Intersectoral Factor Movements:
Do Adjustment Costs Matter for Welfare?

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Abstract

There is a wide empirical literature on the existence of high and persistent costs of intersectoral labour reallocation, an issue which is only little considered in equilibrium modelling. Neglecting these reallocation costs overestimates the size of labour movements and therefore the possibility of adjustment for an economy as well as the welfare benefits of policy reforms. This study aims to incorporate intersectoral labour reallocation costs based on a migration function approach and the assumption of factor specific productivity what makes it possible to track movement of physical labour units. In the light of the Palestinian-Israeli conflict the question is asked, how the existence of reallocation costs for movement between sectors is influencing welfare effects accruing from a calming down of tensions resulting in a more liberalised Israeli labour policy against Palestinians and thus increasing employment of Palestinians in Israel.

1 Introduction

CGE models usually assume extremes of labour mobility: workers either move between industries without cost or they do not move at all[3]. There is an extensive literature about real world costs of labour reallocation between industries which tells a more differentiated story. If costs of reallocation exist they should inhibit labour movement, hence neglecting reallocation costs should result in an overestimation of the size of labour movements. Several empirical studies show that workers who change sectors can experience large and persistent losses in wages. Responsible for these losses are primarily two effects: lower incomes during unemployment and lower wages upon reemployment. The latter is caused by problems associated with transferring skills and time costs required for skill acquisition and learning processes in the new sector of employment. Thus, the main source of costs is not the loss of a job, for a normal worker will find a new job relatively fast and thus losses in income and production are minor. But a large problem is reemployment at lower wage rates because of a failure in the transfer of skills into the new sector, which is a persistent problem for several years.

The Israeli and Palestinian labour markets used to be strongly integrated. Up to 23% of Palestinian workers crossed the border to work in Israel mainly in unskilled jobs in agriculture and construction. Since the outbreak of the Second Intifada in 2000 this situation completely changed: the border was closed, leaving Palestine in severe unemployment. Israel substituted the Palestinian workers with foreign workers coming from the rest of the world. A study conducted by Flaig et al. (2011) found positive welfare effects for both economies, Israel and Palestine, when lifting the movement restrictions and increasing Palestinian employment in Israel. With the background of the empirical evidence for the existence of labour movement costs the question arises, to what extend the Israeli unskilled workers can move out of the construction and agricultural sector and if they are really able to benefit from the new situation.

Therefore this study aims to incorporate the skill losses of intersectoral labour reallocation into the computable general equilibrium (CGE) model STAGE. The data employed are provided by a Social Accounting Matrix (SAM) for Israel in 2004 (Siddig *et al*., 2011). Additionally to the skill level, labour groups are distinguished by sector of employment. Movement of labour between sectors is then based on a migration function which allows workers to move between the sector-specific labour groups based on relative wage changes. In order to account for the reallocation costs found in empirical studies , labour productivity, which is sector specific in the standard version of the model, is modelled factor specific. Workers which are reallocated between sectors experience a loss in wages, modelled by a loss in the factor specific productivity.

[3] While imperfect mobility of land between agricultural sectors is standard feature in CGE models like GTAP, MIRAGE, LINKEAGE or GLOBE (Shutes et al. (2012); labour markets are rarely studied with imperfect mobility, examples are Ivanchovichina and Martin (2004) as well as Zhai and Wang (2002) on rural-urban migration in China, Chan et al. (2005) and Valenzuela et al. (2008) who account for imperfect mobility between agricultural and non-agricultural sectors.

The next section reviews the empirical and modelling literature on the costs of intersectoral labour migration, while section 3 describes the CGE model, its extension and the Israeli SAM, and additional data. Section 4 defines the scenarios analysed and presents and discusses results. The conclusions are discussed in the final section.

2 Literature review: adjustment costs of intersectoral labour migration and simulation modelling

Several empirical studies show that workers who change sectors can experience large and persistent losses in wages. Jacobson et al. (1993) empirically explore wage losses of displaced workers, applying 1980s data from Pennsylvania with a focus on high tenure workers. Findings suggest that wage losses of workers who change the sector, e.g. leave the manufacturing sector, account for 38% of their pre-displacement earnings. Workers who find new employment inside the manufacturing sector experience losses of 18-20%. This also holds if workers find new jobs inside the same four-digit industry. In a more recent study for the US with data between 1990-2005, Figura and Wascher (2010) determine an average wage loss for displaced workers of 15.5%, where workers who switch industries experience an even larger loss of 20.8%, while others who remain in their former industries experience a wage loss of 5%. The results of Figura and Wascher are supported by Fallick (1996), who finds 16-20% higher earning losses upon reemployment in other sectors compared to reemployment in the old sector. The considerable higher numbers found by Jacobson et al. may be caused by the focus on high skilled workers in this study. High skilled workers are most likely to own firm-specific and accumulated human capital and are therefore stronger affected when changing firm. Despite some differences in assessing the level of the wage losses, all studies find considerable differences for wage losses between reemployment in the old industry and reemployment in a new industry. These earning losses are persistent. According to Jacobson et al. (1993) earnings drop sharply when leaving the job and rise rapidly again in the next 1.5 years. After 1.5 years the increase becomes very slow and after 5 years losses still amount to 25% of pre-displacement earnings (see also Fallick, 1996, and Figura and Wascher, 2010). Furthermore the wage losses are depending only little on age and sex and are not only related to few sectors. Local labour market conditions are crucial: losses are larger, when workers are displaced in regions with depressed rates of employment growth. The difference between strong and weak labour markets account for one third of the average loss (Jacobson, 2001). Cyclical conditions have substantial and long lasting effects, too, but even workers displaced in a strong labour market are found to experience a large wage loss.

Gramm (2005) estimates the level of factor specificity of labour and capital in different sectors and for different time periods, using data for 15 industries and 16 countries covering 8 years. The study finds a significant level of factor specificity and Gramm concludes that therefore factors are not perfectly mobile, where capital is found more specific than labour.

Two categories for reason for job change need to be differentiated: first, a worker chooses to reallocate among a given number of jobs; and second, the distribution of jobs alters, resulting in the need to reallocate. In the first situation the worker will only change his job if he will be able to or at least expects to maintain his level of income. The situation considered in this study therefore applies to the second situation, where labour reallocation is induced by the

demand side due to adjustments to macroeconomic changes, e.g. in international trade, technology or politics (Gonzales Uribe, 2006, and Fallick, 1996).

As indicated, the main reason for wage losses is firm- or sector-specific human capital. Fallick (1996) and Jacobson et al. (1993) mention in addition to the loss of sector or firm-specific human capital wage losses after reemployment originating from especially suited skills because of particular good matches from intensive search. Other reasons are the loss of wage premiums and the loss of seniority, more specifically lower long term earnings regarding the career when starting with a lower wage in expectation of a higher wage in the future. In an empirical study on interindustry mobility of Jewish immigrants in Israel, Darvish (1990) identifies four variables, which are relevant for imperfect labour mobility between industries. First labour market experience goes together with greater industry specific skills; age is therefore correlated with lower inter-industry mobility. Second, according to the human capital theory of Becker (1962), the higher the worker's level of education the higher are industry specific skills and the higher is the worker's value for the employer and the cost of inter-industry mobility. Thirdly the mobility depends on the status at work: (former) self-employed are more reluctant to change industries than employees because of higher skills, assuming that people deciding for self-employment are particular competent. Fourthly, in addition to sector specific skills, labour mobility depends on the settlement region: settlement in economic active areas is negatively correlated with the inter-industry mobility rate. This is on the one hand because of the higher number of economic opportunities, and on the other hand because of the higher availability of information and therefore more intensive search, which increases the probability of finding a job in the old industry.

A study of Garcia-Cebro and Varela-Santamaria (2011) on imperfect intersectoral labour mobility and monetary shocks in a small open economy includes the costs of labour reallocation in a modelling framework. The study uses a new open economy macroeconomics (NOEM) model with two sectors: one tradable and one non-tradable which is monopolistic competitive. Furthermore the model distinguishes 4 types of agents: households, firms, the central bank and the government. Simulating a monetary expansion in a small open economy, Garcia-Cebro and Varela-Santamaria find less expansionary effects on (traded) output (short term) and less contractionary effects in the long term as well as less welfare in the long run, when assuming imperfect labour mobility. Imperfect mobility is modelled taking into account the cost of reallocation and leisure in the household utility function, assuming the worker chooses to change his job. This is a different situation than a demand side driven labour reallocation originating from macroeconomic shocks, which mainly are responsible for labour reallocation costs as the empirical studies suggest and what shall be studied in this study.

The results of the previously mentioned studies are supported by Tapp (2011), who estimates the costs of sectoral labour adjustment with an equilibrium search and matching model. The study on Canada's sectoral labour adjustment in 2002-2006, a period of increasing commodity prices and exchange rate appreciation which lead to significant movement of labour out of the manufacturing into the resource sector, finds adjustments costs up to 3% of output during the first three years. Non-transferability of skills was the predominant contributor to these aggregate costs, which generally remained up to five years. The existence of labour reallocation costs is crucial when estimating the adjustment of economies to

globalization and trade liberalization. Davidson and Matusz (2000) ask why public and economic opinions are so strongly divided on the issue if there are welfare gains from trade liberalisation. The authors reason that this difference is due to the view on the labour market: while economists assume a fully-employed, perfectly mobile labour market, the reality of unemployment is most apparent to the public. The truth seems to be somewhere in between: Davidson and Matusz (2000) find that the economies which have the least to gain are those with sluggish labour markets, while economies with either very flexible or very sluggish labour markets show clear net benefits from trade liberalisation. In a very flexible economy adjustment to a trade liberalisation occurs swiftly, while adjustment costs are high in an economy with very sluggish labour markets but this economy has also the highest benefits from liberalisation as the distorting effects from tariffs are large. An economy with moderate sluggish labour markets has the least to gain because adjustment occurs not fast and distortionary effects from tariffs are not that large.

Despite the empirical evidence for its existence, labour reallocation costs are usually not accounted for in CGE-models. Typically workers are assumed to move either freely, without costs, between sectors or not at all. Chan et al. (2005) consider adjustment costs in labour markets in a standard, static CGE-study for Vietnam. They differentiate four different possibilities of adjustment cost treating: firstly labour moves fully mobile across all sectors; secondly two blocks are differentiated, agriculture and manufacturing, where there is no mobility between these blocks but workers are mobile inside a block; thirdly the same as before but there are transaction costs in moving involved; and lastly mobility between the blocks is possible with transaction costs. Imperfect labour movement is implemented with a constant elasticity of transformation (CET) function, and transaction costs are implemented as 10% relocation cost on the value of labour movement, assuming a reduction in factor endowment. The general reduction of factor endowment is caused by the CET approach, which relocates productivity adjusted units and it is thus not possible to track physical units. To overcome this problem this study choses the migration approach to be able to differentiate between quantities and wages and define relocation costs as reductions in wages. Furthermore we are able to isolate transaction costs effects from productivity effects from migration of workers between sectors with different productivities. Findings of Chan et al. suggest that the amount of labour movement between sectors is typically overestimated and that distributional impacts are mostly intensified by transaction costs.

3 Modelling

3.1 Model and database

The model used in this study is an augmented version of the single country Computable General Equilibrium (CGE) model STAGE, developed by McDonald (2009)[4]. STAGE is a Social Accounting Matrix (SAM) based model which has a mix of non-linear and linear relationships which govern the behaviour of the model's agents. Utility maximisation of households is based on preferences which are represented by Stone-Geary utility functions.

[4] Refer to McDonald (2009) for a detailed description of the model.

They consume composite aggregates of domestic and imported commodities that exhibit constant elasticity of substitution (CES), following Armington (1969), where the relative price determines the optimal mix of domestic and imported good consumption. Israel is a classic example of a small country in the world market; therefore world market prices for imports and exports are fixed in the model.

Domestic production is modelled as a two stage production process with either constant elasticity of substitution (CES) or Leontief technologies applied. At the first stage, intermediate input and value added generate the output of each activity based on CES technology. At the second stage the use of intermediate inputs is in fixed proportions using Leontief technology, while the CES technology is used to form value added by primary production factors where the optimal ratio of factors is determined by relative prices.

Commodity demand consists of domestic demand and export demand. The distribution of domestically produced commodities among domestic demand and exports is governed by relative prices on these markets, using constant elasticity of transformation (CET) functions, which reflects imperfect product transformation. The model is solved in General Algebraic Modelling System (GAMS) and adapted to use an Israeli SAM of the year 2004 (Siddig et al. 2011).

The Israeli 2004 SAM used in this study has several distinctive features. First, the SAM differentiates between 43 activities and commodities, i.e., multi product activities can and do exist. Second, there are detailed data on trade and transportation margins. Third, there are 10 (representative) household groups and 36 different labour categories differentiated by profession and ethnicity. For Israeli workers there are eight skill categories, seven profession/occupation categories and one unskilled category, which are further categorized by ethnicity (Jewish and Arab & others) and gender. There are four non-Israeli labour categories; legal and illegal Palestinian cross-border and foreign workers.

The sources of the data used to compile the SAM include the Israeli Central Bureau of Statistics (ICBS), the Central Bank of Israel (BOI), and the Israeli Tax Authority (ITA). In addition, non-Israeli sources were used to fill-in gaps in domestic reports: the World Trade Organization (WTO), the Organisation for Economic Co-operation and Development (OECD), and the World Bank.

Two additional data sets are used by the model: a matrix of quantities of labour inputs, hence differences in wage rates in the model are ‘real’, and a series of elasticities of substitution/transformation for imports and exports, the production nests and the Stone-Geary (LES) demand system.

Domestic production is depicted by a five-level production process. Each level involves CES or Leontief aggregations of primary or aggregated inputs to produce aggregates. In the first level of the production nesting, aggregate intermediate input and aggregate value added are combined to form domestic output in fixed shares. Aggregate intermediate input is a Leontief aggregation of intermediate inputs, while aggregate value added, depicted in Figure 1, is a combination of primary inputs using CES technologies. The CES technology allows for the

assumption of imperfect substitution in factor demand between specific factor types, with the substitution elasticity σ[5] determining the substitution possibilities among them.

Labour groups have been adjusted for the purpose of this study (Table 1). Skill categories are divided into five different sector blocks: agricultural, food producing, industrial, construction and service sectors. Finally each skill category owns a labour group for each sector block.

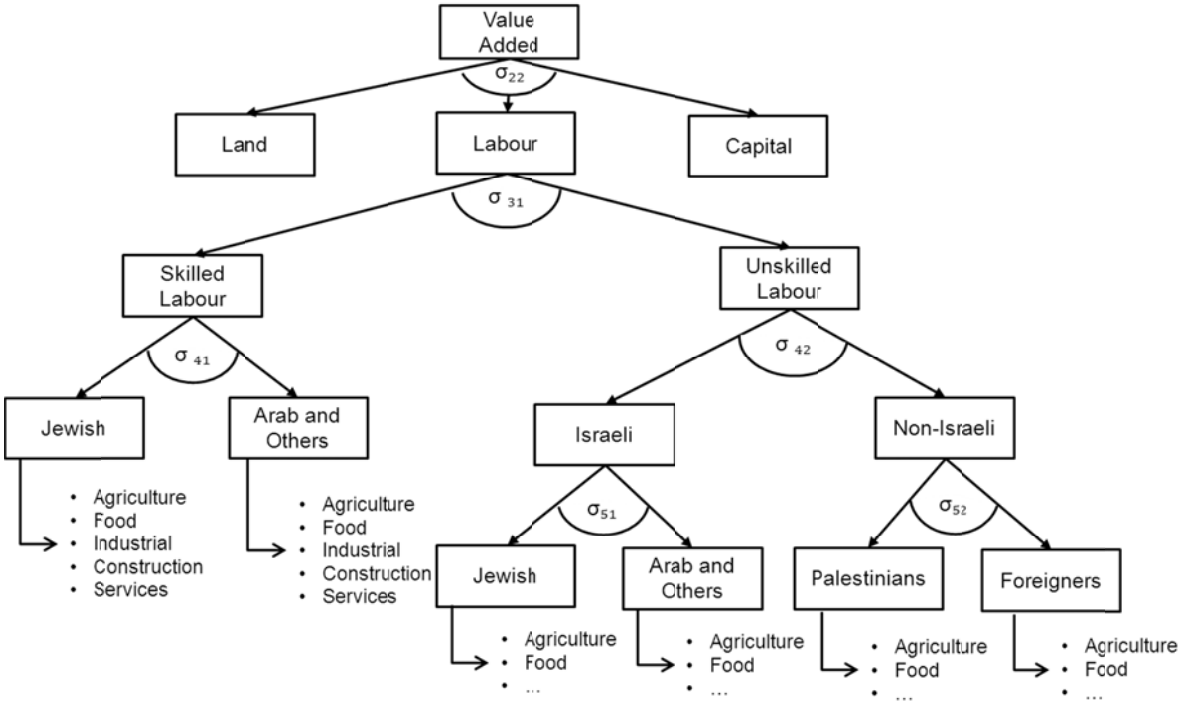


Figure 1: Value added nesting

Table 1: Labour groups

Labour type	**Wages in sector blocks** (NIS/month)				
	Agriculture	Food	Industrial	Construction	Services
Palestinians	1,560	2,943	2,943	2,426	3,311
Foreigners from ROW	3,214	5,906	5,906	3,977	5,575
Jewish Israeli unskilled	4,045	5,142	7,984	5,164	6,085
Arab Israeli unskilled	3,948	5,263	7,036	5,438	5,987
Skilled Jewish	6,188	11,755	18,221	10,116	14,194
Skilled Arab	5,766	9,515	12,594	8,627	13,261

[5] σ is set as follows: derived from literature (Hertel, 1997) σ_{22}=0.8, σ_{31}=1.5; a high value is chosen for the elasticities σ_{41}= σ_{42} = σ_{51} = 3, very strong substitutability is assumed between foreigners from ROW and Palestinian workers σ_{52}= 4.5

3.2 Migration function

There are several possibilities to model imperfect inter-sectoral labour reallocation. One common approach is to use a CET function where labour mobility across sectors depends on the wage ratio. With this approach it is not possible to track the physical units which are moved. Therefore this study develops a migration function based on McDonald and Thierfelder (2009) which allows for bilateral movement between segmented blocks specific labour types (*f*). The segmented blocks are defined by different sector blocks, e.g. 'Agricultural sectors' (Table 1) and migration is possible between the sector blocks and within a specific labour type, e.g. 'Skilled Arab'.

Migration depends on the change in the relative wage, the wage a worker could earn in his old sector compared to the wage he could earn in another sector he could migrate to. Thus the amount of workers who migrate, $FSM_{f,fp}$, from one sector block to another is determined by the change in the relative wage and the labour supply in the base situation, $FS0_f$. The responsiveness of migration to wage changes can be varied with the migration elasticity $etamig_f$. If the elasticity is high there is full mobility between the sector blocks, if it is zero there is no migration.

$$FSM_{f,fp} = FS0_f * \left[\frac{relative\ wage}{relative\ wage\ in\ the\ base}\right]^{etamig_f} - FS0_f$$

If f is not same as fp.

The number of workers who are migrating and the workers who remain in their old sector of work must equal the base labour supply in this labour type.

$$FS0_f = \sum_{fp} FSM_{f,fp}$$

where fp contains all sector blocks a specific labour type is employed in.

The labour supply of all workers which cannot migrate is fixed in the closures. If migration is allowed, labour supply is the sum of all workers of a labour type which migrate to a sector block.

$$FS_f = \sum_{fp} FSM_{fp,f}$$

3.3 Factor specific productivity

The wage a worker of a specific skill group can earn in different sector blocks varies strongly (see Table 1). When assuming that wages reflect the marginal product, the wage differences reflect differences in factor productivity. This productivity varies between skill groups as well as inside a skill group.

In a first step wages are defined per productivity unit and are thus equal to 1. Real factors $FD_{f,a}$ are transformed into productivity units with $ADFDF_{f,a}$, the sector specific efficiency factor for factors.

The output of a sector depends on the quantities of inputs used. If one worker is double as productive as a second worker, the output he produces is double as much; the CES production function embodies the productivity unit:

$$QVA_a = ADVA_a * \left[\sum_f \delta_{f,a} * (ADFDF_{f,a} * FD_{f,a})^{-\rho_a}\right]^{\frac{-1}{\rho_a}}$$

Where: QVA_a *= quantity of Value Added ,* $ADVA_a$ *= adjustment parameter;* $\boldsymbol{\delta_{f,a}}$ *= share parameter,* ρ_a *= elasticity*

And the first order condition for profit maximisation becomes:

$$WFA_{f,a} * (1 + TF_{f,a}) = PVA_a * QVA_a * \left[\sum_f \delta_{f,a} * (ADFDF_{f,a} * FD_{f,a})^{-\rho_a}\right]^{-1} * \delta_{f,a} * (ADFDF_{f,a} * FD_{f,a})^{-\rho_a - 1}$$

Where: PVA_a *= price of Value Added ,* $WFA_{f,a}$ *= wage rate and* $TF_{f,a}$ *= factor tax*

When allowing for free movement and migration between sectors, workers are assumed to gain the new sector's productivity. This assumption may not be correct, for empirical studies show large and long-term reallocation costs for workers, which are mainly caused by losses in sector specific skills. To allow workers to maintain their old productivity level, or a share dependent on it, productivity, which typically is sector specific, is made factor specific.

Productivity is factor specific, when a worker who migrates to a new sector maintains the productivity of his old sector. The average productivity of his new sector adjusts accordingly. The total amount of productivity units a sector uses is determined by the amount of productivity units migrating into it, where the migrating productivity unit is the actual worker times his old efficiency factor:

$$ADF_{f1} * FS_{f1} = ADF0_{f1} * FSM_{f1,f1} + ADF0_{f2} * FSM_{f2,f1} + ADF0_{f3} * FSM_{f3,f1}$$

The sector specific efficiency factor for factors, $ADFDF_{f,a}$, is determined by its base value $ADFDF0_{f,a}$ and the adjustment variable $ADFDFADJ_f$:

$$ADFDF_{f,a} = ADFDF0_{f,a} * ADFDFADJ_f,$$

with

$$ADFDFADJ_f = \frac{\sum_{fp} ADF0_{fp} * FSM_{fp,f} * adfadj_{fp}}{ADF0_f * FS_f},$$

where $adfadj_{fp}$ represents an additional adjustment parameter which allows for variation in the skill transfer. If the adjustment parameter, $adfadj_{fp}$, is set to a value less than 1, the worker cannot maintain his former level of income. When it equals 1 the worker maintains his old productivity; if it is greater than 1, productivity increases.

With this setting, there are three possibilities for productivity or skill transfer of inter-industry labour reallocation:

- First, the reallocated worker is employed with the new sector's productivity, thus ADFDFADJ and adfadj are fixed at 1.
- Second, workers maintain their former sector's productivity, in this case ADFDFADJ is unfixed and adfadj fixed at 1
- Third, the worker is employed with a variation of his former productivity, ADFDFADJ is unfixed and adfadj set to a chosen level.

4 Simulations and results

4.1 Simulations

Two scenarios are run to estimate effects of a reduction of movement restrictions for Palestinian workers in Israel:

a. The base scenario replicates the Israeli SAM for 2004 and thus reflects a restrictive Israeli border measure against Palestinians, therefore only few Palestinians are employed in Israel.

b. The policy scenario simulates a liberalised Israeli labour market policy against Palestinians. Therefore the share of Palestinian workers from the West Bank who work in Israel, is increased from 7% to the pre-Intifada level of 26%. Wages in Israel are 70% higher than what Palestinians could receive in Palestine (PCBS, 2011). In combination with high unemployment over 18% (PCBS, 2011) Palestinian labour supply is assumed elastic, and it is assumed that Palestinians are willing to work in Israel even when wages decrease.

The main interest of this study is to investigate to what extend Israeli unskilled workers are able to adjust to the increased labour supply. For this purpose the policy scenario (b) is run with several variations in the migration setup. Starting with one extreme in the first migration setup, labour reallocation without costs, costs are higher in the second setup and the third migration setup reflects the other extreme when no labour reallocation between sector blocks is possible. Labour reallocation has two different effects: on the one hand the moving worker typically adopts the new sector's productivity, which influences the factor endowment of the economy and thus effects the results. On the other hand there are transaction costs of labour reallocation. In order to disentangle productivity effects from the transaction costs, workers are assumed to maintain their former level of productivity. Thus the average productivity of each labour type will change:

1. No costs: High migration elasticity allows for immediate labour reallocation after changes in relative wages in the first setup.
2. 20% costs: The second setup reflects the situation when reallocated workers experience a 20% cut in wages. Productivity is fully factor specific and reallocated workers' wages decline 20% compared to their former earnings.
3. High costs: Finally the fourth migration setup represents a situation where reallocation costs are high enough to fully prevent labour reallocation. Hence labour migration is completely inelastic.

The macroeconomic closures applied are investment driven savings and the foreign account being cleared by the exchange rate. Furthermore the government balances its account by a variable income and the CPI serves as numeraire. Factors are full employed with a fixed factor supply for each factor type and adjust by variation of the sector specific wage rate.

4.2 Results and analysis

The liberalisation of the Israeli labour market against Palestinians increases domestic production and enhances economic growth. When considering distributional effects, household incomes decrease, but decreasing living costs mitigate this effect and all households benefit while the income gap widens.

GDP increases in all mobility setups but to a smaller extend the higher the transaction costs are (Figure 2). The same is observable when considering distributional effects, higher transaction costs decrease positive effects on household income or increase negative effects (Figure 3). Not so clear are the effects when examining household welfare measured by the equivalent variation (EV). While the EV is lower in the situation with 20% transaction costs for all households compared to the situation without costs, the effects from the situation with high costs are ambiguous.

The introduction of *20% reallocation costs* implies a loss to the economy for each worker who migrates, which negatively affects all agents in the economy compared to the situation without costs. In addition, and what is more evident with *high costs* which prevent migration, households which own labour which should react to the shock but cannot migrate, are affected most negatively. In this study this implies that increasing inter-sectoral reallocation costs widens the gap between poor – who own a larger share of unskilled labour which is strongest negatively affected – and rich.

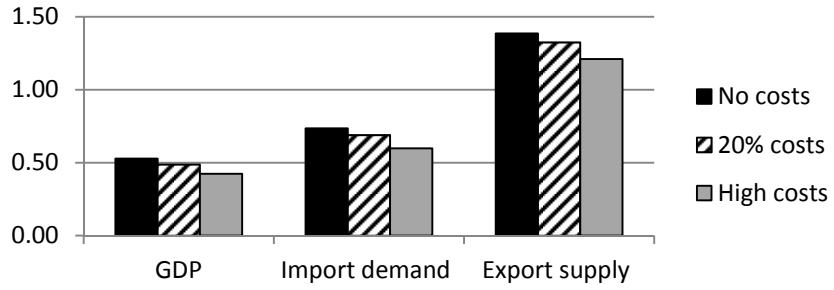


Figure 2: Macroeconomic effects

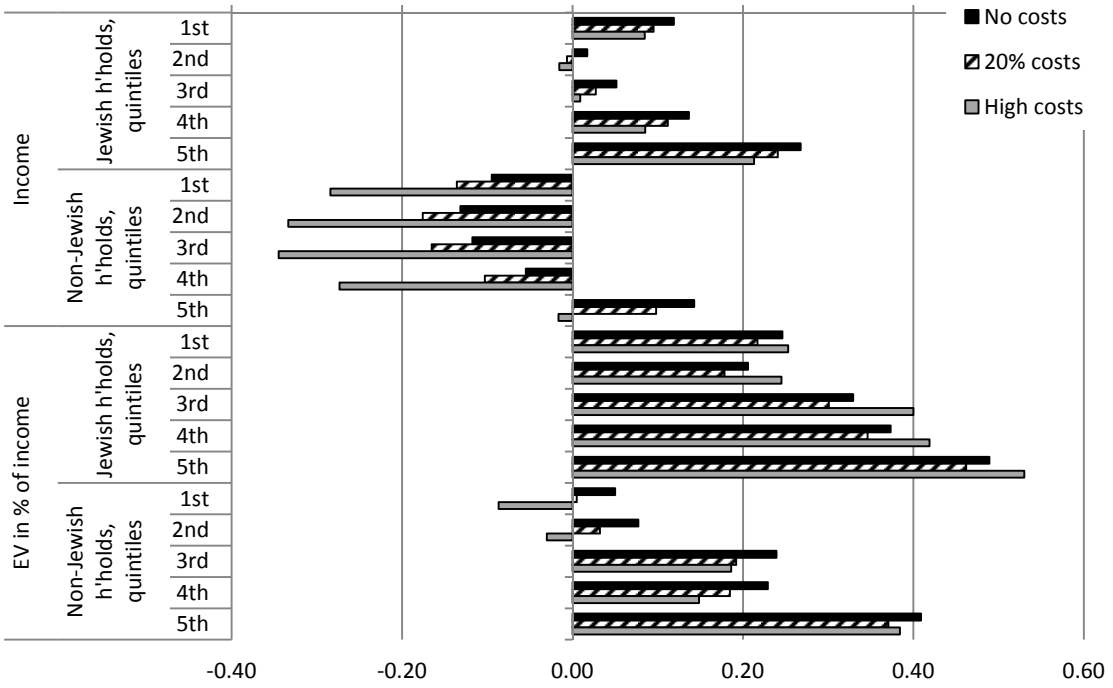
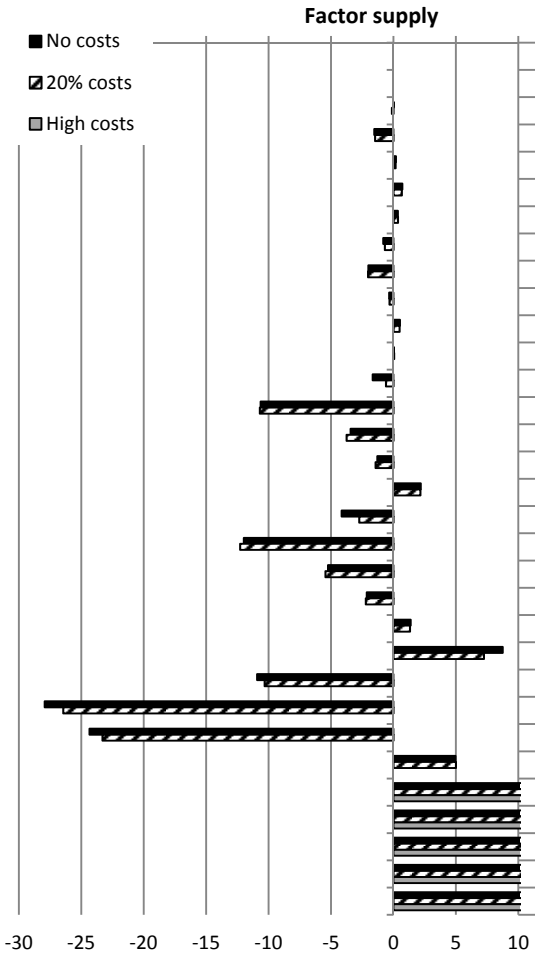


Figure 3 Distributional effects on household groups, income and EV in % of income

The EV shows welfare effects on households by connecting income and expenditure. The most important income source for households is factor income. Increased employment of Palestinian workers by 370%, which are mainly employed in unskilled jobs in Israel, increases unskilled labour supply. Wages of unskilled labour types decrease while average wages of skilled labour, capital and land increase (Figure 4). Foreign workers and Palestinian workers represent a large share of employees in agriculture and construction, Israeli skilled and unskilled labour types move out of these sector blocks and into services and skilled labour types also into manufacturing. Foreigners from ROW, which are direct substitutes to Palestinian workers, show a different movement. Because the increase of Palestinians in construction is strongest, with 9% of all employees being Palestinian in the base scenario, the movement of foreigners from ROW out of construction over weights movement from agriculture to other sectors. There are more foreigners moving from construction into agriculture than out of agriculture, causing a net inflow of foreigners into agriculture. The strong outflow from foreigners in food and industrial sectors, about 25%, has to be related to a very small base and is caused by a relative high number of of Palestinians in the base scenario compared to ROW-foreigners. *20% transaction costs* of labour reallocation decreases overall migration and decreases wages for most labour types. Interestingly the effects are not clear and relatively small. Here it is important to keep in mind, that only pairwise relative wage changes are relevant for bilateral migration flows. In the third setup with *high costs*, there is no migration and wages are affected stronger in both directions: wages increase where workers would move in and decrease where they cannot move out anymore.

Effects of the liberalisation of the labour market on household income are more positive or less negative the richer the household group is. An explanation is that poor household groups own a higher share of unskilled labour where wages decrease. Exemptions are the poorest quintiles whose income consists mainly of transfers which slightly increase. All non-Jewish

households show clearly less positive or more negative income effects compared to the Jewish household groups. The reason for this is that non-Jewish households supply a higher share of their labour to agriculture and construction, where wages decline strongest. This is valid for skilled as well as unskilled workers.



		Wage changes	No costs	20% costs	High costs
capital		Capital	0.68	0.63	0.63
Land		Land	2.13	1.78	1.40
Agriculture	Skilled Israeli, Non-Jewish	Agriculture	-0.06	-0.11	-0.44
Construction		Construction	-0.09	-0.14	-2.38
Food		Food	-0.05	-0.10	0.02
Industry		Industry	0.00	-0.06	0.33
Services		Services	0.02	-0.03	0.20
Agriculture	Skilled Israeli, Jewish	Agriculture	0.11	0.09	-0.39
Construction		Construction	0.08	0.05	-2.38
Food		Food	0.13	0.10	0.02
Industry		Industry	0.20	0.18	0.49
Services		Services	0.20	0.17	0.21
Agriculture	Unskilled Israeli, Non-Jewish	Agriculture	-4.38	-4.45	-3.65
Construction		Construction	-4.63	-4.74	-11.56
Food		Food	-4.46	-4.57	-6.98
Industry		Industry	-4.30	-4.41	-5.38
Services		Services	-3.73	-3.85	-2.32
Agriculture	Unskilled Israeli, Jewish	Agriculture	-3.89	-3.84	-3.57
Construction		Construction	-4.15	-4.17	-11.56
Food		Food	-3.96	-3.97	-7.02
Industry		Industry	-3.72	-3.74	-5.07
Services		Services	-3.17	-3.20	-2.11
Agriculture	Foreign workers from ROW	Agriculture	-7.83	-8.24	-5.10
Construction		Construction	-8.51	-8.84	-14.87
Food		Food	-9.28	-9.57	-17.21
Industry		Industry	-9.15	-9.46	-15.84
Services		Services	-7.54	-7.89	-4.63
Agriculture	Palestinian	Agriculture	-31.20	-30.40	-29.04
Construction		Construction	-33.37	-33.48	-36.35
Food		Food	-36.93	-36.84	-38.09
Industry		Industry	-36.16	-36.16	-37.07
Services		Services	-29.69	-29.57	-29.02

Figure 4 Factor supply changes (migration) and wage change in %

Table 2 changes in total labour supply per sector block, in %

	including Palestinians			excluding Palestinians		
	No costs	20% costs	High costs	No costs	20% costs	High costs
Agriculture	11.60	11.37	10.03	1.63	1.39	0.00
Construction	20.44	20.60	24.94	-4.95	-4.77	0.00
Food	4.15	4.15	4.82	-0.67	-0.68	0.00
Industry	5.46	5.43	5.20	0.27	0.23	0.00
Services	2.75	2.75	2.32	0.44	0.44	0.00

Household expenditure is another element affecting household welfare. Decreasing wages have two contrary effects: on the one hand household income decreases and on the other hand production costs potentially decrease and consumption prices decrease, too, which finally results in falling cost of living. When exploring the effects from the simulations on domestic production and prices it is possible to distinguish five sector blocks – agriculture, food, manufacturing, construction and services. Agricultural sectors as well as construction can

realise strongly declining wages, reflected in the prices of value added which dominate the effects on producer and purchaser prices (Figure 5). While the price decreases become smaller with increasing transaction costs in the agricultural sector block there is a strong drop in the price of value added from -2% to -4% in construction. These price developments are determined by the average wage in a sector and thus the composition of its factor demand. Workers in construction are strongest affected by the inflow of Palestinian workers and thus the wages in construction are also most sensitive to labour mobility (Table 2). While the reduced mobility result in decreased outflows of workers out of construction, in agriculture this means reduced inflow of workers and thus price effects become smaller. Prices also decrease for food products although to a smaller extend. The price effects are small and negative for most of the manufacturing goods and slightly positive for services. Concerning the production quantity the sector blocks show similar effects, production increases in most of the sectors but with increasing transaction costs the effect is smaller. The strong price decline in agriculture and construction is reflected in a rather moderate increase in demand, caused by low elasticities of demand for these goods. The production increase in manufacturing is relatively strong relative to the small and even positive price developments. These sectors, which typically have a high share of production exported (up to 62% in Manufactures nec.), benefit from the increased competitiveness on the international markets, exports increase by 1.2-1.3% (Figure 2), caused by a depreciation of the currency of 0.03%. Increased employment of Palestinian workers in Israel implies increased outflow of remittances to Palestine, the Israeli currency depreciates to maintain a balanced current account. Increased demand for services products, mainly of rich households who experience an increase in real income due to higher factor income and decreasing product prices, increases production despite increasing prices in the services sector block.

Finally the ambiguous effects on different household groups in a situation with *high transaction costs* can be explained with differences in factor endowment of the household groups. Workers who would adjust to a shock and are hindered in migration due to the reallocation costs experience higher losses in wages. The decrease in purchaser prices is not strong enough to fully mitigate negative income effects in Arab and poor Israeli household groups.

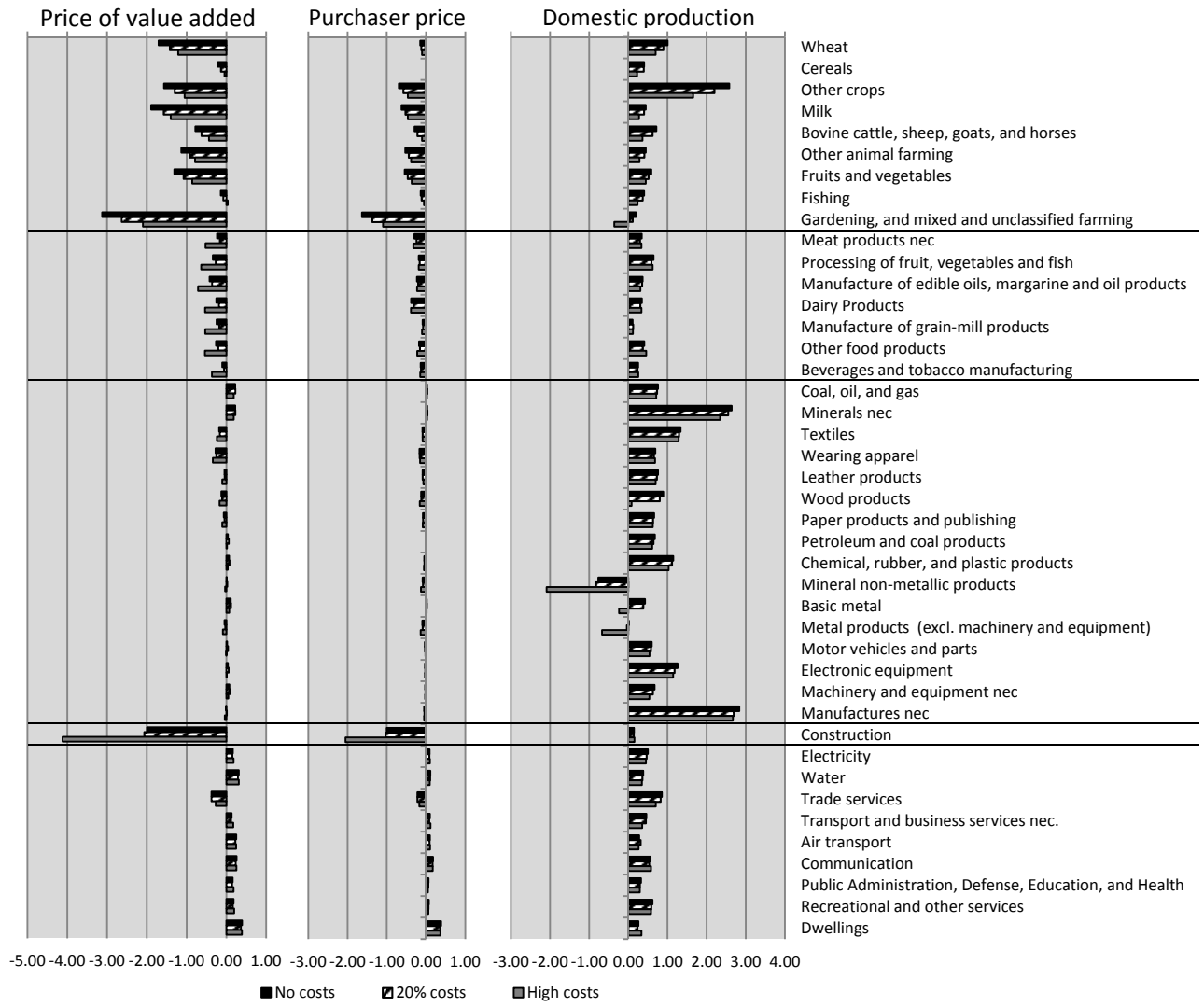


Figure 5 Production, PVA and purchaser and producer prices, % changes.

Sensitivity analysis

The model employs two sets of elasticities which might influence the results and are thus systematically analysed. These are first the substitution elasticities governing responsiveness in the labour nesting and second the migration elasticities.

A systematic analysis of each of the substitution elasticities (σ, Figure 1) shows that a variation in the substitution elasticities has only small effects on production, the macro economy and households. Figure 6 displays simulation effects on household income with different substitution elasticities in different nests of production.A lower substitutability between skilled and unskilled workers further increases distributional effects and a lower substitutability between unskilled Israelis and non-Israelis improves results for all household groups. A lower elasticity between Jewish and no_Jewish Israelis (both skilled and unskilled) improves effects for non-Jewish Israeli households and reduces positive effects for Jewish Israeli households.

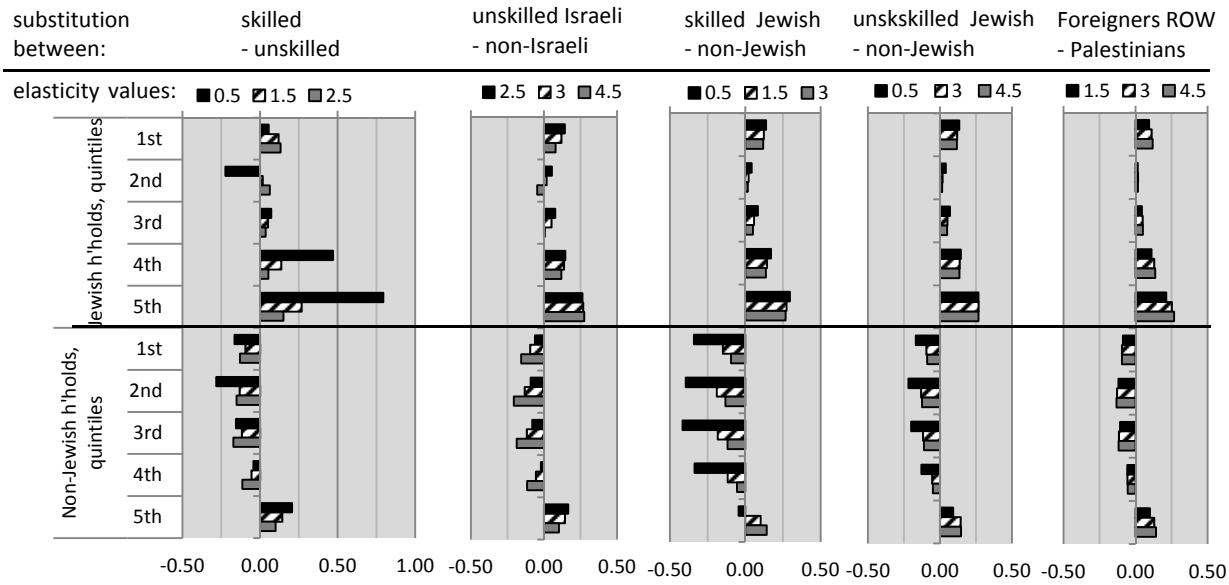


Figure 6: Effects of substitution elasticities on results on household income, different elasticities and elasticity values, no costs scenario

The second relevant elasticity is the migration elasticity, which governs the response of labour migration to relative wage changes, a detailed analysis for values between 0.5 and 12 shows that the value of the elasticity is not relevant for the results.

5 Conclusions

There is a wide empirical literature on the existence of intersectoral labour reallocation costs. Workers who change sectors can experience large and persistent losses in wages. The main reason for wage losses is firm- or sector-specific human capital. These costs are typically not accounted for in CGE modelling which possibly overestimates adjustment processes in the economy which is analysed.

In order to estimate the relevance of these transaction costs this study applies three different setups of labour mobility – migration without cost, with 20% costs and high costs which prevent migration – to a scenario which simulates a liberalisation of the Israeli labour market policy against Palestinians. This scenario increases Palestinian employment in Israel by 370% to a historic level from 2000, when 26% of all Palestinian employees were working in Israel. Increased labour supply induces economic growth and increases welfare for all households in Israel; however income effects are stronger for rich households.

Results from the different mobility setups show that labour reallocation costs matter, especially for the analysis of distributional effects. Increasing transaction costs decrease positive effects accruing from the liberalisation of the Israeli labour market for Palestinians. This is reflected in lower economic growth, affecting nearly all sectors of the economy. The scenario employed causes labour reallocation between sector blocks. Increasing reallocation costs lowers the ability of workers to adjust to shocks in the labour market what results in increased wage effects and thus income effects. Especially workers which otherwise would

move out of a sector are negatively affected. In this study these are employees in agriculture and construction, sectors were wages are below average. Thus the introduction of reallocation costs further increases the gap between rich and poor households in the economy.

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