Trade reform, migration, and a Chinese village economy

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1 Introduction

In the late 1970s, China launched economic reforms that initiated the country's transition from a planned economy toward a "socialist market economy" (Wang, 2000, p.2). In the course of these reforms, the foreign trade regime has been liberalized considerably. The reforms led to remarkable reductions in poverty; however, income inequality has increased steadily and is considered a primary challenge for China's development (Ravallion and Chen, 2007; Dollar, 2007). In this context, poverty and inequality impacts of further trade reform efforts which might follow a WTO Doha Round agreement or bilateral free trade agreements remain in the focus of the political discussion.

Growing rural-urban and regional disparities are important dimensions of inequality in China and have triggered large scale population movements; the number of temporary rural-urban migrants is estimated at around 136 m (Fang et al., 2009). Not surprisingly, migration plays a highly important role for the livelihoods of households in rural China. Migration has become one of the strongest forces affecting the rural economy in the past decades. It had the fastest growing share in the off-farm labour market and has played an important role in determining the income of rural households, accounting for approximately 9% of total rural incomes in 2001 (de Brauw et al., 2002; de Brauw and Rozelle, 2008; Knight and Song, 1999). Migration fulfils an important function in linking rural economies with industrial and services sectors of urban areas and in transmitting policy impacts to rural households. Therefore, the impact of policy reforms on rural households may depend strongly on the access of these households to migration as well as on their migration behaviour. In this context, household characteristics such as demographics are highly important.

This paper takes a village level perspective and is based on a village computable general equilibrium (CGE) model which was developed to study the impacts of trade liberalisation on a small rural community in South-western China. In the model, the importance of migration and the role of migration behaviour for the household and village level outcomes of policy reforms are recognised through the application of an innovative approach towards the modelling of the households' labour allocation behaviour.

2 Modelling approach

The present study applies a village CGE model to assess village level impacts of trade liberalisation in China. Given the insights from the above discussion, the model puts great emphasis on the modelling of households labour allocation behaviour, in particular migration. Regarding the modelling of migration in a village CGE model, two principal issues arise. First, migration always creates feedbacks to a household's consumption sphere by altering consumption demand as a consequence of changes in the household size. These effects constitute a benefit additional to the receipt of remittances to the household which impacts the migration behaviour. Second, migration involves psychological costs to the households, i.e. creates disutility which makes engagement in this activity less attractive. These disutilities can determine the migration behaviour and lead to observable differences in migration responses among households and, given the role of migration as income source and a means to cope with economic shocks, different impacts of a given policy reform. The differences in migration behaviour, in turn, can often be

linked to certain characteristics of the households. The presence of children or elderly, for example, may make migration a less attractive option for a young couple. Likewise, the need for childcare may require at least one person to stay at home and make farm work the preferred option for this person.

Bearing these considerations in mind, a refined depiction of labour allocation is implemented in the village CGE model. The approach takes into account household preferences towards work in different types of employment as well as feedback links between household migration and consumption demand. This is achieved by the assumption of a composite utility function which defines the behaviour of each household in the model (see equation 1). The composite utility function consists of a consumption utility function which captures utility created by commodity consumption and a labour utility function which allows to account for the utility or disutility associated with the participation in different types of employment. Thereby, the approach offers an innovative extension of previous works on village modelling, such as those by Taylor and Adelman (1996) and Kuiper (2005), which have not considered the disutility arising from certain employment options.

Due to the necessity of capturing the effects of changes in household consumption demand which arise following changes in migration, the consumption utility function U^C is specified as a per capita expenditure system. A per adult equivalent Stone-Geary utility function is chosen to represent consumption demand (see Kuiper, 2005, for a former application of this approach). The labour market participation component U^L of the composite utility function in this application is assumed to lead to increasingly negative marginal utility of labour allocated to the different activities. This implies that households experience a certain degree of disutility from participation in any income generating activity which increases with the amount of labour allocated.[1] A simple sum of power functions is used here.

Accordingly, the composite utility function is

$$\begin{aligned} U_h &= U_h^C + U_h^L \\ &= \prod_{c \in CD} \left(QD_{ch} - \sigma_{ch}\right)^{\gamma_{ch}} + \sum_{a \in AO} \left(-\varepsilon_{ah} FDD_{fah}^{\delta_{ah}}\right) \qquad \forall\, h \in H,\ f \in FU. \end{aligned} \tag{1}$$

The first term on the right hand side is the consumption utility function U^C in which all quantities of consumed commodities QD_{ch} are defined per adult equivalent. σ_{ch} describes the fixed committed (or subsistence) consumption quantities and γ_{ch} are the marginal expenditure shares (Sadoulet and de Janvry, 1995). The consumption utility function is defined over all commodities consumed c by the households h, entering a set CD, and leads to a linear expenditure system (LES).

The second term of the composite utility function constitutes the utility function for labour market participation U^L. Time worked in the different activities is expressed in terms of a factor demand variable FDD_{fah}. The set FU contains the 'utility' factors, i.e. the production factors which bear a utility connotation.[2] The parameters ε_{ah} and δ_{ah} determine how the time allocated to a particular activity a translates into utility. The

[1] The inclusion of utility aspects in an agricultural household model draws on work by Lopez (1984, 1986) and Sonoda (2008).

[2] This set in the current model only contains labour. It allows, however, for further disaggregation, e.g. by gender.

negative sign which precedes ε_{ah} ensures that the households experience a disutility from labour market participation. Only time worked in off-farm activities, represented by the set *AO* in the model, is included into the labour utility function.

Constrained maximisation of the composite utility function leads to modified factor demand functions which govern the households' allocation of labour to different off-farm activities. In case of migration (represented by a set *HAOM* in the model), the demand of labour by the corresponding household activity is described by

$$\kappa_h * PA_{ah} = WF_{fh} + \frac{1}{\lambda_h} * \varepsilon_{ah} * \delta_{ah} * FDD_{fah}^{(\delta_{ah}-1)} - \sum_{c \in CD} QD_{ch} * PD_{ch} \quad \forall\, a \in HAOM,\ f \in FU,\ h \in H. \tag{2}$$

This factor demand equation states, that households equate marginal returns from migration with marginal costs in the optimum. The marginal returns are the activity price PA_{ah}, or the wage rate at the destination, multiplied with a remittance factor κ_h. The marginal costs consist of three components. The first component is the household specific shadow wage WF_{fh}, i.e. the opportunity cost of the factor.[3] The second component $\frac{1}{\lambda_h} * \varepsilon_{ah} * \delta_{ah} * FDD_{fah}^{(\delta_{ah}-1)}$ reflects the disutility arising from migration to the specific household. This generates a mark-up on the shadow wage and, equivalently, diminishes the value of the returns from migration. The third component $\sum_{c \in CD} QD_{ch} * PD_{ch}$ emerges due to the definition of a per capita LES. As this third component takes a positive value, it works contrary to the disutility component and increases the marginal returns from migration, thereby creating a feedback between the level of migration and the consumption sphere.

The mechanics of Equation 2 are best illustrated through the effect a supposed increase in PA_{ah}. First of all, a rising PA_{ah} requires that the right hand side of the equation increases, too. This raises the household shadow wage and the time allocated to migration. However, both movements are counteracted by an increase in the term $\sum_{c \in CD} QD_{ch} * PD_{ch}$. This increase happens due to the higher shadow wage, a higher income and, as a consequence of the latter and a smaller household size, an increase in per capita consumption quantities. Ultimately, a new equilibrium—which also involves second round effects through changes in income and quantities consumed—with a different level of migration is established. In general, the values of λ_h, ε_{ah} and δ_{ah} determine how fast the disutility component changes from a change in migration, i.e. how much labour has to be shifted to migration to achieve a given change in marginal disutility. The less labour is necessary for a given change in disutility, the faster the equilibrium is established and the weaker is the migration response of the household. Thus, the approach allows for the flexible modelling of different migration responses of rural households, taking into account not only the marginal returns of migration, but also notions of household utility attached to this activity and interactions between migration and the consumption sphere. Other off-farm activities are similarly formulated.

Parameters of the factor demand function have to be calibrated such that Equation 2 holds at given prices and quantities. In principle, there is an infinite number of possible combinations of the three parameters which fulfil this condition. However, the parameters cannot be calibrated independently from each other. In practice, the calibration is carried

[3] Taylor and Adelman (1996), for example, include only this component into their migration functions.

out in four steps: First, given normalized prices, the quantities in the equation and κ_h are calculated from the social accounting matrix (SAM) which underlies the model. Second, λ_h is set equal to 1, leaving ε_{ah} as the only undetermined shift parameter. Third, a value of δ_{ah} is chosen. Finally, the equation is solved for ε_{ah} to calibrate this parameter. This procedure is repeated until the desired labour supply response is achieved.

Thereby, the value of δ_{ah} drives the reaction of the utility term to an exogenous shock. If δ_{ah} is close to 1, a change in the differential between WF_h and PA_{ah} triggers a very elastic response in the labour demand FDD_{fah}, and correspondingly the labour supply response of the household. The farther away δ_{ah} moves from 1, the smaller becomes the change in labour demand and the less elastic the labour supply response. Whereas for $\delta_{ah} > 1$ the supply response to a rise in the own wage is positive, it becomes negative for $\delta_{ah} < 1$. Thus, the prosed approach offers substantial flexibility in the calibration of households' labour supply behaviour.

For the model simulations, the responses in migration have been calibrated to an own-wage elasticity of 0.25 for all households, based on considerations regarding results on the labour supply behaviour of Chinese rural households as presented by Sicular and Zhao (2004).[4] In informal local off-farm work, own-wage elasticities have been set to 0.50 and in formal local off-farm work, households' labour supply responses have been assumed to be inelastic in order to take into account market entry restrictions to this sector.

In the model, six representative household groups are distinguished, stratified according to the households' demographic characteristics as well as income levels. Regarding the former, the households which constitute the village are divided into two groups along the median of the dependency ratio. Following the presumption that households with a relatively high share of dependants are less inclined to migrate, this procedure yields two aggregate representative households with different migration behaviour, namely a low migration household with a weak migration response and a high migration household which responds more strongly to incentives to migrate. Thus, the influence of household demographics on labour allocation behaviour is implicitly modelled. The two migration groups are further subdivided according to income terciles, allowing to assess different impacts of trade reform on poorer and richer households.

The remaining parts of the model are fairly standard. All in all, four household specific activities are modelled: farming, formal & informal local off-farm work and migration. For agricultural production, a nested Leontief-Cobb-Douglas technology is assumed. In farming, five inputs are used, namely land and family labour as well as three intermediate input commodities (capital, services and hired labour). Apart from food of plant origin, other food, non-food goods and services, which are manufactured commodities purchased from the market, households consume parts of their agricultural output as well as leisure. All commodities except for land are traded beyond village borders in a perfect market environment, i.e., the village is assumed to be a price taker for these commodities. In case of land, a village land rental market is modelled which reconciles demand and supply for land under a uniform rental rate. In case of family labour, imperfect substitutability of family labour and hired labour as well as the preference driven employment choices discussed above lead to household specific shadow wages which differ from any of the market wage rates of the different off-farm activities.

The model is built upon a village social accounting matrix (SAM) created from a unique

[4] As will be shown below, this leads to different migration responses.

Table 1: Price and wage effects of unilateral trade liberalisation in China.

	% change
Activity prices	
Agriculture	-1.79
Formal local off-farm work	-1.03
Informal local off-farm work	-1.32
Migration	-1.17
Intermediate input prices	
Capital	-1.28
Imported labour	-1.80
Services	-0.52
Consumer prices	
Own-produced food	-1.79
Food of plant origin	-1.26
Other food	-1.81
Non-food	-0.83
Services	-0.66

Source: Zhai and Hertel (2010); Zhai (2011); own calculations.

set of household data of the year 2006, gathered in a census survey carried out by researchers of the International Food Policy Institute, the Chinese Academy of Agricultural Sciences and Guizhou University in a village in Puding county in the Chinese province of Guizhou (see, for example, Brown et al., 2010).

3 Policy scenario

In order to carry out policy simulations, price and wage changes following a unilateral trade liberalisation by China obtained from a national level CGE simulation are fed as a shock into the village model. These price and wage changes have been taken from a study conducted by Zhai and Hertel (2010) which employs a comparative static CGE model for the Chinese economy. This study is part of a recent undertaking to analyse the impact of trade liberalisation on inequality and poverty (Anderson et al., 2010). Details on the model can be found there.

The policy scenario analysed involves the elimination of all import tariffs and export subsidies in the agricultural and lightly processed food sectors and the elimination of import tariffs in all other sectors. In the base situation, the overall level of protection has been low. With average applied tariff rates of 6.5% and 5.0%, respectively, the agricultural and the food manufacturing sectors received the relatively highest levels of protection in terms of tariffs in the base situation. Average tariffs applied to other sectors have been consistently lower, ranging between 0.0% and 2.9%. Exports subsidies play only a role in the agricultural sector, with an average rate of 0.8%. This initial structure of protection leads to relatively modest price impacts of liberalisation. Prices and wages decline across the board, with more negative effects on the agricultural and food sectors (Zhai and Hertel, 2010). Table 1 presents the price and wage shock which has been constructed from the simulation results obtained by Zhai and Hertel (2010) and which constitutes the policy scenario to be analysed with the village equilibrium model.

Reflecting the relatively high level of protection in the base period, agricultural pro-

Table 2: Impact of trade liberalisation on village trade.

	% change		% change
Exports		**Imports**	
Migrant labour	0.28	Intermediate inputs	-0.29
Formal local off-farm labour	-0.01	Food of plant origin	-0.23
Informal local off-farm labour	-0.54	Other food	0.00
Agricultural outputs	0.26	Non-food	-0.90
		Services	-1.12

duction is affected most adversely among the three activities. The price of this activity, i.e. the aggregate price of agricultural output, deteriorates by -1.79%. Activity prices in the off-farm activities, i.e. wages, decline less. Wages in formal local off-farm work decline by -1.03%, in informal local off-farm work the decrease is at -1.35% and in migration workers have to accept -1.17% lower payments. The differences in wage changes mirror the skill levels of the individuals working in the different activities. Intermediate input prices are by between -0.50% and -1.80% lower after trade reform. The strongest decline is in the price of village imported labour, which is the wage for unskilled agricultural labour. The decrease in consumer prices is between -0.66% in case of services and -1.81% for other purchased food. The price for own-produced food is assumed to be the same as the agricultural output price, reflecting the opportunity cost of self-consumption. Hence, the same price change applies.

4 Results

The aggregate adjustments of the village to trade liberalisation in terms of changes in exports and village imports are presented in Table 2. An increase in the supply of migrant labour and a lower supply of labour to local informal off-farm employment both are logical consequences of the relatively weak decline in the migration wage rate and a stronger decline in the wage in informal off-farm work.

It is, however, surprising that the villages' supply to formal off-farm employment declines slightly in spite of a higher relative wage after reform. This happens because the households which are active in this activity either reduce their overall labour supply due to a strong substitution effect of a lower shadow wage on leisure consumption or have strong preferences towards migration, triggering relatively strong migration responses at the expense of the time worked in other activities (compare Tables 4 and 5).

Perhaps even more at odds with prior expectations is the change in village exports of agricultural outputs. Agricultural exports increase although the price of the agricultural activity has declined most of all activity prices. This phenomenon, however, is not the result of higher outputs from farm production in the village, but stems from an average increase in marketed surplus (see Table 4). This, in turn, is a consequence of reduced own-consumption by the households as a reaction to a deterioration in income levels (compare Table 6). Nonetheless, the village still increases migration by a larger extent than the supply of agricultural products which would correspond to prior expectations regarding the impact of a relatively strong decrease in agricultural prices.

On the import side, imports of the intermediate farm input into the village decreases

Table 3: Impact of trade liberalisation on village income, poverty and inequality.

	Base	Scenario
Total village income[a]	0.0	-1.38
Poverty indices		
P0	0.447	0.449
P1	0.105	0.107
Gini coefficient	29.410	29.466

a %-change against baseline.

with trade reform. This is a consequence of a lower demand for this commodity by households of the high migration group which overcompensates for a higher demand by the low migration households. The development of the imports of consumption commodities reflects changes in consumption demand due to lower income levels. Imports of food of plant origin, the non-food commodity as well as services decline and only those of other food remain constant.

The lower levels of income already mentioned lead to slightly higher levels of poverty in the village after trade reform. As reported in Table 3, both the poverty headcount (P0) and the poverty gap index (P1) decrease by magnitudes of 0.5% and 1.8% against the baseline.[5] The increase in poverty is a result of a decline in total village income by around -1.4%, which in turn stems from lower earnings of households from any of the activities (Table 6). Inequality, as measured by the Gini coefficient, has increased by around 0.2%, thus following the general trend of rising inequality in China (Ravallion and Chen, 2007). This increase in inequality is the consequence of a more adverse impact of trade reform on the poorer strata of the village population (see Table 6).

The village level impacts mask substantial differences in the reactions of the different representative households to the policy shock. As Table 4 illustrates, households of the high migration group respond positively to the improved incentives to migrate whereas those of the low migration group migrate less. Indeed, the high and middle income households of the high migration group show slightly positive migration responses, and the low income household of this group even allocates 2.83% more time to the activity. In case of these households, the relative increase in the migration wage sets incentives to migrate more. These incentives are accentuated by cross-wage and cross-price effects mediated via the decline in shadow wages due to an on average lower labour demand in the other activities.

Thereby, the more pronounced response of the low income household is caused by a comparatively strong impact of the shadow wage which ultimately stems from a very low value of κ_h in Equation 2. A low value of κ_h implies a very low transmission of migration wage shocks to the household itself. This requires δ_{ah} in the migration labour demand function of this household to take a very low value in order to achieve a migration response which is comparable to that of other households. The corollary of this relatively elastic calibration of the utility term of the household's migration function is that a given change in the shadow wage triggers a much stronger migration response than in case of the other households.

[5]For the calculation of the poverty measures, a poverty line of 871 Yuan per capita and year has been used.

In contrast to the high migration households, households of the low migration group all reduce the time worked in migration. This at the first sight counter-intuitive reaction is caused by a strong substitution effect of a lower household shadow wage (see Table 5) on the consumption of leisure and thereby on overall labour supply. Thereby, this is consistent with the theoretical notion that low migration households because of the higher shares of dependants require more work to be done in the household.

In case of informal local off-farm work, all households reduce the time worked in this activity by a similar scale. In a consistent reaction to the relatively strong decline in informal wages, households appear to substitute migration for time in informal off-farm work, either by expanding migration or by reducing time in migration by a lower extent than informal work.

Table 4: Impacts of trade liberalisation on household production (% change against baseline).

	Low migration				**High migration**				**All**
	High	*Middle*	*Low*	*Total*	*High*	*Middle*	*Low*	*Total*	
Factor demand and input use									
Migration	-0.22	-0.22	-0.16	-0.21	0.06	0.03	2.83	0.51	0.28
Formal local off-farm	-0.01			-0.01	-0.01		-0.01	-0.01	-0.01
Informal local off-farm	-0.55	-0.55	-0.61	-0.57	-0.48	-0.58	-0.60	-0.51	-0.54
Agriculture									
Labour	-0.18	0.08	2.12	0.63	-3.19	0.15	-2.35	-2.50	-0.53
Land	0.36	0.70	3.30	1.39	-3.58	0.70	-1.19	-1.20	0.00
Intermediate inputs	0.27	0.56	3.07	1.51	-3.51	0.59	-1.43	-1.44	-0.29
Activity output									
Agriculture	0.27	0.56	3.07	1.19	-3.51	0.59	-1.43	-1.35	-0.21
Marketed surplus									
Agriculture	0.76	1.54	6.31	2.47	-5.03	1.35	-1.40	-1.46	0.26

In agriculture, however, three out of the six households now even work more time on the farm. This happens in spite of falling relative prices of farm output. Similarly, four households expand the use of land and other farm inputs. In fact, only the high and the low income household of the high migration group seem to draw out of farming while they increase migration. These households also reduce the land area they farm, thereby allowing others to expand their cultivated area.

Given identical exogenous changes in output prices and wages for all households, the differences in the adjustments of agricultural input use are related to the absolute and relative changes of (shadow) prices for land and labour following trade reform. In general, land and household labour in the village becomes cheaper, thereby making the use of these factors in farm production more attractive. Furthermore, for all but the high income high migration household, land becomes cheaper compared to labour (see Table 5). Hence, these households to a certain extent increase the ratio of land to labour used in agricultural production and thereby seek to substitute the former for the latter. In the tendency, households for which the decrease in the price for land is stronger relative to the decline in the shadow wage decrease the use of labour relative to the use of land to a larger extent than others. That is, these households substitute relatively more land for labour. At the same time, the actual change in land use depends on the households' labour allocation decisions and the amount of labour in agricultural production. Accordingly, the

households which use most labour for other activities, namely migration, decrease their land use and end up making land available on the village market.

Table 5: Household level impact of trade liberalisation on endogenous prices (% change).

	Low migration				**High migration**				**All**
	High	*Middle*	*Low*	*Total*	*High*	*Middle*	*Low*	*Total*	
Endogenous prices									
Family labour & leisure	-2.05	-1.97	-1.45	-1.82	-2.96	-2.04	-1.42	-2.14	-1.98
Land									-2.58

Regarding the changes in farm output contained in Table 4, changes in agricultural production reflect the adjustments in land use. The high and the low income household of the high migration group both reduce their levels of output by rather high magnitudes. The households which use more land after reform, in contrast, expand their agricultural production levels. Changes in marketed surplus of agricultural products reported in the same table in most cases are more pronounced than output changes. Households with increased outputs raise their marketed surplus by even higher margins and changes in percentage terms are around twice as high as in case of agricultural output. These differences not only stem from the per se lower absolute quantities of sales as compared to output, but also from a decrease in consumption of own-produced food due to lower income levels.

Table 6 summarizes the impact of trade liberalisation on income, expenditure and welfare. According to the results, households experience losses in net income by between 1.14% and 1.77%. High migration households have higher losses on average and those with low income tend to be affected more negatively by the reform in terms of relative income losses. The determinants of the pattern which arises are the changes in relative income from the different sources as well as the earnings composition in the initial situation.

In case of remittances income, the households of the low migration group all have to accept losses, ranging between -1.34% and -1.40%. In this group, the households with higher income levels tend to lose more. In the high migration group, remittances received by the high and middle income households also decline by -1.11% and -1.21%, respectively. The low income household, in contrast, after reform receives 1.63% more in remittances. The changes in remittances reflect lower migration wages as well as adjustments in labour allocation made by the households.

Due to the deterioration in wages and a small supply response, income from formal local off-farm work decreases by around -1.04% for all three households which work in this activity. In case of informal local off-farm work, all households also have lower earnings after reform. The rate of decrease is between -1.79% and -1.92%. Differences between households are small, but low income households tend to have higher losses, again related to stronger supply responses. Not least as a consequence of the relatively strongest decline in the activity price, agricultural income is hurt most for all households. Returns from farming decrease by between -1.99% and -3.27%, thus disproportionally more than income from other activities. On average, the high migration households incur higher relative losses than their low migration peers.

The reforms' welfare impacts are measured by the EV expressed as percentage share of per capita consumption expenditure in the baseline. According to the high reduction

Table 6: Household level impact of trade liberalisation on income and welfare (% change).

	Low migration				High migration				All
	High	*Middle*	*Low*	*Total*	*High*	*Middle*	*Low*	*Total*	
Income									
Net income	-1.14	-1.39	-1.54	-1.29	-1.41	-1.44	-1.77	-1.42	-1.38
Remittances	-1.40	-1.39	-1.34	-1.39	-1.11	-1.21	1.63	-1.08	-1.26
Formal off-farm	-1.04			-1.04	-1.04		-1.04	-1.04	-1.04
Informal off-farm	-1.87	-1.87	-1.92	-1.89	-1.79	-1.90	-1.91	-1.84	-1.86
Agriculture	-2.51	-2.43	-1.99	-2.31	-3.27	-2.43	-2.82	-2.82	-2.58
Household welfare									
EV[a]	-0.48	-0.63	-0.82	-0.60	-0.55	-0.82	-1.22	-0.76	-0.67
CPI[b]					-0.86				

a % of per capita consumption expenditure in baseline.

b Average value for all households.

in net income relative to the CPI, the welfare outcome of the reform is negative for all households. The EV ranges between -0.48% and -1.22% of consumption expenditure. Regarding the relative impact by household groups, a clear pattern arises. High migration households are more negatively affected when using this measure and low migration households less. Within the migration groups, low income household are hurt more than high income households. This picture resembles the observation of rising village inequality made above. It should be noted, however, that the EV is calculated based on the LES and that the utility component of labour market participation is not be taken into account. Hence, the figures given do not reflect total utility changes.

5 Conclusions

Making a short assessment of simulations just presented, the results by and large correspond to prior expectations. Net incomes as well as overall welfare are negatively affected by trade reform and impacts appear to be more severe for low income households. The patterns of the households' migration responses appear to make sense. Low migration households return from migration whereas high migration households tend to work more outside the province. In this context, the result that people work less in local off-farm activities as compared to migration is in line with the fact that local wages decline relatively more than migrant wages. It is, however, somewhat surprising that some households get more involved into farming, whereas agricultural prices are affected most negatively by the policy changes. This outcome is strongly driven by the adjustments in the prices for household labour and land which take place in the context of the households' adjustment to the price shock. In parts, these results are unexpected but cannot be discarded as unrealistic.

In general, simulation results are in line with those obtained from the aggregate CGE analysis by Zhai and Hertel (2010). Poverty as well as inequality increases, although poverty effects are weaker in the village equilibrium model. At a more detailed level, returns to agricultural labour as well as land decline. In accordance with Zhai and Hertel (2010), the village model predicts an increase in migration from the village. The rise

in migration by around 0.3% from the village model compares to 0.1% for unskilled labour and 1.3% for semi-skilled labour in the CGE model. The village model, however, shows that this migration response may not be uniform among households, but some might return home while others migrate more. This difference, in turn, could be attributed to differences in household demographics.

With respect to most of the more aggregate variables such as net household income, welfare, village trade or inequality and poverty, the attempt to incorporate different assumptions on households' migration behaviour has brought about only small differences. Regarding the labour allocation of the households, in particular with respect to migration and agricultural production, as well as the associated village level variables, differences, however, have become more significant. This suggests that differences in labour migration which stem from differences in household demographics may well play a role for the outcome of a particular reform. This is all the more true for other possible reform scenarios which would entail larger changes in relative prices. Also, if the primary focus of the modelling effort would be different, say, for example, on the impacts of a reform on agricultural output, the current set-up of the model can help to shed light on important aspects of the interplay between migration, land markets and agricultural production.

Moreover, the specification of the model in general allows a highly flexible calibration of the households' labour market behaviour as it offers the possibility to freely choose the magnitude of own-price and own-wage labour supply responses to the different activities. This is particularly valuable in cases where the modelling exercise can be complemented by detailed studies of the labour supply behaviour of the households to be modelled. But even without such complementary information, the model represents a valuable tool to contemplate the responses of rural household to different policy reforms and the resulting community level impacts along the lines of household demographics and relative income levels. Thereby, it constitutes an excellent source of hypotheses on the migration behaviour of rural households under changing economic environments. And finally, the approach to include household group specific non-monetary disutilities resulting from certain occupations in labour allocation functions in a CGE opens an interesting field for applications, which may also extend to levels of higher regional aggregation.

The model, however, in its current state still is an experimental one. The households' labour demand functions have been calibrated based on a simplifying assumption of equal own-wage/price but different cross-wage/price responses. It might be of great interest, for example, to calibrate the model according to results of econometric analyses of labour supply in order to achieve results with a better empirical foundation. Furthermore, in particular the assumption of a perfect neoclassical intra-village land rental market is a strong deviation from the Chinese reality with its particular institutional set-up and the village model should be improved in this part.

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