Labour leisure trade-off meets a mobility function to model cross-border movements of labour between Palestine and Israel

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Abstract

This paper presents the first model analysis combining the labour leisure trade-off and a factor mobility function to assess the long-term effects of an increased Palestinian labour demand in the Israeli economy. A unique and comprehensive social accounting matrix is constructed and used to calibrate the model. The model features a nested utility function combining the benefits of linear expenditure systems and constant elasticity of substitution functions by depicting the household's behaviour with different functional forms at each stage of the nest. The results show that an increased Palestinian labour demand in Israel has in the long-run negative effects on the Palestinian economy, but positive welfare effects for Palestinian households. This finding demonstrates both the mitigating effect of Palestinian employment in Israel on poverty in the Palestinian territories and its deteriorating effect on the Palestinian economic growth by bidding up domestic wages, reallocating labour away from tradable activities and reducing the competitiveness of the Palestinian export sector. The paper also highlights the divergence between the outcomes of increased Palestinian employment in Israel in the short-run and the long-run. In light of these results, the paper discusses some policy options for the Palestinian National Authority to tap into the benefits of Palestinian employment in Israel, while alleviating its negative effects on the domestic production capacity.

Keywords: labour supply, production boundary, factor mobility, conflict, Palestine.

1. Background

The movement of natural persons to supply services abroad has been a sensitive issue in international trade negotiations for a long time (Stephenson and Hufbauer, 2010). While tariff rates were significantly reduced through bilateral and multilateral trade agreements in the five last decades, still restrictions of various kinds limit the mobility of labour and impede trade in services (Orefice, 2017). These restrictions mostly target the low and semi-skilled workers. The restrictions include quantitative regulations (quotas of workers), rules for obtaining the work permits, and inefficiencies linked to the processing of work permits (Cattaneo et al., 2010).

The restrictions on labour mobility are often tightened when a political conflict arises between the two trade partners. Political conflicts affect international labour mobility in two ways. Firstly, workers and employers across the borders depend on continuity and stability to maintain long-term employment links. The expectation or outbreak of conflicts destroys those links (Long, 2008). Secondly, international labour flows gives states a set of coercive instruments to signal their resolve in a political conflict (Heilmann, 2016). While both the sanctioning and sanctioned parties are negatively affected, the magnitude of the shock and the capacity of the economy to absorb it depends on the relative importance of the link for each partner. Small countries, for which international remittances account for a substantial part of the Gross National Income (GNI) are particularly vulnerable (Di Giovanni et al., 2015).

Investigating the effects of conflict-related restrictions on labour mobility is at the heart of this study with a focus on the Palestinian-Israeli conflict. The Palestinian and Israeli economies have developed close ties since 1967 and the aftermath of the six-day war (Missaglia and Valensisi, 2014). The two economies virtually form a customs union (Arnon, 2007). However, the size of the affluent Israeli economy led to imbalanced economic relations. Until the late 1980s, nearly a third of the Palestinian workers were employed in Israel (UNCTAD, 2012). The labour income from Israel is mostly repatriated and consumed in the Palestinian territories. In the 1970s and 1980s, that income amounted to 30% of the Palestinian GDP (Arnon and Weinblatt, 2001). While the Palestinian economy developed a strong dependency on Israel for employment opportunities, Israeli employers were able to switch with relative ease between Palestinian and foreign labour, especially from Asia (Flaig et al., 2013a). This structural dependence of the Palestinian economy on Israel puts the Palestinian economy in a particular vulnerable position.

When the first Palestinian uprising broke up in 1987, Israel accelerated the implementation of security measures effectively restricting the movement of goods, services, and labour with the Palestinian territories. These restrictions include a permit policy that requires Palestinians looking for employment in Israel to get a security clearance that is bound to personal status criteria assumed to reduce the likelihood of the Palestinian worker to be involved in attacks against Israelis (Etkes, 2012). The permits also restrict the number of Palestinian workers in the Israeli economy and limit their employment opportunities to specific sectors through a quota system (Miaari and Sauer, 2011). Because of the restrictions, the share of Palestinian employment in Israel in total Palestinian employment fell to 8% leading to a rise in unemployment and poverty in the Palestinian territories (Flaig et al., 2013b).

Agbahey et al. (2017) investigated the economy-wide effects of a return of the Palestinian employment in Israel to its pre-intifada level of 1999, which is seen by many observers and both Palestinian and Israeli officials as a desirable outcome. Their study used a computable general equilibrium model calibrated to a database compiled for the West Bank economy. The focus of the analysis was to investigate the short-term effects of increased Palestinian employment in Israel. Accordingly, the labour market was assumed

rigid with limited labour mobility and the existence of involuntary unemployment. The supply and demand of labour were determined given fixed real wages. Subsequently, Agbahey et al. (2017) called for further model developments to assess the long-term effects of an increased Palestinian employment in Israel. The model developments needed to reflect the long-term equilibrium should permit unrestricted factor mobility and enable wages to adjust to the labour market conditions.

The present study addresses these questions and is organized as follows. The next section, section two, provides a discussion on the methodological aspects of modelling labour supply and labour mobility in the CGE framework. Section three presents the data and the model used in the study. Section four describes the simulation implemented. Section five analyses the main results, while section six draws on the main conclusions and policy implications.

2. Labour mobility and supply in the CGE framework

Labour markets are usually differentiated in the CGE framework to ensure imperfect substitutability based on the skill level or the social traits (age, gender, etc.) of workers. Two common issues that necessitate the modeller's attention are how to depict labour mobility across sectors and how does labour supply respond to changes in wages.

2.1. Labour mobility in CGE

Labour mobility across sectors is a core aspect of structural change in the economy. In CGE literature, it is usually dealt with using two extreme assumptions. Labour is either perfectly mobile across sectors or specific to individual sectors. Perfect mobility of labour implies that workers can move between sectors, until wages in all sectors equalize. Hence, it is assumed that labour is homogenous and should be paid the same irrespective of the sector of employment. However, empirical data show that workers with similar level of skill or education who are employed in different sectors receive significantly different wages (Flaig et al., 2013a). This suggests differences in the marginal productivity of labour according to the sector of employment.

A first approach to account for imperfect labour mobility across sectors relies on the segmentation of the labour markets and the use of a CET function to transform labour used in one segment into the labour used in the other segment. Keeney and Hertel (2005) and Banse et al. (2013) segmented the labour markets into farm and non-farm segments, and used a CET specification to transform farm labour into non-farm labour. The CET specification has the advantage not to assume homogenous labour, since labour is differentiated by segments. However, it normalizes wages to unity and reallocates labour in terms of efficiency units based on the elasticity of the CET function and relative wages. Hence, the factor market clearing condition becomes opaque, as labour is no longer measured in physical units.

A second approach is to account explicitly for labour heterogeneity using a sector-based classification. This approach keeps the market clearing condition clear, since labour is measured in physical units and ensures a unique price definition for each labour class. A first limitation is the amount of data required to reach such a level of disaggregation. A second limitation is that for this level of disaggregation, labour becomes sector-specific and there is no possibility to reallocate workers between sectors. A solution to this limitation is the approach developed by McDonald and Thierfelder (2009), so called labour mobility function, where physical units of labour are allowed to transit across sectors based on response elasticities

and the ratio between the wage the worker could earn in his sector of origin and the wage he could earn in any other sector. Under this approach, labour moves either to pools linked to multiple segments (with perfect mobility within each pool) or between predefined pairs of segments, where each segment represents the labour employed in one or more sectors. Workers who belong to a notionally identical group and working in the same market segment receive the same wage, which reflects a long-run equilibrium situation.

An alternative to the labour mobility function is the proximity index approach of Lofgren and Cicowiez (2017). This approach retains the principle of reallocation of labour to other sectors based on change in relative wages. However, by contrast to McDonald and Thierfelder (2009), Lofgren and Cicowiez (2017) considers that workers migrating to a new market segment are less productive than workers previously in that segment. Hence, in-migrant workers receive a lower wage than workers with notionally the same characteristics but already employed in the market segment. Wages are then measured in productivity terms, and the productivity of a worker depends on his seniority. While this approach is suitable to capture the reallocation costs and the productivity loss associated with labour mobility, it only fits a short-term perspective. Arguably, in the long-term in-migrant workers will adapt and reach the same productivity as workers who are already in the market segment, and hence should receive the same wage.

Based on this discussion, the labour mobility function is adopted in this study as it fits the analysis of the long-term effects of Palestinian labour mobility to Israel. In this study, the factor market conditions are changed to allow mobility between the domestic and Israeli labour markets, in addition to mobility between market segments within the domestic market. Moreover, the model used in this study makes factor income distribution endogenous. Hence, changes in the composition of the labour force and in the distribution of labour income to the households of origin are accounted for.

2.2. Modelling labour supply in CGE

The assumptions embedded in the model regarding the response of labour supply to changes in the wages have several implications for the operation of the labour market. The discussion here is structured around three stylized groups of treatments: i) fixed labour supply and surplus labour, ii) upward-sloping labour supply curve, and iii) labour leisure trade-off.

2.2.1. Fixed labour supply and surplus labour

Many of the CGE models focus on the time allocated by households to the market activities and assume that labour supply is fixed at this level. This corresponds to a vertical labour supply curve, making households decisions in the labour market indifferent to policy shocks that may increase or decrease wages. This assumption excludes the possibility for labour to be unemployed and ignores the alternative uses of time other than in employment in the market activities.

Traditionally this has been relaxed by the assumption of surplus labour that can be drawn into employment at no marginal cost. This assumption corresponds to a horizontal labour supply curve with fixed real wages. A more sophisticated specification is a regime switching formulation, assuming that below a certain level of employment the supply curve is perfectly elastic and real wages are fixed. Once demand reaches the pre-defined threshold for employment, the supply curve becomes perfectly inelastic and any further labour demand is translated into wage increase.

The surplus labour assumption is appealing for modelling economies with involuntary unemployment and for short-run analyses. Accordingly, the labour markets are considered rigid and real wages fixed, such that the unemployed labour would take employment at the current real wage rates if there were employment opportunities. However, in the medium and long-run, wages do adjust to labour market conditions (Boeters and Savard, 2011).

A common limitation of the fixed labour supply and surplus labour assumptions is that they assume a superficial neutrality between labour uses within and outwith the System of National Accounts (SNA) production boundary, which refers to activities producing goods and services for sale on markets. The fixed supply achieves this neutrality by assuming a strict separability between labour uses within and outwith the boundary. This treatment is open to challenges, even in economies with no involuntary unemployment, as it makes households' decisions on the allocation of labour indifferent to changes in the wage rates. The surplus labour achieves the neutrality by assuming labour to have zero opportunity cost outwith the production boundary. This assumption is unlikely to hold, since labour not employed within the production boundary is often engaged in activities producing services for the use of the entire household. Subsequently, transferring labour across the boundary create welfare losses outwith the boundary that need to be accounted for (McDonald, 2018).

An additional criticism of the surplus labour is about its presumption that factors are the active agents in the labour supply decisions, while in standard economic theories the owners of the factors, i.e. the households, and activities are the decision making agents in the operation of factor markets.

2.2.2. Upward-sloping labour supply curve

The upward sloping labour supply curve stems from the empirical results of Blanchflower and Oswald (1995) who found that wage rates are negatively correlated with unemployment rates. They derived a labour supply curve, which reflects that an extra labour demand increases both the real wage and employment. The upward-sloping labour supply curve has been used in recent years in several CGE analyses, as it offers a pragmatic framework to mimic the empirical evidence that the supply of labour is wage rate responsive.

The upward-sloping curve also implies a transfer of labour across the SNA production boundary. While this approach recognises that additional employment within the SNA production boundary has a positive marginal cost, it assumes the opportunity cost of that labour ouwith the SNA boundary to be zero (Aragie et al., 2017). Hence, this treatment is not neutral to welfare generated outwith the boundary. With a transfer of labour across the production boundary, the utility forgone outwith the boundary is presumed to be zero, while the market activities within the boundary pay a positive price for that additional labour. Consequently, there are welfare leakages and the outcomes of any policy shock that induces increases in wage rates overstates changes in absorption.

An additional limitation to the use of the curve is that its theoretical and behavioural foundations are not supported by standard economic theories. Its use can only be rationalized with non-competitive theories of the labour market such as the union bargaining power, efficiency wage and labour contract analytical frameworks (Blanchflower and Oswald, 1995). Moreover, the upward-sloping labour supply curve implicitly assumes factors to be the active agents in the labour supply decisions, while the theoretical

foundations of CGE modelling consider the owners of factors and activities to be the active agents in the operation of factor markets (McDonald, 2018).

2.2.3. Labour leisure trade-off

The labour leisure trade-off approach is a way for accounting for household full time endowment comprising work and leisure time. It allows for substitution between the work and leisure time and reflects the trade-off facing households in the determination of the amount of labour to supply to the market. The approach also defines household utility at full consumption by considering leisure as a good that is consumed by households. Hence, households maximize their utility by consuming a basket of commodities and leisure subject to budget and time constraints. Leisure is then treated as a household-specific commodity produced that the respective household at home using part of its available labour supply as input. Solving the utility maximization problem provides the opportunity cost of leisure, which is equal to the market wage. This is consistent with the CGE's law of one price, meaning that any commodity should have the same price across all uses. Similarly, the opportunity cost of labour used in the production of leisure is the marginal product of that labour in any conventional activity, i.e. the market wage. In other words, leisure time is time forgone from the labour market, within the production boundary. As such, the valuation of the opportunity cost of leisure avoids the complications associated with defining new production boundaries (Aragie et al., 2017).

The labour leisure trade-off presumes that there is no involuntary unemployment and only monetary utility associated with the employment status (Posnet and Ian, 1996). In the presence of involuntary unemployment, it is reasonable to assume that the opportunity cost of leisure time is less than the market wage may, as the utility derived from the non-working time is lower than that derived from employment (Boeters and Savard, 2011).

The labour leisure trade-off offers the most consistent framework for dealing with labour transfers across the SNA production boundary, as it explicitly accounts for the trade-offs between uses of labour within and outwith the boundary. This approach is also the most consistent with orthodox microeconomic theory of general equilibrium, as it makes the owners of labour (i.e. households) the active agents whose preferences determine the labour supply decisions.

2.3. Integrating labour mobility function and flexible labour supply

The labour mobility function is activated by a relative change in wages. Hence, it is not compatible with the surplus labour assumption, since that assumption keeps wages fixed. Consequently, the two assumptions left that allow for a flexible labour supply to the market activities are the upward sloping curve and the labour leisure trade-off.

Based on the previous discussion on the different assumptions about the labour markets and their implications for welfare analysis, it follows that on theoretical grounds, the labour leisure trade-off is the most consistent framework for dealing with transfers across the SNA production boundary.

The presumption in the labour leisure trade-off framework that there is no involuntary unemployment is not a constraint for the analysis conducted in this paper. The long-term time perspective of the analysis implies that factor markets are fully flexible. Hence, the allocation of time between activities within and outwith the production boundary is assumed unconstrained by access to paid employment or self-

employment. In the Palestinian context, and more generally in developing countries where there is no unemployment benefits, household members not employed within the SNA production boundary, and commonly referred to as "unemployed", are usually involved in low productivity activities outwith the production boundary, which constitute a form self-employment (SNA; United Nations, 2009). Leisure being conceptualized as the time allocated by household to activities outwith the SNA production boundary, it includes therefore the time available to those household members who are unemployed in the market activities.

3. The model and data

3.1. Data

The database used in this study is a unique Social Accounting Matrix (SAM) compiled for the West Bank economy, which is currently the only Palestinian territory with workers employed in Israel. The SAM is extensively disaggregated, and comprises 189 accounts. It has a multiple product-activity set up with 48 commodity groups produced by 36 activities. Two foreign accounts are included for Israel and the rest of the world to depict the customs envelope between Palestine and Israel and the interdependency of their labour markets. The SAM encompasses 33 production factor accounts, among which 31 are labour groups, besides two accounts for capital and land. Foreign labour is separated from the domestic labour, which is further disaggregated based on skill level and gender. Male workers who represent the quasi totality of Palestinian labour in Israel are further categorized based on eligibility for a work permit in Israel. Three levels of eligibility are considered based on social characteristics such as age and marital status: ineligible, weakly and highly eligible. There are 20 household groups classified based on income quintile (measured as expenditure per adult equivalent), and socioeconomic characteristics of their active members. The SAM is fully documented in Agbahey et al. (2016).

To implement the labour leisure trade-off, changes to the database are required in order to incorporate leisure activities and commodities. Each representative household is paired with a unique activity that uses the household's own time as input to produce leisure that is consumed only by that household. The factor ownership matrix also has to be extended to account for labour each household uses to produce leisure, in addition to the labour that is supplied to the market. Leisure in this paper is equivalent to the non-working time, including the time available to the household's members who are unemployed within the SNA boundary. In practical terms, we considered that one employed person within the SNA boundary in the original database corresponds to eight working hours and a person unemployed within the SNA boundary counts for eight non-working hours. Next, we assumed that every person has twelve active hours per day, after excluding the time required for vital functions such as sleeping. Accordingly, the leisure time at disposal for every person, whether employed or not within the SNA boundary, amounts to four non-working hours. Subsequently, every person employed within the SNA boundary has eight working hours and four non-working hours, while every person, who is unemployed within the SNA boundary, has in total twelve non-working hours.

Table 1 reports the employment data in the baseline.

Table 1. Baseline employment data (unit = 8 hours)

Employment within the SNA boundary	Domestic market activities	519,148
	Foreign market activities	74,814
Employment outwith the SNA boundary	Leisure activities	482,819

As the social accounting matrix records the transaction values, leisure produced by a factor f is valued at the market price of that factor. Hence, the transaction values in the SAM for leisure production and consumption equal the leisure time for each labour group multiplied by its market wage. As the amount of leisure produced by each household is exactly the same that is consumed by that household, the system is close and there is no leakage.

3.2. Model description

The model used in this study is a modified version of the standard STAGE-2 model by McDonald and Thierfelder (2013). STAGE-2 belongs to a suite of single-country SAM-based CGE models. For this study, a number of new specifications are introduced in the standard version of the model to depict some of the special features of the Palestinian economy. A multiple trade partner specification is added to separate Israel from the other trade partners. This model extension is set up in a generalized way that can support more than two trade partners. The domestic production module is modified to accommodate a seven-level production process that reflects the composition of the labour force in the West Bank. Each level of the production process involves Constant Elasticity of Substitution (CES) functions. Furthermore, a mobility function is incorporated in the model.

The mobility function is governed by a wage ratio ($WMOBRATIO$) as defined in equation [1]

$$\boldsymbol{WMOBRATIO_{f,fp,insw}} = \frac{\frac{\sum_a (\boldsymbol{WF_{fp} * WFDIST_{fp,a} * FD_{fp,a}})}{\sum_a \boldsymbol{FD_{fp,a}}}}{\frac{\sum_a (\boldsymbol{WF_{fmig} * WFDIST_{f,a} * FD_{f,a}})}{\sum_a \boldsymbol{FD_{f,a}}}} \quad \textbf{[1]}$$

where FD is the demand for factor f in activity a, WF the average wage rate for factor f and WFDIST an activity specific factor "efficiency" parameter capturing differences in the observed productivities of factor f in different activities.

The mobility function is activated by a change in relative wage as defined in Equation [2].

$$\boldsymbol{FSIM_{f,fp,insw}} = \boldsymbol{FSI0_{insw,f}} * \left(\frac{\boldsymbol{WMOBRATIO_{f,fp,insw}}}{\boldsymbol{WMOBRATIO0_{f,fp,insw}}} \right)^{\boldsymbol{etamig_{f,fp,insw}}} \quad \textbf{[2]}$$

where FSIM is the variable recording the number of workers moving from f to fp, FSI0 is the initial stock of labour f supplied by institution insw, WMOBRATIO is the wage ratio between wages for f and fp after the shock and WMOBRATIO0 is the wage ratio in the base period. Hence, the migration decision is triggered by a change in relative wages. When wage for factor f increases relative to factor fp, the ratio

WMOBRATIO diverges from WMOBRATIO0 and factor mobility from f to fp takes place. The intensity of the mobility is governed by a response elasticity (etamig), which is defined for each pair of market segments and captures the influence of structural features such as transaction costs and efficient factor markets on the labour mobility.

Equation [3] avoids the creation of additional factors by ensuring that for each unit of factor moved from one segment only one unit of factor is created in the paired segment. This equation also determines the number of workers who stay in their market segment. The new stock of factor f supplied by each institution is defined by the equation [4].

$$\boldsymbol{FSIM_{f,fp,insw} = FSI_{insw,f} - \sum_{fp} FSIM_{f,fp,insw}} \quad \textbf{[3]}$$

$$\boldsymbol{FSI_{insw,fmig} = \sum_{fp} FSIM_{f,fp,insw}} \quad \textbf{[4]}$$

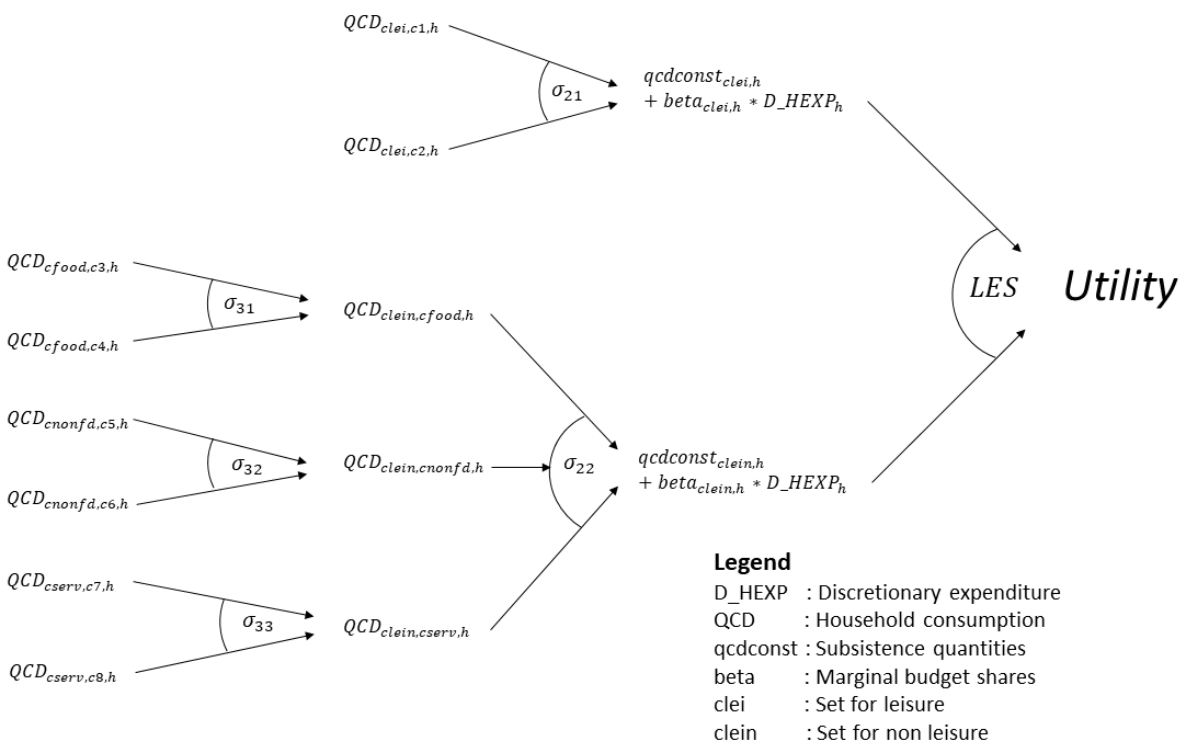
Allowing labour to be mobile across market segments implies that the standard assumption of factor income being distributed to households in fixed proportions is no longer valid. Accordingly, the matrix of fixed share coefficients controlling the functional distribution of income is replaced by a matrix of variables that tracks changes in the supply of labour in each segment, hence making the labour income distribution endogenous.

Incorporating the labour leisure trade-off in the STAGE-2 model does not require changes to the behavioural relationships of the model on the production side, since the opportunity cost of labour used in the production of leisure is the marginal wage income forgone. However, on the consumption side, the utility function of the standard model is modified to differentiate households' preferences for leisure and non-leisure commodities. Instead of the single-stage Linear Expenditure System (LES), derived from Stone-Geary utility function, a three-stage nested utility function is used combining LES and CES functions. The benefits of introducing a multi-stage nesting structure are twofold. First, it allows the use of different functional forms at each stage of the nest and the combination of their respective advantages to better replicate households' behaviour. Second, it provides greater flexibility in assigning different elasticity of substitution at different stages of the nest.

For this paper, a LES function is used at the top of the nesting structure with two broad groups of commodities: leisure and non-leisure entering the nest. At the intermediate level, a CES function is used to differentiate the individual components making up each of the two broad groups of commodities. The non-leisure group is made of three aggregate commodities: food, non-food goods and services. At the lowest level, each of these three aggregates are composed of individual commodities.

Figure 1 illustrates the nesting structure.

Figure 1. Nesting structure of the utility function



Source: Authors' own illustration

Having the LES function at the top of the nesting structure allows the differentiation between subsistence and discretionary consumption. This functionality is especially relevant in developing regions like the West Bank, where some households are very poor. Defining the subsistence levels of consumption over broad groups of commodities is more reasonable than having subsistence consumption for individual commodities as implied by the single-stage LES structure (Aragie et al., 2017). The choice of leisure and non-leisure as the two broad groups of commodities entering the LES nest is based on empirical findings that leisure and non-leisure are complements even in developing countries (Alderman and Sahn, 1993). Subsequently, the choice of the LES function, which implies that the commodities in the nest are gross complements (De Boer and Missaglia, 2006), is well suited to nest these two broad commodity groups.

At the intermediate level, a CES function is used to combine food, non-food and services to form the broad group of non-leisure commodity. The choice of a CES function is motivated by the empirical finding that these groups of commodities are mostly substitutes (Halbrendt et al., 1994; Huang, 1993). Therefore, their optimal combination is determined at the intermediate level of the nest by their relative prices, through a first order condition. Finally, at the lowest level, individual commodities making up the three groups of food, non-food goods and services are also considered as substitutes. Subsequently, their optimal combination is determined by their relative prices. The substitution at the lowest nest is considered to be higher than that at the intermediate level of the nesting structure.

3.3. Labour market clearing conditions

The initial factor market clearing condition is modified to reflect the employment of Palestinian labour in the domestic market activities, in the Israeli market and in the production of leisure, as shown in Equation [5]

$$\boldsymbol{FS_f = \sum_{alein} FD_{f,a} + \sum_w fd\_w_{f,w} + \sum_{insw} FSIE_{insw,f} \quad \forall alein_a \; and \; f_{ff}} \qquad \textbf{[5]}$$

Where FS_f is the total supply of labour. Factor demand $FD_{f,a}$ is only aggregated over the set $alein$, which refers to the domestic market activities. The parameter $fd\_w_{f,w}$ captures the demand for Palestinian labour in Israel. As a parameter, which value is set exogenously, it ensures that the model takes up the envisaged shock of increased Palestinian employment in Israel. This mechanism reflects the empirical evidence that Palestinian employment in Israel is demand-driven. The wage premium in Israel ensures that any increased demand is met, while the permit system and the closures enforce any drop in demand. $FSIE_{insw,f}$ is the amount of factor f supplied by institution insw for the production of leisure. The demand of labour in the production of leisure is defined in the equation [6], where the mapping (map_hh_alei) pairs leisure activities $alei$ with households (hh), while the set $alei$ refers to leisure activities.

$$\boldsymbol{FSIE_{insw,f} = \sum_{a\$map\_hh\_alei(insw,a)} FD_{f,a} \quad \forall alei_a \; and \; f_{ff}} \qquad \textbf{[6]}$$

3.4. Macroeconomic closures

The reality of the West Bank being a small player in the world markets is depicted with the small country assumption, which implies that the West Bank is a price taker. The nominal exchange rate is fixed to reflect the reality that Palestine does not have its own currency and uses the Israeli Shekel over which it has no influence. The current account balance is also fixed to avoid any changes in borrowing from foreign funds, while keeping all the welfare effects in the solution period. The CPI is fixed and serves as numeraire, meaning that transfers and wages are in real terms.

The model is investment driven, as investments in the Palestinian economy are largely exogenous. The level of investment is defined in terms of final demand because economic growth in the West Bank is likely to be correlated with a lower tension with Israel providing a secured environment that will attract more foreign investments (Naqib, 2003). To keep the balance between savings and investments, household and enterprise savings rates vary equiproportionately. The government savings are fixed, while direct tax and value added tax rates adjust multiplicatively to maintain the balance. Government consumption is a fixed share of final demand, such that when final demand increases as the economy expands, government consumption follows suit. This assumption is grounded in the tendency of the public sector in the West Bank to expand quickly (UNCTAD, 2006).

All factor markets are at full employment. Capital and land are fully mobile across activities. Labour is mobile within a market segment across all activities of that market segment but only mobile across segments that are controlled with a positive elasticity of mobility. Labour can move from agricultural sector to secondary and construction sectors; from secondary sector to construction and tertiary sectors and from construction sector to tertiary sectors.

4. Simulation

After assuring that the model replicates the original data that represents the economy in 2011, which is called "base" scenario, a counterfactual scenario of a return to the *pre-intifada* level of Palestinian employment in Israel is introduced. In 1999, before the second Palestinian uprising, the number of Palestinians from the West Bank employed in Israel amounted to 99,974 workers. It could be argued that the two economies have grown over time and that for economic reasons both the demand and supply of Palestinian workers in Israel surpass this pre-intifada absolute number. However, a group of Palestinian and Israeli officials and researchers acknowledge that for political reasons it is unlikely that the number of Palestinians permitted to work in Israel in the future exceed the pre-2000 levels (Aix Group, 2004). Therefore, the 1999 absolute number of Palestinians working in Israel serves as the reference.

The shock keeps the composition of Palestinian labour in Israel unchanged compared to the baseline. Table 2 summarizes the number of Palestinian workers in Israel in the baseline in physical units and in the scenario as percentage change compared to the base. Note that the factor income from Israel for each labour group is increased in the same proportions as their numbers.

Table 2. Number of Palestinian workers in Israel in the baseline (physical units) and in the scenario (%)

	Baseline (unit = 8 hours)	Scenario (%)
Low-skilled ineligible males	17,364	35.7%
Low-skilled weakly eligible males	19,065	35.7%
Low-skilled highly eligible males	29,128	35.7%
Low-skilled females	1,162	35.7%
High-skilled ineligible males	3,123	35.7%
High-skilled weakly eligible males	1,254	35.7%
High-skilled highly eligible males	2,559	35.7%
High-skilled females	32	35.7%
Total	73,687	35.7%

5. Results and analyses

This section starts with a discussion of the effects of the shock on the factors markets, followed by changes in commodity markets (output and consumption). Afterwards, it discusses the macroeconomic and welfare effects. The section ends with a discussion on how sensitive are the results to changes in key parameter values and changes about the nesting structure of the utility function. In this section, due to space contingency, results are displayed for aggregated categories. The full set of results can be obtained from the authors upon request.

5.1. Effects in the factor markets

The extra demand of 26,287 Palestinian workers in Israel is met with 20,092 workers previously employed within the SNA boundary and switching from employment in the domestic market to employment in Israel and 6,195 additional workers supplied by households out of the production of leisure. In other words, about three-fourths of the new Palestinian workers in Israel were previously employed in the domestic

market, while one-fourth are coming out of “unemployment” by reference to the SNA production boundary. This finding is consistent with the expectation that labour supply to the market activities is almost perfectly stable in the long-run (Boeters and Savard, 2011). Empirically, Gronau and Hamermesh (2006) showed that household leisure time barely responds to 25-40% increase in the price of time.

This finding is to be contrasted with the short-run effects of the same shock assessed by Agbahey et al. (2017) who found that the majority of the Palestinian workers who start working in Israel were in the previous period not employed in the market activities. These results were consistent with the empirical evidence of a close correlation between employment in Israel and the unemployment rate in the West Bank in the short-run. In fact, the volatility of employment in Israel combined with the low capacity of the domestic economy to absorb in the short-run large numbers of workers displaced from the Israeli economy by the conflict creates a pool of involuntary unemployment, which supports the close correlation between employment in Israel and the unemployment rate in the West Bank. However, in the long-run, as labour is either employed in the market activities or self-employed in the production of services consumed at home (leisure), there is no involuntary unemployment and the supply of labour by households to the market activities is quite stable. Consequently, the correlation between employment in Israel and unemployment in the market activities in the West Bank is less strong. Instead of reducing substantially their leisure time to supply more labour to the market activities, households rather shift their members who are already in employment within the SNA boundary from the domestic market to Israel, where wages are higher.

The higher wages offered in Israel do not only displace workers out of domestic employment, but also raises real wages by 6.1% in the domestic market. Domestic wages increase relatively more for low-skilled workers (by 7.3%) than for high-skilled workers (by 4.8%). This result is consistent with the empirical findings of Mansour (2010). Increased demand for Palestinian labour in Israel improves employment opportunities for Palestinian workers, so that to retain workers in the domestic economy, employers have to raise wages. Because the availability of employment in Israel is concentrated in low-skill sectors, the domestic wages for low-skilled workers experience a stronger increase.

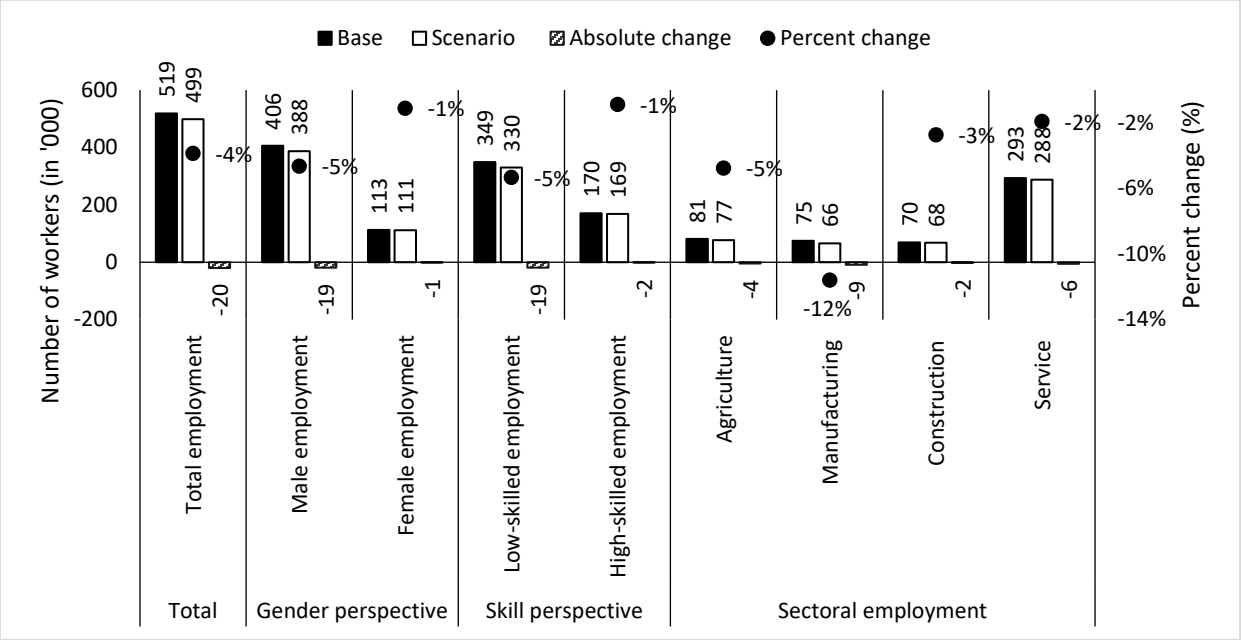
Because of the mobility function, workers are allowed to move across market segments. Table 3 points that workers are moving from primary and secondary sectors into the construction sector. This finding is related to the composition of Palestinian employment in Israel. Palestinian employment in Israel is concentrated in manual sectors with about 56% of all Palestinians working in Israel being employed in the construction sector in the baseline. The experiment by preserving the initial composition of Palestinian employment in Israel hence imposes a stronger shock on the labour employed in the construction sector. Therefore, wages increase more rapidly in the construction sector than in the other sectors. Consequently, provided the possibility for labour to be mobile upon changes in relative wages, there is a labour movement from the other sectors into the construction sector.

Table 3. Labour movement results

	Moving from			Moving to
	Agriculture	Manufacturing	Construction	Services
Low-skilled ineligible males	657	1,882	2,539	0
Low-skilled weakly eligible males	187	1,367	1,554	0
Low-skilled highly eligible males	1,263	2,171	3,434	0
Low-skilled females	0	339	0	339
High-skilled ineligible males	207	333	540	0
High-skilled weakly eligible males	37	148	185	0
High-skilled highly eligible males	89	258	347	0
High-skilled females	0	93	0	93
Total	2,440	6,592	8,600	432

Figure 2 compares the employment within the SNA boundary in the domestic market after the shock to the baseline. In total, the pool of employment in the domestic market decreases by 4%. From the gender and skill perspectives, domestic employment for males and low-skilled workers is the most negatively affected. This finding can be put into perspective with the evidence that Palestinian employment in Israel is mostly made up by male workers with a low-skill profile. From the sectoral perspective, the manufacturing sector experiences the most important drop. Put into perspective with the findings in Table 3, it can be concluded that the manufacturing sector is the least attractive sector.

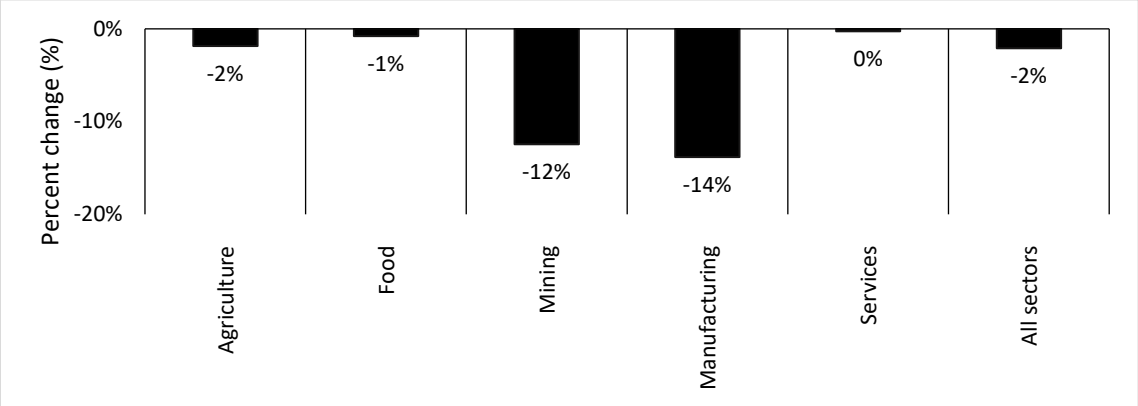
Figure 2. Levels of employment in the domestic market activities (in '000 workers) and change in scenario compared to baseline (in '000 workers and in %)



5.2. *Effects on domestic output*

The increase in factor prices drives production costs up by 3.1% on average. Due to the increased costs and the limited availability of labour, after many workers switched away from the domestic market activities, domestic output experiences a drop by 2.1% on average. The sectors experiencing the highest drop in domestic output are the mining and manufacturing sectors (Figure 3).

Figure 3. Change in domestic output by sector (in %)



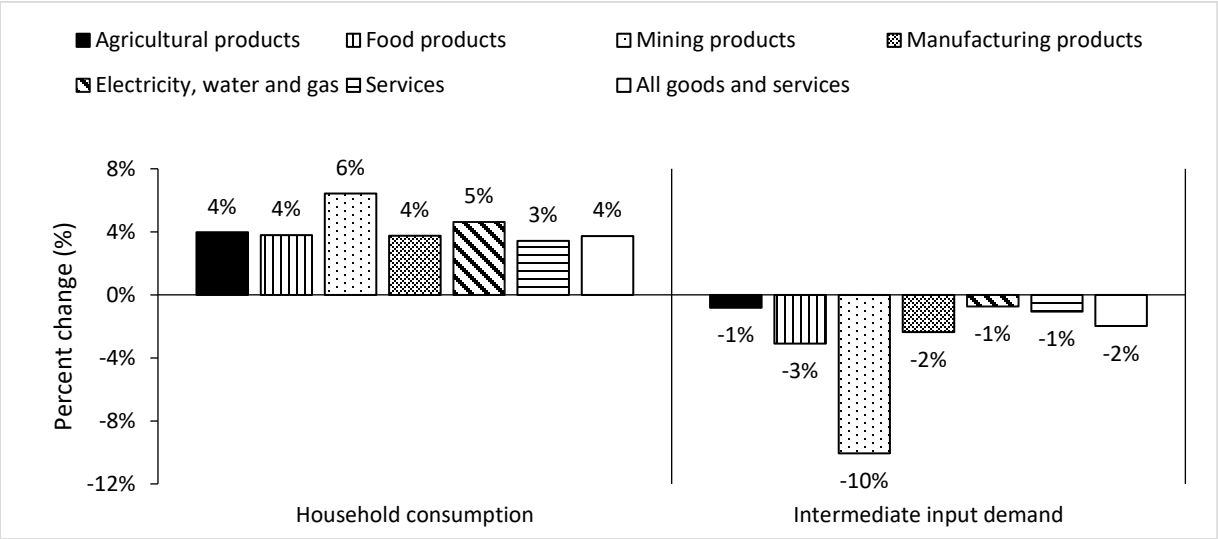
The substantial drop in domestic output in the manufacturing and mining sectors is consistent with the reduced demand for labour in those sectors as shown in Figure 2. This finding stems from manufacturing being the main export sector in the West Bank, contributing to 68% of Palestinian export of goods and services in 2011 (PCBS, 2012). With the increased demand for Palestinian labour in Israel, the inflow of labour income from Israel is also increased. This large inflow of foreign currency in the West Bank's economy has "Dutch disease" effects, with the real appreciation of the exchange rate. Subsequently, the West Bank's exports loose competitiveness in the world markets. The manufacturing sector, as the most export-oriented sector in the West Bank, is the most negatively affected.

The manufacturing sector is itself dominated by the stone and marble industry, which accounts for about 25% of Palestinian overall industrial revenues (Abu Hanieh et al., 2014). The negative effects felt in that industry leads to spillover effects into the mining sector, which is dominated by quarrying stone and marble. This explains that the mining sector is the second most negatively affected sector.

5.3. *Effects on demand*

The increase in domestic production costs is transmitted to the consumer prices, which increase on average by 2.2%. Subsequently, the demand for goods and services as intermediate inputs decreases on average by 2.0%. By contrast, household consumption for goods and services increases on average by 3.7% (Figure 4). Despite the increase in prices, households are able to increase their demand for goods and services because their income increases on average by 5.8%. This increase in household income stems from the extra labour income from Israel and the raise in domestic wages, which combined effect overcompensates the expected loss in income due to the exit of workers out of employment in domestic market activities.

Figure 4. Change in household and intermediate demand for goods and services (in %)



The reduction in the demand for intermediate inputs is finding stems not only from the increased prices of goods and services used as intermediate inputs, but also from the slowdown in domestic production, which necessitates fewer inputs. Demand for mining products as inputs drops the most (by 10.1%). This finding corroborates the forward linkages between the mining and manufacturing sectors, with the mining products, stone and marble, used as inputs in the leading export industry of finished stone and marble, which is the most negatively affected by the real appreciation of the local currency.

Across quintile groups, consumption of goods and services increases for all household groups, but it increases relatively more for the poorer households than for the richer households (Figure 5). This finding stems from poor households deriving in the baseline a higher share of their income from labour and having a higher share of employment in Israel. Subsequently, increasing Palestinian employment in Israel has a stronger positive effect on poor households' income and hence on their consumption.

Figure 5. Change in household consumption of goods, services and leisure compared to baseline (in %)

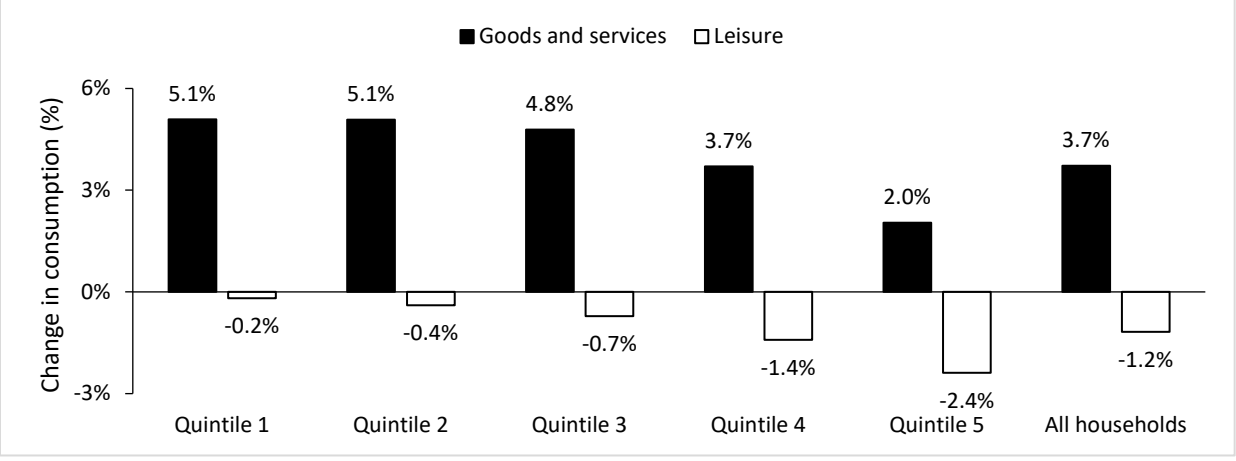


Figure 5 also shows that consumption of leisure decreases for all households groups. For the average household it decreases by 1.2%. This is the net of substitution and income effects affecting households' decisions. The income effects imply that households are inclined to consume more leisure because of additional income from Israel, since leisure is a normal good (Alderman and Sahn, 1993; Njegovan, 2006). However, as wages increase by 6.1% so does the opportunity cost of leisure. The substitution effects make household to shift labour out of the production of leisure to the market activities. As the net effect is a reduction in the leisure consumption, it can be concluded that the substitution effects were stronger than the income effects.

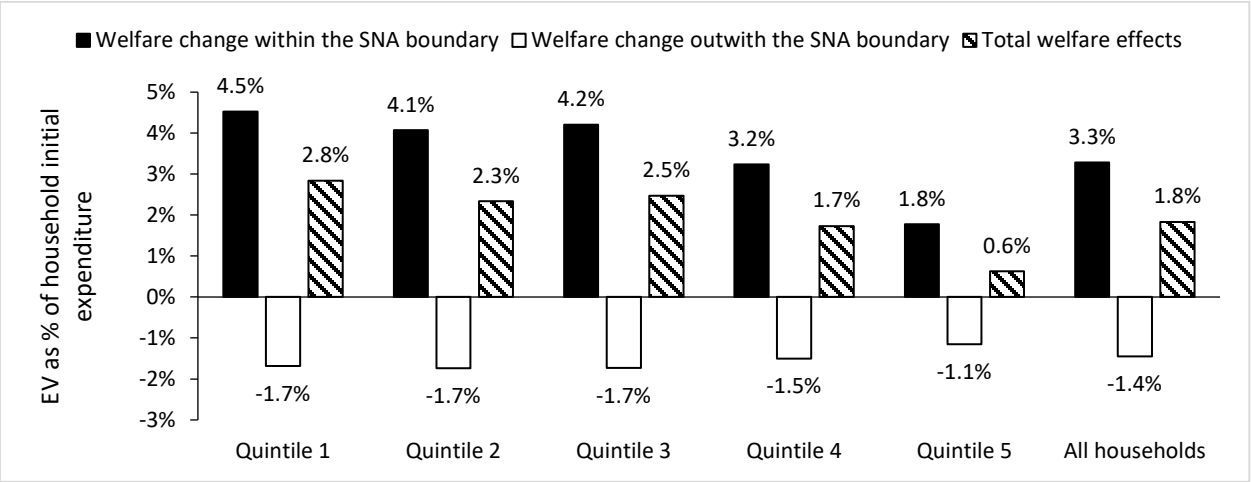
A comparative analysis shows that leisure consumption decreases more for rich households than for poor households (Figure 5). In other words, rich households are the ones reducing the most their leisure time to supply more labour to the market activities, while households in the lower quintiles mostly have their members, already employed within the SNA boundary, switch between market activities in the West Bank and Israel. This finding stems from poor households having a relatively higher endowment in low-skilled labour in the baseline. The availability of employment in Israel is concentrated in the low-skill sectors and it reduces the incentive to work inside the SNA production boundary by increasing the price of non-traded commodities, of which the most "non-traded" is leisure.

5.4. Welfare analysis

The results show that while household income increases by 5.8%, household expenditure increases by 3.1% on average, with the difference between income and expenditure made up by savings and transfers. The increase in household expenditure stems from both the increase in the consumer prices of goods and services and the increased household consumption. As a measure of household welfare, the Slutsky Equivalent Variation[2] as a share of household initial expenditure shows that household net welfare improves on average for all household groups (Figure 6). The welfare generated within the SNA boundary increases by 3.3% for the average household. However, the welfare outwith the production boundary decreases for all household groups, as their leisure consumption is reduced. It decreases by 1.4% for the average household. An advantage of using the labour-leisure trade-off is the ability to differentiate between the welfare generated within and outwith the SNA boundary. The total welfare effect is nonetheless positive for all household groups. The distributional effects at quintile level show that welfare improves more for poor households than for households in the top quintile. This finding stems from poor households having a higher share of employment in Israel in the baseline and deriving a higher share of their income from labour. These distributional effects inform that increased employment in Israel can contribute to alleviating poverty in the West Bank.

[2] The Equivalent Variation is defined as the amount of compensation, that must be added (subtracted) to (from) the household's initial income, to leave him as well off as under the combined price and income changes.

Figure 6. Household welfare results (EV as % of household's initial expenditure)



5.5. *Macroeconomic aggregates*

The changes in the macroeconomic aggregates show that aggregate demand (absorption) of goods and services in the West Bank's economy increases by 2.6% in real terms, mostly driven by the increase in household consumption. This increased household consumption is mostly met by increasing import demand, which rises by 2.3% in real terms. By contrast, the export supply from the West Bank to the world markets drops by 16.3%. This drop stems from the "Dutch disease" effects of the large inflows of foreign currency associated with the increased employment in Israel. Subsequently, there is a real appreciation of the exchange rate, which negatively affects the domestic export industry.

Aggregate domestic output decreases by 2.1% in real terms, due to increased production costs and reduced availability of labour, which switch from employment in the domestic West Bank's market to employment in Israel. Ultimately, the economy shrinks as GDP declines by 1.2%. This finding illustrates the trade-off associated with employment in Israel for the West Bank. While households benefit from increased income and achieve welfare gains, the domestic economy in the long-run shrinks as employment opportunities in Israel reduces incentives to work and invest in the domestic market.

5.6. *Sensitivity analysis*

In absence of reliable data series to self-estimate country-specific values of key parameters used in the model, a throughout sensitivity analysis is needed to check for the robustness of the simulation results. This section is articulated around two poles: i) the sensitivity of the simulation results to key elasticities, and ii) the sensitivity of the results to a different nesting structure for household utility.

5.6.1. Testing for the sensitivity of the results to the level of the substitution elasticities

The sensitivity of the results to a number of parameters is performed by varying their values independently to assess the effects on the results. The key parameters of concern are: the marginal utility of income (so-called Frisch parameter), the income elasticities of demand for leisure relative to demand for goods and services, the CES elasticities in the utility function and the labour mobility elasticity.

For the sake of keeping the results of the sensitivity analysis clear and concise, Table 4 presents the values assumed for the parameters in the baseline (in bold) and the shifts operated in the sensitivity analysis as well as the findings of the robustness checks for selected macroeconomic aggregates and results. For the labour mobility and the CES elasticities, the shifts operated consisted in halving and/or doubling the values of the parameters in the baseline. For the income elasticities of demand, the check consisted in assuming the opposite assumption of that in the baseline, i.e. households have a higher income elasticity for leisure relative to goods and services. For the Frisch parameter, the subsistence share of household expenditure was increased and decreased to the extent that is possible to avoid negative subsistence consumption, and the corresponding values of the Frisch parameters were computed.

The findings of the sensitivity analysis show that the model is marginally sensitive to changes in the values of the parameters of concern. Changing the labour mobility elasticity affects the movements of labour across market segments but hardly change the welfare outcomes and macroeconomic results. Doubling and/or halving the substitution elasticities along the nesting structure of the utility function mainly affects the composition of household consumption but leaves the aggregate volume of consumption unchanged as compared to the baseline results. Shifting the values of the Frisch parameter and the income elasticity of demand affects the number of additional workers supplied by households to the market activities by less than +/- 10% compared to the baseline results.

In conclusion, the overall macroeconomic picture is not very sensitive to variations in key parameter values. No qualitative change is observed in the direction of the effects of increased Palestinian employment in Israel on the West Bank's economy. Subsequently, the results can be seen as robust. The complete set of results of the robustness check is available from the authors upon request.

Table 4. Values of parameters in baseline and in the robustness checks and key results of the sensitivity analysis

	Labour mobility elasticity			CES elasticity along the utility function (see Figure 1)					Income elasticity of demand		Frisch elasticities		
	e=1.0	**e=2.0**	e=4.0	$\boldsymbol{\sigma_{22}}$**=0.1**	σ_{22}=0.2	σ_{3i}=0.075	$\boldsymbol{\sigma_{3i}}$**=0.15**	σ_{3i}=0.3	$\boldsymbol{\delta_{clei}}$ **(0.3)** **<**$\boldsymbol{\delta_{clein}}$ **(0.5)**	δ_{clei} (0.5) > δ_{clein} (0.3)	ρ_{Q1} =- 1.52 ... ρ_{Q5}=- 1.16	$\boldsymbol{\rho_{Q1}}$**=- 1.60 ...** $\boldsymbol{\rho_{Q5}}$**=- 1.20**	ρ_{Q1}=- 1.69 ... ρ_{Q5}=- 1.26
Additional labour supplied by households (physical quantities)	-6329	**-6195**	-6093	**-6195**	-6125	-6273	**-6195**	-6047	**-6195**	-5640	-6640	**-6195**	-5738
Household consumption of goods and services (%)	3.80	**3.73**	3.68	**3.73**	3.73	3.75	**3.73**	3.69	**3.73**	3.69	3.78	**3.73**	3.68
Net welfare excluding leisure (EV as % of initial household expenditure)	3.35	**3.28**	3.23	**3.28**	3.28	3.30	**3.28**	3.24	**3.28**	3.24	3.32	**3.28**	3.24
Net welfare including leisure (EV as % of initial household expenditure)	1.87	**1.83**	1.81	**1.83**	1.84	1.84	**1.83**	1.82	**1.83**	1.83	1.83	**1.83**	1.83
Real output (%)	-2.07	**-2.11**	-2.14	**-2.11**	-2.11	-2.11	**-2.11**	-2.11	**-2.11**	-2.14	-2.05	**-2.11**	-2.16
Real GDP (%)	-1.12	**-1.13**	-1.15	**-1.13**	-1.15	-1.12	**-1.13**	-1.17	**-1.13**	-1.17	-1.08	-1.13	-1.19

5.6.2. Testing for the sensitivity of the results to a different nesting structure of the utility function

The nested utility function used in the original model assumed that leisure and non-leisure (goods and services) are the two broad groups of commodities on which households decide their subsistence consumption. Having these two groups in the LES nest also implies that they are gross complements in generating utility as supported by the empirical evidence provided by Alderman and Sahn (1993). There are a large number of alternatives that can be applied. Assuming for instance that households rather decide on their subsistence consumption over food and non-food commodities and that leisure is actually a substitute to other non-food commodities makes a substantial difference. A visual representation of such a nesting structure is provided in Appendix 1. A particularity of this assumption is that leisure enters a CES nest and therefore there is a greater flexibility in controlling the substitution between leisure and other non-food commodities.

For the sensitivity analysis, we used such as nesting structure and found that the results are very sensitive to the value of the CES elasticity between leisure and other non-food commodities. Using a small elasticity (0.5) has the effect of making households to supply only 616 more workers to the market activities. Real GDP drops substantially by 1.68%. However, assigning a very large elasticity (5.0) has strong effects on the labour supplied by households and on the economy in general. About 27,649 workers are supplied by households to the market activities. This means that all the extra Palestinian labour demand in Israel (26,287 workers) is met with labour previously unemployed within the SNA boundary and additionally some 1,362 workers start employment in the domestic market. Subsequently, domestic output in real terms increases and ultimately, real GDP increases by 1.39%.

Given this sensitivity of the results to the elasticity of substitution between leisure and other non-food commodities, if one chooses to use such a nesting structure, the choice of the elasticity should be properly documented.

6. Conclusions and policy implications

This paper presents the first model analysis combining the labour leisure trade-off and a factor mobility function to assess the long-term effects of an increased Palestinian labour demand in the Israeli economy. A unique and comprehensive social accounting matrix is constructed and used to calibrate the model. The model also features a nested utility function combining the benefits of linear expenditure systems and constant elasticity of substitution functions by depicting the household's behaviour with different functional forms at each stage of the nest.

The analysis shows that an increased Palestinian labour demand in Israel affects the labour supply of households. About one-fourth of the Palestinians who start working in Israel were in the previous period "unemployed" by reference to the SNA production boundary, i.e. the market activities producing goods and services. In other words, they were used by households for leisure production. The remaining three-fourths were already employed within the SNA boundary in the previous period and are now shifted from the domestic market activities to the Israeli market. The reduced employment in the domestic market activities in the long-run negatively affects the domestic production. Ultimately, the economy shrinks and real GDP decreases by 1.13%.

These results confirm the findings of other studies (Astrup and Dessus, 2005; UNCTAD, 2016) that an increased Palestinian employment in Israel hurts the domestic economy in the long-run. Increased employment opportunities in Israel does not only displace workers out of employment in the domestic market activities, it also raises the domestic real wages. Subsequently, domestic employers have less incentives to invest and hire more labour. Moreover, the large inflow of labour income from Israel has "Dutch disease" effects with the real appreciation of the exchange rate. Consequently, Palestinian exports loose competitiveness in the world markets and this adds a burden on the domestic production capacity.

The increased labour income from Israel increases household income by 5.8% on average and enables them to increase their consumption of goods and services. Ultimately, Palestinian households enjoy welfare gains. While the gains generated by the consumption of goods and services from the market are substantial, the net welfare is reduced by the losses due to the reduction in the consumption of leisure. The ability to separate the welfare effects generated within the SNA boundary from those outwith the boundary is one of the benefits of using the labour-leisure trade-off framework. This explicitly accounts for welfare changes taking place outwith the SNA production boundary.

The study shows a weak long-run correlation between employment in Israel and the supply by households of labour not employed in the market activities in the previous period. In the long-run, the supply of labour to the market by households is relatively inelastic (Boeters and Savard, 2011). Moreover, the "Dutch disease" effects of large inflows of labour income from Israel reduce incentives to work inside the SNA production boundary by increasing the price of non-traded commodities, of which the most "non-traded" is leisure. Using the labour leisure trade-off framework proved suitable to capture this mechanism. By contrast, the short-run empirical evidence supports a close correlation between employment in Israel and unemployment in the market activities in the West Bank (Bulmer, 2003; Etkes, 2012). In fact, the small capacity of the domestic economy does not provide sufficient employment opportunities to absorb in the short-run all the workers previously employed in Israel who were displaced during the conflict. Consequently, there is a pool of involuntary unemployment, ready to take employment at current wage rates. A suitable framework to model this short-run empirical evidence is the labour surplus assumption used by Agbahey et al. (2017).

In their short-run analysis, Agbahey et al. (2017) showed that the same increase in Palestinian labour demand in Israel as simulated in this paper is mostly met with labour unemployed in market activities in the previous period. Additionally, employment in the domestic market activities is increased as the additional household income derived from labour employment in Israel increases demand, which stimulates the domestic production. Subsequently, in the short-run not only households derive welfare gains, but the economy as a whole benefits from the improved labour access to the Israeli markets, with real GDP increasing by 4.10%. Contrasting the long-term and short-term outcomes of the shock shows that time dimension matters in assessing the effects of increased Palestinian employment in Israel.

Using a mobility function to address labour mobility across market segments shows that labour moves mainly from primary and secondary sectors into the construction sector, which is the sector the most affected by the shock since most Palestinians employed in Israel work in the construction sector. Adopting the labour mobility function distributes the effects of the shock more evenly across sectors, as otherwise wages would have surged in the construction sector, without triggering a movement from the other sectors into that one.

The sensitivity analysis performed shows that the results are robust and are hardly affected by a systematic change in the values of the following parameters: Frisch parameter, income demand elasticities, substitution elasticities along the utility function and the labour mobility elasticity. However, the results are sensitive to changes in the nesting structure of the utility function, especially if one considers leisure to be a substitute to goods and services in consumption.

This paper makes three significant contributions. First, the methodological approach allows accounting for household's full time endowment comprising work and leisure time. This reflects the trade-off facing household in real life between allocating time for leisure or for work in the market activities. Welfare generated from the consumption of leisure is explicitly accounted for with leisure entering household's utility function. In addition to the labour leisure trade-off, this paper assumes imperfect labour mobility, which is a core aspect of structural change in the economy. Labour heterogeneity is explicitly recognized and a mobility function is used to control labour movements across market segments. Combining the labour leisure trade off and the mobility function allows the debate over the long-term effects of increased Palestinian employment in Israel to be addressed within a theoretical framework capable of generating robust empirical results.

Second, this paper contributes to the ongoing debate over the costs of Israeli occupation of the Palestinian territories and the potential effects of a negotiated solution to the conflict. The results show that an increased Palestinian labour demand in Israel, which may result from a lower conflict environment, has in the long-run negative effects on the Palestinian economy, but positive welfare effects for Palestinian households. This finding demonstrates both the mitigating effect of Palestinian employment in Israel on poverty in the Palestinian territories and its deteriorating effect on the Palestinian economic growth by bidding up wages, reallocating labour away from tradable activities and reducing the competitiveness of the Palestinian export sector.

Third, the simulation results have important policy implications. Seen the limited development options for Palestine, it is interesting for the Palestinian National Authority (PNA) to seek increased Palestinian employment in Israel in order to improve the welfare of the Palestinian households. However, the negative effects for the domestic economy should be mitigated. To do so, the PNA could levy a tax on the Palestinians employed in Israel. This tax will generate additional much needed revenue for the PNA. With this revenue, incentives could be given to domestic employers to invest in upgrading production technologies to restore their competitiveness in the world markets. The tax would also reduce the attractiveness of employment in Israel, keep some workers in the domestic market activities and limit the structural dependence on the Israeli labour market. Ultimately, the Palestinian economy should seek shifting from a labour-export to a goods-export development strategy.

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Appendix 1. Nested utility function used for sensitivity analysis