000000	0.000000	40.166519	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	223.037961	0.000000
0.000000	0.000000	14.706688	228.616428	126.291047	0.000000	34.727084	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	193.137198	0.000000
0.000000	0.000000	82.996508	101.018479	0.000000	18.076880	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	61.278182	0.000000
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0.000000	102.477533	0.000000	0.000000	0.000000	0.000000	0.000000	8.990676	90.547602	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	15.059334	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	271.022284	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	29.562531	0.000000	6.312596	34.711074	0.000000	0.000000	0.000000	67.695268	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	80.201735	0.000000	0.000000	0.000000	0.000000	110.421676	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	137.539698	0.000000	0.000000	0.000000	0.000000	0.000000	70.219690	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	3,112.946333	2,426.966672	66.713429	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	339.191333	0.000000	0.000000	0.000000
0.376696	4.315966	1.010428	3.420947	0.138717	4.377632	2.348076	0.185962	0.717089	0.364482	3.973024	6.280083	0.000000	0.745605	0.707033	0.009464	0.000000	8.671949	6.784936	2.513246	7.902090	3.149806	1.253181	14.017738	34.379024	5,323.211641
7.349560	298.202024	4.374685	14.818870	0.600577	18.969919	10.163750	1.477146	5.697099	2.895726	205.012057	9.540091	0.000000	0.530309	0.502878	0.006731	0.000000	17.931404	30.652441	12.371616	149.693243	10.876990	73.382085	84.985059	21.526056	3,678.263226
403.027750	147.848998	5.565184	18.851714	0.764062	24.133831	12.927316	5.543889	21.389285	10.873536	0.168115	3.441679	0.000000	0.518709	0.491878	0.006584	0.000000	2.442802	79.230676	8.343146	14.114395	0.000000	0.000000	11.559687	0.000000	477.581814
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	365.698893	0.000000	0.000000	0.000000	0.000000	0.000000	46.106731	31.583617	13.071175	0.000000	5.461377	0.000000	0.000000	0.000000	0.000000	0.000000	589.119901	0.000000	281.487792	0.000000	85.721069	0.000000	0.000000	70.690140	0.000000
0.000000	126.658325	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	3,576.496549	1,456.810396	0.000000	486.627028	0.000000	88.878399	0.000000
872.311919	1,120.579606	0.000000	0.000000	0.000000	0.000000	0.000000	6.554742	19.587892	11.560390	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	45.769191	1,670.953791	212.377608	1,593.098135	95.479388	2,941.310549	1,715.156106	143.352915	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	21.361971	301.847055	0.000000	0.000000	0.000000
0.000000	0.000000	7.313372	31.438485	0.000000	6.391897	37.355224	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	159.937042	0.000000	61.632817	0.000000
0.071057	598.224546	5.014995	16.990659	0.735061	6.968358	28.967464	5.618107	21.681898	11.020252	70.673386	9.409739	0.000000	9.173896	8.697017	0.116399	0.000000	55.224474	1,888.511814	53.950606	1.346820	87.075148	8.237440	140.090107	59.500220	29.716686
387.413880	201.975737	103.287313	156.743918	17.237009	83.597813	626.011896	79.945162	95.265300	149.769833	394.074128	78.992055	0.000000	598.800206	507.086941	14.644993	0.000000	358.938759	261.712158	450.654057	0.000000	0.000000	0.000000	0.000000	1,837.800486	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	41.718862	0.000000
59.935412	77.201762	7.208632	45.247111	2.040257	6.311742	40.661186	6.001138	0.000000	8.516515	0.000000	0.000000	0.000000	50.255540	43.070610	1.183757	0.000000	20.915764	0.000000	20.703824	481.840104	0.000000	0.000000	3,885.275401	781.202272	0.000000
70.082006	77.270999	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	123.738851	211.721001
68.907235	149.622355	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	526.924616	201.782041
70.463473	155.564622	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	124.852839	214.958129
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	248.400001	0.000000	0.000000	5.388613	96.423283	49.065440	129.729318	26.930358	0.000000	10.126520	258.694674	0.000000	0.000000	132.891088	73.395188	195.360789	69.874342	1,345.407086	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1,000.016300	1,166.434762	209.585647	801.673270	51.120355	179.022025	745.400667	137.984635	516.611073	267.807821	754.794738	103.423982	0.000000	99.385252	85.041009	2.336001	0.000000	312.465667	372.679836	453.849518	5,372.603134	39.754894	703.081785	3,817.157658	401.801168	1,734.930524
634.289547	280.156275	3.376392	0.000000	182.484924	62.056818	0.000000	0.000000	0.000000	0.000000	0.000000	35.583470	0.000000	0.000000	0.000000	0.000000	0.000000	106.646712	0.000000	115.460446	796.829166	45.583312	329.209264	90.232901	7.989365	100.561765
289.404724	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	2,990.404682	108.808505	132.332055	144.203553	132.499521	346.508851	34.927056	160.671915	73.482612	237.019154	58.506225	0.000000	209.974972	179.095878	4.924489	0.000000	383.016973	302.052957	337.639955	3,259.014588	72.435916	1,331.697713	940.804849	168.871817	793.440933
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

0.000000	0.000000	623.712777	0.000000	0.000000	97.464147	156.985501	173.790768	125.466893	71.793545	141.455682	91.352664	0.000000	2,570.589658	1,863.913607	0.000000	166.961605	199.575918	240.255443	1,361.352923	19.448648	73.716177	0.000000	1,717.009192	37.711669	305.295620
0.000000	0.000000	270.062689	0.000000	0.000000	31.179231	104.276311	271.726464	192.779808	192.636319	0.000000	88.180511	0.000000	0.000000	0.000000	23.597078	157.488339	188.436592	44.822775	1,370.557958	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	4,896.767407	0.000000	0.000000	108.567636	1,694.910155	842.655474	2,693.971857	547.915106	0.000000	225.095225	5,687.123094	0.000000	0.000000	2,826.233373	1,511.133244	3,826.113637	1,650.521985	26,457.062017	0.000000	0.000000	65.242490	0.000000	2,938.909014	0.000000

53 ccomm acomm	54 cbusi abusi	55 creal areal	56 ccsrv acsrv	57 cadmn aadmn	58 ceduc aeduc	59 cheal aheal	trc	labself	labunsk	labskll	capa	capn	land	hrur	hurb	gov	s-i	dtax	stax	mtax	etax	Exports
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1466.787293	498.221318	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1646.357269	1805.953765	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1497.739172	125.288235	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							32.178926	39.230737	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							2213.912980	1073.332353	0.000000	0.000000					24.823656
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							2238.146091	2002.348172	0.000000	0.000000					103.080103
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							448.659830	282.355880	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							214.056129	148.736162	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							6.404783	0.087880	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							264.887481	125.103384	0.000000	0.000000					332.108015
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							470.193148	165.370535	0.000000	0.000000					71.117283
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					224.975826
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							215.664461	419.146179	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					295.045235
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							3182.361080	2030.714002	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					100.210337
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1266.828578	789.941183	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					7672.311290
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							122.681889	26.061691	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					188.606234
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							423.242720	535.098300	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							304.478329	533.184533	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							348.233157	631.183193	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							190.531450	326.408846	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							533.779924	375.731306	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					5625.278737
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1245.624062	1171.826790	0.000000	0.000000					926.985455
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					7544.390277
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							2971.479815	3793.459938	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1379.820809	1580.130603	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							103.090607	138.037905	0.000000	0.000000					953.343362
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							258.741614	612.044478	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							2305.343196	1593.847652	0.000000	0.000000					785.932217
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							722.526250	837.305553	0.000000	0.000000					55.348501
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							1883.516757	2208.411536	0.000000	0.000000					13.772353
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							630.110242	751.292088	0.000000	0.000000					7.235339
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							322.917584	726.211542	0.000000	0.000000					1797.698121
106.269387	79.358095	169.987836	0.000000	0.000000	0.000000	0.000000	0.000000							83.219663	215.062290	0.000000	0.000000					1.276660
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	0.000000					0.000000
2.111370	11.618680	43.497152	22.708935	25.505481	8.103304	2.516162	0.000000							238.067809	867.936774	0.000000	0.000000					0.000000
11.656752	4.973558	18.671323	41.739273	52.124786	14.913975	4.626536	0.000000							84.287687	219.720504	0.000000	0.000000					0.000000
0.041094	0.008637	0.032453	6.706724	0.000000	2.387372	0.741536	0.000000							1308.021853	505.898664	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							285.027626	12.453754	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	83.121521	183.079801	47.351757	14.321868	0.000000							2226.996424	2275.916901	0.000000	0.000000					54.457385
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							292.045498	277.957567	0.000000	312.579392					0.000000
45.203578	32.969592	76.398172	0.000000	0.000000	0.000000	0.000000	0.000000							2876.731166	5000.373103	0.000000	15095.478399					827.815891
80.938880	59.291764	136.309968	0.000000	0.000000	0.000000	0.000000	0.000000							0.000000	0.000000	0.000000	12798.826260					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							4.448964	8.346735	0.000000	0.000000					0.000000
14.865066	12.304441	46.143503	73.729634	5.592641	26.427283	8.187720	0.000000							1117.318859	2318.771649	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	837.652656							0.000000	0.000000	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000							2136.488150	7060.497518	0.000000	0.000000					0.000000
44.856743	32.740234	75.669657	290.442761	693.286613	172.987264	52.111233	2,008.858729							611.489451	1278.645147	0.000000	0.000000					0.000000
123.636666	91.052187	207.292512	0.000000	0.000000	0.000000	0.000000	0.000000							328.577900	1036.414246	0.000000	0.000000					0.000000
120.345194	89.331240	197.218829	0.000000	0.000000	0.000000	0.000000	0.000000							180.625441	470.665822	0.000000	0.000000					0.000000
124.735427	91.645792	210.438793	0.000000	0.000000	0.000000	0.000000	0.000000							684.116267	1611.751352	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	2,011.293151	0.000000	0.000000	0.000000	0.000000							830.371076	1522.038174	0.000000	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	3,776.133460	0.000000	0.000000	0.000000							7.030939	20.050767	12327.471313	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	1,038.772555	0.000000	0.000000							19.216081	33.342306	2629.982356	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	228.090525	0.000000							143.233476	134.054623	515.845382	0.000000					0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000																
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000																
712.682338	327.984160	1,149.230439	730.858427	5,764.878008	253.294613	109.660528																
198.554276	437.282424	0.000000	410.649569	3,430.723028	1,642.594487	446.147147																
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000																
773.017227	629.979751	1,085.795744	714.108467	2,199.362662	514.480689	154.820752																
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000																
								12424.788851	14086.383630	1711.853255	2704.168102	4023.221119	6775.002408	333.2991848	-333.2991848	2282.850147						1940.558119
								1490.569409	23498.510622	7821.037413	0.000000	10339.531615	0.000000	333.2991848	-333.299185	2476.489455						7559.146433
																		7293.093315	10303.58227	3523.886677	1089.163687	5714.233197
														2108.085608	1260.505794	6776.399027						18061.89362
												4111.147726		806.5316991	2375.41389							
37.805048	227.924786	0.000000	0.000000	0.000000	0.000000	0.000000																
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000																
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000																
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000											914.9214655						