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Trade policy in Palestine: A reassessment[☆]

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Abstract

The paper develops a CGE macro-model for Palestine, departing in three fundamental ways from the set-up applied in earlier studies. The present framework: (i) reformulates the modelling of fiscal policy in light of context-specific elements, including the absence of a government bond market and the incomplete transfer of revenues collected by Israel for the PNA; (ii) endogenizes private capital flows; (iii) postulates a demand-driven causality structure. Various policy scenarios are then assessed, with one crucial novelty: the overall effect of further trade liberalization turns out to be slightly contractionary, due to its fiscal implications.

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1. Introduction

Together with a series of econometric studies by UNCTAD, the analysis by Astrup and Dessus based on CGE modelling remains a key reference for trade policy simulation in Palestine, be it in its static or dynamic version (Astrup & Dessus, 2001, 2005 respectively).² After a decade since its development, though, the time is ripe for an update of that work – which is ultimately an application of the World Bank LINKAGE model (van der Mensbrugghe, 2005) – as well as a reassessment of its theoretical underpinnings. Taylor and von Armin (2006, 2007), for instance, have argued that the support lent by “standard CGE models” to fiscal discipline and trade liberalization is to a large extent in-built, and derives ultimately by the closure rules and causality assumptions adopted by the modeller. Supposedly, macroeconomic considerations should inform the choice among alternative theoretical approaches that could be applied to a simulation exercise. In the case in point, however, some specificities of Palestine’s conflict-torn economy, starting from the prevalence of widespread unemployment, are in contrast with the theoretical assumptions underlying “standard CGE models”.

The present paper intends precisely to fill this gap. It aims at enhancing the consistency of modelling assumptions with the unique specificities of the Palestinian context, while also assessing the extent to which the findings of earlier policy simulations exercises are robust to alternative macro closures. To this end, the paper develops a somewhat peculiar CGE macro-model, departing from earlier set-ups to capture the specific features of the Palestinian economy, as well as some key institutional arrangements enshrined in the Paris Protocol. The model is then used to simulate alternative trade policy options for Palestine, with some important novelties compared to earlier findings.

The paper is organized as follows. Section 2 explores the peculiarities of Palestine’s macroeconomic situation, notably its asymmetric integration with Israel and the far-reaching consequence of the conflict on the very working of the economy, and reviews some key stylized facts on the Palestinian macroeconomic performance in the post-Oslo period. Section 3 analyses the building blocks of the CGE model, comparing it with the formalization adopted by Astrup and Dessus (2001, 2005), and drawing the attention on the macroeconomic considerations that justified the proposed modelling choices. Sections 4 and 5 present the results of trade policy simulations and the related sensitivity analysis. Section 6 summarizes the arguments and concludes.

2. Specificities of the Palestinian context

To be consistent with the reality on the ground, macro-modelling exercises require some extra attention to the multifaceted specificities of Palestine’s socio-economic, political and military context. Broadly speaking, these peculiarities follow from the asymmetric form of economic integration with Israel, and from the wide-ranging consequences that the continuing conflict bears for the functioning of the economic system.

The former element relates basically to the *de-jure* arrangements defining the rules of the game applicable to the Palestinian economy, to its interaction with Israel, and, to some extent, also with

² In a nutshell, UNCTAD (2006, 2009) apply Seemingly Unrelated Regression analysis to a multisectoral demand-led model à la Klein, using the information extrapolated from time series data to subsequently simulate changes in closure, macroeconomic, trade and labour policies. References concerning CGE models of the Palestinian economy include, among others, Flaig, Siddig, Grethe, Luckmann, and MacDonald (2011), Missaglia and de Boer (2004); however, none of these simulations is focused on trade liberalization issues.

the rest of the world. On top of these “initial conditions”, the *de-facto* military situation on the ground impinges on the very working of the Palestinian economy, introducing a broad range of distortions that are mainly contingent on the variable intensity of the conflict between the two sides. Regardless of this conceptual distinction, both aspects exert far-reaching consequences on Palestine’s macroeconomic fundamentals, and are crucial to grasp the peculiar features of its national accounting system, most notably of the balance of payment.

2.1.1. *The asymmetric integration with Israel and the Paris protocol*

The intertwined links between the Palestinian economy and its Israeli counterpart date back to the aftermath of the six-day war, and were initially enforced by the military authorities in the occupied territories. After almost 30 years in which the asymmetric integration between Palestine and Israel became more and more entrenched, the so-called Paris Protocol of 1994 “turned the *de facto* arrangements into agreed upon ones” (quoted from Arnon et al., 1997: 7, italics in the original), sanctioning also *de-jure* the prevailing state of affairs.³ At an institutional level, the asymmetries underlying this relation can be epitomized by the provisions of the protocol concerning three key issues: the trade regime, the currency used in the territories, and the access of Palestinian workers to the Israeli labour market.

Starting with the former aspect, the protocol provided for a quasi custom union between the two sides, with the Israeli duties serving as a unilaterally fixed “minimum basis for the Palestinian Authority” (see Article III, 5a of the Paris Protocol on Economic Relations stipulated between Israel and the P.L.O.). As a consequence of this one-sided arrangement, Israel has had the possibility to set external tariffs on third countries regardless of Palestine’s comparative advantages, which were presumably dissimilar owing to the different economic size and level of development. In addition, it must be borne in mind that Palestinian trade with third partners had in any case to be conducted through Israeli-controlled borders, with ensuing transaction costs, delays, and the like (Dessus & Ruppert Bulmer, 2004; FEMISE, 2006). Besides, it is worth noting that such a biased trade regime was intervening on an already evident situation of dependency of Palestine on the Israeli market, both as a source of imports and as an export destination.

Moving from the trade regime to the “currency issue”, the protocol recognized that the New Israeli Shekel (NIS) was to be “one of the circulating currencies in the areas, and legally serve as means of payment for all purposes including official transactions”.⁴ The sanctioned use of the NIS as a means of exchange in the territory contrasts with the generic deferral of the introduction of a “mutually agreed Palestinian currency”; possibility which has, until now, remained dead letter.⁵ This situation has led to the overlapping use of the US Dollar (\$), the Jordanian Dinar (JD), and the New Israeli Shekel (NIS). From a macroeconomic point of view, it is interesting to note that

³ Interestingly, this continuity of the Palestinian development trajectory, has been underscored also by Naqib (2002) and by Dessus (2002, p. 6), who argues that “the implementation of the Paris Protocol did not seem to have entailed any structural break with respect to the pre-Oslo period, as far as GDP growth is concerned”.

⁴ This citation and the following one are taken respectively from Article IV, 10a and Article IV, 10b of the Paris Protocol on economic relations, as quoted in Arnon et al. (1997).

⁵ Incidentally, the lack of a national currency implies a sizeable loss of seignorage for the Palestinian authorities, and seriously constrains the role of the Palestinian Monetary Authority (PMA) as lender of last resort and manager of the inter-banking discount window system. Furthermore, the absence of a Palestinian currency restrains the ability of the PMA to conduct any autonomous exchange rate or monetary policy, given that the exchange rate is determined exogenously, while the interest rate is essentially left to the behaviour of commercial banks, with the PMA capable only of acting indirectly by revising reserve and capital requirements.

the pattern of currency utilization in Palestine appears to be closely related to the function money is used for. While the NIS serves predominantly as a *means of exchange* in order to minimize transaction costs, the JD and USD represent the preferred currencies to be used as a *store of value*. Coming finally to the *unit of account*, the situation is so complicate that even the government budget is computed both in NIS and USD, with obvious costs and exchange rate risks. Though no systematic data exist on the extent of currency overlap in the monetary base, the previous analysis is broadly confirmed by the structure of credit and deposit facilities within the banking system. As shown in [Valensisi and Missaglia \(2010\)](#), Palestinians favour NIS-denominated instruments for short-term purposes related to the management of liquidity and working capital (overdrafts and current accounts); conversely they resort almost exclusively to assets and liabilities denominated in USD or JD for long-term investment decisions (time deposits and loans).

Coming to the access of Palestinian workers to the Israeli labour market, the subject has represented a controversial political issue, at least since the aftermath of the six-day war. In view of its higher level of development, Israel was traditionally in the position to attract large numbers of Palestinian labourers offering them a wage premium.⁶ The associated inflow of remittances, in turn, was certainly beneficial for Palestinians' living standards, but was also hurting the domestic economy by bidding up the reservation wage. Historically, after a first phase in which the number of Palestinians employed in Israel had expanded gradually, the onset of the first Intifada led to a growing segmentation of the two labour markets. At the height of the Oslo Accord, the provisions of the protocol reflected this evolving situation, and essentially maintained every option open by stating that “both sides will attempt to maintain the normality of movement of labour between them, *subject to each side's right to determine from time to time the extent and conditions of labour movement into its area.*”⁷ In spite of the reciprocity enshrined in this formulation, the underlying balance of power remained asymmetric, in so far as Israel could then easily substitute Palestinian labourers with other foreigners (mainly from Asia and Eastern Europe), while for Palestinians it continued to be difficult to replace relatively well-paid jobs in Israel with alternative occupations in the territories.

2.1.2. *Economic consequences of the conflict*

If the asymmetric integration with Israel is, in its multiple facets, one of the defining characteristic of Palestine's context, in practical terms the very working of the economic system continues to be profoundly affected by the long-standing situation of conflict between the two parties. From a macroeconomic perspective, three considerations are noteworthy in this regard. First and foremost, Israel's military operations inflict considerable destructions of fixed and working capital on the Palestinian side, and dramatically increase transaction costs even in relatively peaceful periods. These widely discussed aspects do not only belong to the past; even in recent years they have been documented, among others, by [World Bank \(2009\)](#). This study underscores the destruction of productive base caused by the Cast Lead operation, as well as the impediments

⁶ A recent quantitative evaluation of the importance of the Palestinian workers' movement towards Israel and the settlements may be found in [Flaig et al. \(2011\)](#).

⁷ The citation comes from Article VII, 1 of the Paris Protocol on economic relations, as quoted in [Arnon et al. \(1997\)](#); italics added.

to the movement of goods and people that derive from territorial fragmentation, border closures, checkpoints and administrative obstacles.⁸

Secondly, the unresolved situation of conflict exacerbates the degree of uncertainty permeating economic activity, thereby discouraging long-term investment and stimulating, instead, precautionary saving behaviours. The latter may be defined as allocative decisions in the financial market that do not directly increase productive capacity, but simply transfer wealth into safer – and often liquid – assets. This point is of extreme relevance, because it provides a compelling reason to argue that output may well be demand-driven in a context like Palestine. Put differently, it is plausible that the unsettled political situation may stimulate money hoarding, and lead entrepreneurs to refrain from undertaking certain (otherwise profitable) investment projects, or to operate below full capacity utilization.

Thirdly, it can be argued that the political and territorial motives behind the Israeli-Palestinian conflict, coupled with the extreme uncertainty, affect the very pattern of capital accumulation, as well as of domestic credit provision. A case in point is the striking share of gross fixed capital formation accounted for by buildings and construction, that is by items which are indeed classified as fixed capital accumulation in national accounting systems, but are not necessarily related to the expansion of the country's productive capacity. On the other hand, it is evident that the hazardous and unpredictable situation on the ground tends to discourage Palestinian banks from granting long-term credit (particularly to agricultural and manufacturing sector), leading them to accumulate large stocks of net foreign assets instead (see [Valensisi & Missaglia, 2010](#)).

2.2. Key stylized facts on Palestine's macroeconomics: growth performance, structural change and external accounts

It is straightforward to see that the state of affairs described above bore deep consequences on Palestine's growth performance, structural dynamics, and balance of payment structure. Though various other factors were also at play, political developments have clearly been amongst the key drivers of business fluctuations and economic growth. In the last 15 years, GDP growth in the West Bank and Gaza Strip has been altogether rather weak, extremely erratic, and prone to dire shocks caused by the recurrent intensification of the conflict and of related security measures, such as closures, trees uprooting, arable land grabbing, restricted access to water and the like.⁹

⁸ If in the last few years the destruction of capital stock and the intensified closure regime targeted the Gaza Strip disproportionately, it should be noted that the circulation of goods and people even in the West Bank is far from smooth.

⁹ Interestingly, some authors have argued that the inherent flaws of the Paris Protocol largely explain why the economic development envisaged for Palestine in 1994 failed to materialize. Along these lines, [Arnon and Weinblatt \(2001\)](#) identify four structural weaknesses:

- i. The uneven balance of power between Israel and Palestine was locked in the agreement, which did not design any mechanism to solve the imbalances, nor to deal with transition process.
- ii. Being an inherently incomplete contract, the Protocol unavoidably needed a subsequent re-negotiation on several delicate issues, however no such re-negotiation was ever foreseen or attempted.
- iii. In the determination of economic borders, the agreement reflected an inefficient compromise between the "first best" option of having no economic boundaries between the two parties, and the "second best" alternative of adopting economic frontiers along existing "security borders", creating at the same time several well-structured crossing points.
- iv. The economic issues at stake in the agreement were in effect subordinated to political considerations.

[Naqib \(2002\)](#) similarly argues that the various Accords failed to tackle the economic core of the problem, namely the issue of Palestinian sovereignty and the "colonial-like relationship" with the Israeli economy.

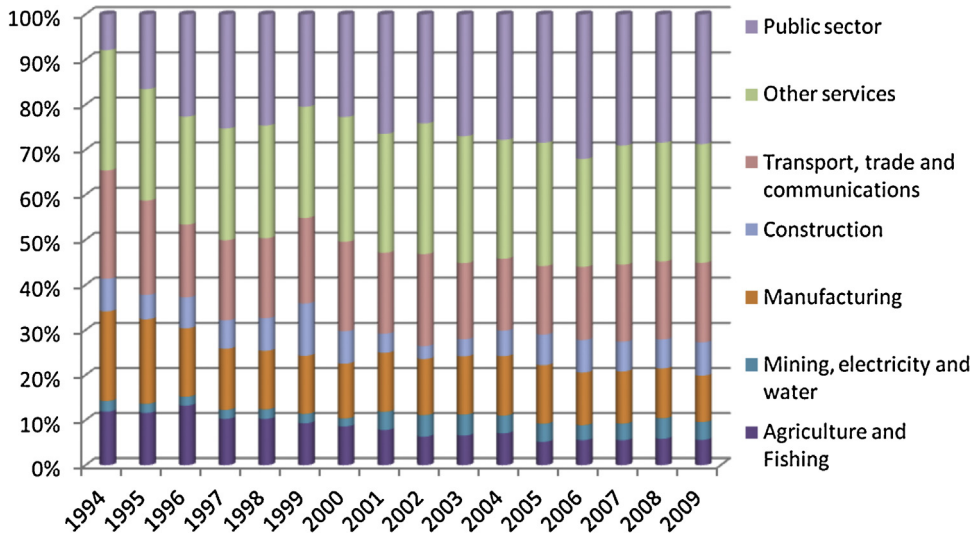


Fig. 1. Sectoral composition of value added, constant 2004 prices.

Source: author's calculation based on PCBS data (downloaded on 20/01/12 from www.pcbs.gov.ps).

According to Palestinian Central Bureau of Statistics (PCBS) data, real GDP grew at about 8% per year in the interim period 1995–1999, then plummeted by nearly 10% per year at the outset of the Second Intifada (2000–2002), it rebounded again at a yearly rate exceeding 11% from 2003 to 2005, declined once more by 8% following Hamas electoral victory and the ensuing tensions, and picked up again at upwards of 6% per year from 2007 to 2009. These bleak and inconsistent figures confirm the divergence between Israel and Palestine since the second half of the 1980s, and the fact that “the economic integration of West Bank and Gaza with Israel has not produced the positive dynamic gains (...) that could have been theoretically expected” (Dessus, 2002: 14).

The impact of this dismal record on the standards of living of the Palestinians has been dramatic, and exacerbated the problems of unemployment and widespread poverty. According to PCBS data, in real terms GDP (GNI) per capita in 2009 was barely 86% (80%) of its 1999 value, while the unemployment rate, pulled by economic stagnation and demographic dynamics, was as high as 30% (UNCTAD, 2011). On the other hand, income poverty touched 26% of the whole Palestinian population in 2009–2010, with headcount ratios as high as 18% in the West Bank and of 38% in Gaza (*ibidem*).¹⁰

The evolution of the composition of output since 1994 confirms Palestine's gloomy macro-economic record, shedding light on the ongoing process of de-industrialization, as well as on the unbalanced composition of effective demand. GDP decomposition by sector of activity (Fig. 1) reveals a sharp fall in the contributions of agriculture and manufacturing, counterbalanced by a rapid expansion of the public sector and, to a lower extent, services.¹¹ This worrying pattern of structural change is strongly consistent with the findings of growth accounting exercises, which

¹⁰ Refer also to IMF (2009), concerning the sharp economic divergence between the West Bank and Gaza.

¹¹ The surge of the PNA as a crucial source of GDP creation and employment in the wake of 1994 was accompanied by an unsustainable boom in current expenditures for wages and salaries (World Bank, 2007).

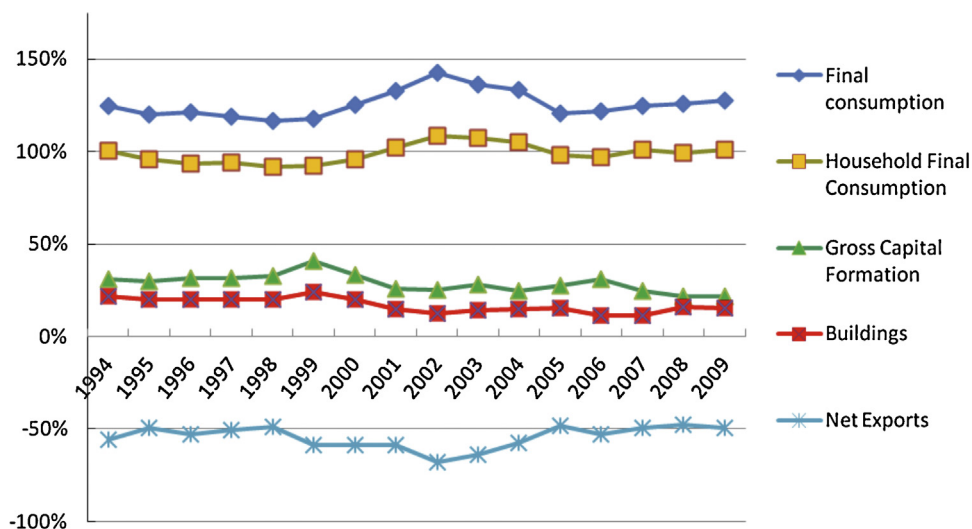


Fig. 2. Demand decomposition – GDP shares at current prices (West Bank and Gaza Strip).

Source: author's calculation based on PCBS data (downloaded on 20/01/12 from www.pcbs.gov.ps).

underscore the sluggish growth of TFP (Total Factors' Productivity) in Palestine and a slowdown in the pace of capital accumulation since the second half of the 1980s (Armon et al., 1997; Dessus, 2002). Identifying the root-causes of such a vicious structural dynamics is beyond the scope of this paper, but in the literature they have been ascribed to a number of factors, ranging from long-standing occupation to limited innovation, from Dutch disease induced by windfalls of aid and remittances to inefficient business environment, to end with the huge transaction costs imposed by Israeli security measures.

The unresolved confrontation with Israel has equally affected the demand structure, as emerges clearly from Fig. 2. In this respect, with reference to the post-Oslo period, at least three aspects deserve close attention. First and foremost, households' consumption demand covers alone approximately the entire Palestinian GDP. In view of national accounting identities, this implies that external sources of income were necessary to finance not just the entire gross capital formation, but also public consumption expenditure. Secondly, gross capital formation amounts to an average of nearly 29% of the Palestinian GDP – entailing apparently a fairly high, albeit declining, investment rate – however buildings account for well over a half of such expenditures. Thirdly, in the 1994–2008 period Palestine's lopsided trade relations represent a leakage of effective demand systematically around 50% of GDP, given that the import to GDP ratio averaged 0.69 whereas the quota of exports on GDP a much lower 0.14. In light of the asymmetric integration discussed above, it is not surprising that the structural deficit in the Palestinian trade balance is largely accounted for by its bilateral trade with Israel. The scale of such a dependency is striking: in the post-Oslo period Israel absorbed approximately 90 percent of the Palestinian exports and supplied about three quarters of its imports, though a significant part of it is accounted for by indirect imports (Bank of Israel, 2010; UNCTAD, 2011). By contrast, less than 1 percent of Israeli imports and about 6 percent of its exports was accounted for by the occupied territories.¹²

¹² Dessus and Ruppert Bulmer (2004), FEMISE (2006) and Botta (2010), among others, provide similar evidence of Palestine's dependency on Israel, both as a source of imports and as an outlet for exports.

Given the intrinsic logic of the national accounting system, the specificities of the Palestinian economy mirror also in the structure of its balance of payment. As can be seen from [Table 1](#), trade deficits have been so wide that they systematically exceeded both income payments and current transfers, resulting in a structural deficit of the current account, which averaged more than USD 800 million per year. As anticipated above, remittances inflows – that averaged USD 900 million per year in the period considered – play a significant role in financing part of the trade deficit, and reflect the large but declining number of low-skilled Palestinians working in Israel, as well as the growing pool of relatively well-trained Palestinian diasporas working in other Arab countries. ODA receipts have also represented a prominent source of external funding, and have gradually acquired an even greater weight, climbing from about USD 600 million per year in the second half of the 1990s, to upwards of two USD billion in 2008 and 2009.

The working of the capital and financial accounts is also influenced by the peculiarities of the Palestinian situation, and most notably by the “currency issue”, which entails several conceptual difficulties in the interpretation of the exchange rate. Even though nominal exchange rate movements between NIS, JD and USD are essentially exogenous, the overlapping use of these three currencies creates multiple complex interactions between real transactions and their financial counterparts. Consistently with the idea that NIS are mostly used as a “means of exchange”, while JD and USD are used as “store of value”, various authors have suggested that NIS fluctuations are transmitted to the Palestinian economy mainly through the current accounts, whereas Jordanian monetary disturbances affect primarily the capital and financial accounts (see [FEMISE, 2006](#); [Naqib, 1999](#)). In practice, one recent example of such a close interaction between financial and real variables can be found in the modification of assets’ allocation stemming from the creeping appreciation of NIS vis à vis USD and JD, at least until 2008. On the one hand, this exchange rate dynamics eroded the Palestinian competitiveness in foreign markets other than Israel, and on the other it reduced the real value of USD- and JD-denominated financial resources.

Beyond these general remarks, it is worth noting that capital inflows transiting through the financial account – hence certainly different from either remittances or ODA – have also played a significant role in backing the net-imports of goods and services (see [Table 1](#)).¹³ In this respect, it is instructive to analyze the financial account at a deeper level of disaggregation, discriminating among *net foreign direct investment (FDI)*, *net portfolio investment* and the residual class denominated *net other investment*. Consistently with Palestine’s sluggish economic performance and with the unsettled political situation, FDI and net portfolio investment have been very volatile and actually represented net outflows of capital for most of the period considered. Only in the more recent years, after the so-called “rebound” from the Second Intifada, have FDI led to a net inflow of capital, while portfolio investments continued to drain resources abroad. More striking though, is the magnitude of capital inflows systematically entering Palestine in the form of net other investments, that is through instruments such as “trade credits, loans, currency and deposits (both transferable and other), and other assets and liabilities (for example, miscellaneous accounts

¹³ Admittedly, the years 2002 and 2007 represent marked exceptions to this general pattern. Indeed, with the Second Intifada in 2002, Palestine suffered a generalized economic crisis hence a lower trade deficit, while receiving over 1.5 billion USD in ODA. Moreover, since aid flows were mainly for emergency purposes (showing in the balance of payment as current rather than capital transfers) the resulting current deficit plummeted below 0.5 billion USD. In the same vein, during 2007 aid flows reached their highest peak at 1.8 billion USD, causing the current deficit to contract sharply thanks to over 2 billion USD of current transfers; simultaneously, the Palestinian GDP was basically stagnating, with West Bank posting a very modest growth rate but Gaza being strangled by the Israeli blockade.

Table 1

Palestinian balance of payment – millions USD at the end of period; (all data were downloaded on 20/01/12).

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current account, n.i.e.	-984	-1424	-1548	-1038	-1192	-990	-998	-436	-915	-1516	-1152	-913	249	764	-737
Goods: exports f.o.b.	490	530	612	600	565	540	395	327	368	401	435	450	623	668	645
Goods: imports f.o.b.	-2399	-2893	-3055	-2839	-3049	-2721	-2394	-1801	-2120	-2737	-3115	-3245	-3684	-3903	-4147
Trade balance	-1909	-2364	-2443	-2239	-2484	-2182	-1999	-1473	-1752	-2336	-2680	-2795	-3061	-3234	-3502
Services: credit	274	293	282	394	475	473	180	197	259	240	282	260	369	496	579
Services: debit	-391	-440	-507	-506	-518	-548	-675	-673	-573	-601	-504	-560	-741	-836	-861
Balance on goods & services	-2026	-2511	-2669	-2350	-2528	-2257	-2494	-1950	-2066	-2697	-2901	-3095	-3432	-3575	-3783
Total net income	607	578	651	901	937	628	523	417	480	447	574	692	766	919	808
Balance on Gds, Serv. & Inc.	-1419	-1933	-2017	-1448	-1590	-1629	-1971	-1533	-1586	-2250	-2327	-2403	-2666	-2656	-2975
Total net current transfers	435	508	470	410	399	639	973	1096	671	734	1175	1491	2915	3420	2239
Capital account, n.i.e.	262	264	278	264	282	198	226	301	305	669	418	275	402	399	719
Financial account, n.i.e.	557	206	937	609	729	941	543	120	841	775	680	702	-52	-386	131
Direct investment abroad	-129	-142	-156	-160	-169	-213	-377	-360	-49	46	-13	-125	8	8	15
Dir. Invest. in Rep. Econ., n.i.e.	123	177	163	218	189	62	19	9	18	49	47	19	28	52	264
Portfolio investment assets	-83	-68	-105	-107	-120	-113	-150	-161	-38	49	-11	-8	-131	-25	-444
Portfolio investment Liab., n.i.e.	0	3	14	27	15	12	14	8	13	8	14	0	0	0	78
Other investment Assets	612	140	932	526	613	1135	1042	661	974	553	532	818	61	-429	35
Other investment Liab., n.i.e.	35	95	89	105	202	58	-4	-38	-78	71	112	-2	-19	8	182
Net errors and omissions	164	1176	491	112	146	-58	213	30	-130	99	28	-41	-507	-243	-66
Overall balance	0	221	158	-53	-35	91	-16	15	100	27	-26	22	91	534	47
Reserves and related items	0	-221	-158	53	35	-91	16	-15	-100	-27	26	-22	-91	-534	-47
<i>Memorandum items</i>															
ODA total, net disbursements *	514	552	613	613	581	685	998	972	1042	1161	1016	1360	1717	2470	2817
Remittances inflows**	582	542	623	1081	1116	1010	1066	1036	572	638	705	928	1085	1220	1261

All data from IMF – International Finance Statistics, except: * from OECD-DAC database, and ** from Migration and Remittances Factsbook 2011.

receivable and payable)".¹⁴ Table 1 suggests in this respect that conspicuous sums came from the liquidation of foreign assets belonging to residents and, to a much lower degree, from the increase in their liabilities towards the rest of the world. Given the dearth of data concerning Palestine's net foreign asset position, it is impossible to account completely for the nature of such transactions. Nonetheless, the evidence reported in Table 1 seems sufficient to argue that portfolio choices by Palestinian agents played a significant role in systematically financing current account deficits, at least until the second half of the 2000s.

3. The model

The previous discussion has highlighted some unique and deep-seated features of Palestine's macroeconomic context. Starting from those observations, the present section points to the difficulty for the standard neoclassical framework to capture some of these context-specific elements, and focuses on the building blocks of an alternative CGE macro-model, equally plausible on theoretical grounds, but designed precisely to capture more closely the specificities of the Palestinian situation. Rather than dilating on the mathematics of the various equations, which are left to the appendix, particular attention is paid to the logic underlying alternative modelling options and its consistency with the reality on the ground.

The CGE proposed here features one productive sector only, but has the key characteristics of more sophisticated set-ups (Missaglia & Valensisi, 2010). This choice is dictated by the intrinsically *macroeconomic* nature of the mechanisms analyzed in the paper, namely the budgetary implications of trade liberalization in the specific Palestinian context. Taking the model developed by Astrup and Dessus (2001, 2005) as a reference point, a first conceptual departure relates to technologies and price formation. Here a Leontief production function is assumed, ruling out factors' substitution, hence demand for production inputs is obtained from the fixed labour-output and incremental capital-output ratios.¹⁵ Unlike in the neoclassical theory of distribution, where prices are derived from cost minimization and demand functions obtained through Shepard's lemma (with markets operating under perfect competition), the present model postulates a mark-up pricing rule, in which the mark-up rate τ depends parametrically on the degree of competition.

Beyond these relatively straightforward modifications, the core of the reasoning underlying the present CGE model for Palestine is related to the macro-closures, i.e. those macroeconomic constraints that are applied to the system of equations, and define its structure of causality by fixing exogenous or pre-determined variables. Macro-closures usually characterize the conceptual treatment of:

- international trade;
- fiscal conduct;
- balance of payment; and
- overall macroeconomic causality.

¹⁴ The quotation is taken from the IMF Balance of Payment Manual (IMF, 1993) page 95, 413.

¹⁵ While in a static framework technical coefficients are typically held fixed, on a longer-term horizon factors substitution, as well as efficiency gains, can be captured by parametric shifts in the coefficients. This approach, characteristic of post-Keynesian economic theory, is intended to capture the costly and time-consuming nature of factors' substitution and technological change.

The common practice among most CGE modellers is to rationalize international trade through the nested Armington–CET approach. This framework is utilized to determine the response of intra-industry trade flows to relative price movements, under the assumption of imperfectly substitutability between domestic and foreign varieties of each good.¹⁶ Foreign prices are then assumed exogenously on account of the so-called “small country assumption”, and it is postulated that the level and composition of imports, exports, and domestic output adjust smoothly to ensure the full employment.

The present model, on the contrary, employs a different conceptual approach for both imports and exports. On the import side, a log-linear demand function relates the total imports of final goods to the real output V and to the relative price of domestically produced and imported goods, with θ and γ indicating the income and price elasticities respectively.¹⁷ The total demand for (final) imports is subdivided across the different varieties of goods, from Israel and the rest of the world, through a CES function with elasticity equal to λ . Without losing the insight of imperfect substitutability of the different varieties of goods, this choice allows relaxing the assumption of a unitary income elasticity of imports, which is implicit in the neoclassical Armington framework (Lloyd & Zhang, 2006). Conversely, in the case of exports the CET-approach is replaced by ad hoc export functions, which capture through the elasticities σ_I and σ_R the relationship between Palestinian sales to Israel or the rest of the world and the relevant real exchange rates. Besides, the “small country assumption” is maintained here as well, with import and export prices being exogenously fixed.

Moving to the formalization of fiscal policy, significant departures from the standard approach appear to be warranted on the basis of the actual constraints faced by the PNA in the management of the budget process. Assuming that the economy operates always at full employment, while simultaneously postulating that public expenditures are pre-determined and “public receipts adjust endogenously to achieve the pre-determined government net position” (Astrup & Dessus, 2001: 33), sits somewhat at odds with the reality on the ground.¹⁸ Equally important, under the terms of the Paris Protocol, a large share of government revenues is not directly collected by the PNA, but actually transferred to it from Israeli authorities, subject to a whole set of political considerations. This is the case both for VAT on imported goods and for customs duties, two of the largest sources of revenues for the Palestinian authorities.¹⁹ Moreover, Palestine lacks a domestic market for

¹⁶ In plain words, the Armington–CET set-up works as follows (see Armington, 1969). On the demand side, agents’ utility maximization involves a two-step problem: firstly, they decide the overall demand level for each good in terms of a fictitious CES aggregator, the “Armington bundle”; secondly, they subdivide this amount into demand for the domestic and foreign varieties of each product, taking relative prices into consideration. Similarly, on the production side firms maximize their profits ensuring the full-employment of productive inputs, and then utilize a CET function to earmark domestic output for national or foreign markets, taking into account the corresponding price levels in the different destinations. Hence, the composition of domestic output and the nature of intra-industry trade smoothly adjust to the changes in relative prices, leaving the overall level of activity unchanged.

¹⁷ Here, as in Astrup and Dessus (2001, 2005), imports of intermediate goods are instead assumed to be a fixed fraction of GDP (Eq. (A6)).

¹⁸ Since the economy is at full employment by construction, the approach followed in Astrup and Dessus (2001, 2005) requires a tax rate, or an equivalent compensating mechanism, to adjust endogenously in order to achieve the pre-determined government net position.

¹⁹ See in this respect the chapter on “Fiscal Policy and Performance” in FEMISE (2006). Incidentally, note that the PNA bears a sizeable loss of tariff revenues due to the management of indirect imports. Under current practice, the tariff revenue calculated on these goods – initially attributable to Israel and only subsequently re-exported by Israeli intermediaries to the West Bank or Gaza – is retained by Israeli authorities, but paid by Palestinian consumers.

government bonds, which implies that deficit financing is bound to resort primarily to budget support from the international donor community.²⁰

In light of these considerations, the model proposed here regards tax revenues directly collected by the PNA as endogenous (with all tax rates being pre-determined), but considers the budget deficit exogenous, since it depends on revenue transfers from Israel and on the decisions of international donors. This essentially amounts to postulating that the PNA maximizes its public expenditure, subject to each period's disbursement in terms of budget support and revenues transfers from Israel. A similar closure rule, which may admittedly be inappropriate to other contexts, appears to capture some salient unique features of Palestinian context, as can be testified by recent historical examples. In the aftermath of Hamas' electoral victory in 2006, when Israel suspended the stipulated revenue transfers and ODA flows simultaneously halted due to political considerations, the PNA soon found itself unable to pay public employees. As a consequence, public expenditure and service provision plummeted abruptly, triggering a sharp fall in the aggregate demand and in the overall level of activity. Again, Israel considered analogous measures to withhold some USD 100 million of custom clearance revenues to the PNA in May 2011, in the wake of the formation of the "Palestinian unity government" (UNCTAD, 2011).

Coming to the balance of payment, rather than interpreting the related accounting identity as a mere constraint on the current account to balance exogenous capital inflow, the formalization adopted here assumes financial flows from the rest of the world to Palestinian households to be endogenous. In line with the above discussion, this choice is not intended to deny the magnitude of remittances and ODA inflows to Palestine, nor to question the latter's exogeneity. Rather, the rationale here is to capture the effect of the large capital inflows transiting through the financial account (Table 1), i.e. of those transactions originating in portfolio choices on the part of Palestinian agents, which played an important role in financing the structural deficit of the current account.²¹

Even if the modifications introduced so far already have far-reaching consequences, it is with respect to the overall macroeconomic causality that the present model departs most fundamentally from the standard neoclassical approach. Beyond theoretical concerns on the importance of effective demand mechanisms, in the case of Palestine two sets of considerations underscore the limitations of a completely supply-driven set-up. First, the full employment assumption sits at odds with Palestine's macroeconomic outlook, and most notably with the country's massive unemployment and significant unutilized capacity. Secondly, as discussed earlier, there are strong reasons to believe that the uncertainty stemming from the prolonged conflict negatively affects aggregate demand, leading to widespread precautionary saving behaviours, and discouraging investments (Valensisi & Missaglia, 2010).

Consistently with these views, the causality structure employed here pivots around effective demand: it is the latter that determines the degree of capacity utilization and hence the functional distribution of income, which in turn affects the availability of savings. The inclusion of an autonomous investment function plays in this respect a central role, since it relates investment demand to the profit rate, to the degree of capacity utilization, and to the parameter capturing the

²⁰ The PNA has also financed part of its deficits by borrowing from commercial banks, by transferring exceptional profits from the Palestinian Investment Fund and by taking recourse to payment arrears; however these sources of funding have historically played a minor role vis à vis budget support (World Bank, 2007).

²¹ Admittedly this formalization of endogenous portfolio decisions is somewhat rudimentary; the lack of data concerning Palestine's net foreign asset position, as well as the difficulties implied by the "currency issue" impede, however, a more detailed treatment of financial transactions.

“animal spirits”. While effective demand mechanisms are central, the model also accounts for the possibility that real output will not respond anymore to demand injections, once full utilization of productive capacity has been reached. In such a case – i.e. when real output V reaches its potential level V^* – aggregate demand expansion will endogenously increase the mark-up rate beyond its benchmark level τ_0 , and this will translate into higher prices. In other words, Eq. (A28) allows the model to switch endogenously from a fix- to a flex-price regime, when full capacity utilization is attained.

It is worth emphasizing that the demand-driven nature of the model does not impede that conflict-related supply bottlenecks be incorporated in the picture. Beyond the destruction of physical capital (which of course affects the predetermined level of capital), the host of military and administrative measures that reduce the overall level of efficiency can be captured through parametric variations in the ICOR, and therefore affect the value of V^* . As such, they do not per se modify the macroeconomic causality of the model, but rather change the threshold above which a fix-price regime switches to a flex-price regime.

A final word is due on the characterization of the labour market, in view of the possibility, for a declining but still substantial number of Palestinian workers, to supply their labour in Israel and the settlements, conditioned to the vagaries of the political situation. The model account for this segmentation of the labour market through a sort of arbitrage condition, which equates the expected wage in the territories with the corresponding expected wage in Israel, adjusted for an ad hoc risk premium. Although this condition echoes the findings of Harris and Todaro (1970), it must be stressed that the arbitrage process determines the wage level, but does not play the role of a full-fledged theory of unemployment. Indeed, owing to the overall structure of the CGE, employment levels remain directly linked to the evolution of aggregate demand, while wage determination has only second-round effects on the level of activity through distributional issues. Straightforward comparative statics suggest that the implications of such a theory are quite reasonable in the Palestinian context: wages in the Territories increase with the expected wage in Israel and with relaxations in the closure policy, whilst they decrease when total labour supply expands.

4. Trade policy simulations

The trade policy simulations carried out here are based on a simplified macroeconomic social accounting matrix (SAM) elaborated in collaboration with the PCBS, using data referred to years 2006–2008 (Missaglia & Valensisi, 2010). Given the lack of reliable time series to estimate the relevant parameters, the latter are taken from Lim and Saborowski (2010) (for the elasticity of substitution across different exporters) and Tokarick, 2010 (for the import demand and export supply elasticities).²² These values are fairly standard in the literature, but admittedly country- and time-specific idiosyncrasies may require some variation from this default. Accordingly, Section 5 will conduct a thorough sensitivity analysis to verify the robustness of our findings to systematic variations in the parameters.

Before illustrating the simulation results it is instructive to reflect upon the working of trade policies in the present framework. Trade liberalization entails three direct effects: (i) lower prices for imports of final goods; (ii) lower prices for intermediate imports; and (iii) reduced fiscal revenue. Beyond these first-round impacts, though, the overall macroeconomic implications are a

²² As Palestine is not covered by Tokarick's (2010) study, it is assumed that the relevant parameter values equal the short-run general equilibrium elasticities of the median country in the same income group (i.e. lower middle income).

priori uncertain, since the various components of aggregate demand may well move in opposite directions. Tariff cuts, for instance, are likely to increase private consumption, insofar as the propensity to consume of profit-earners' is lower than that of wage-earners, and liberalization redistributes income from the former to the latter. Exports are also expected to increase, *ceteris paribus*, because cheaper intermediate imports result in lower prices. Trade liberalization, conversely, reduces the fiscal revenue; hence the government is bound to cut public expenditures, unless it is able to compensate the loss of import duties through other revenues or increased donors' assistance. The precise effect on imports, on the other hand, depends on the specific liberalization scenario implemented, on the overall change in GDP and on the elasticity of substitution between imports from different sources. The effect on investment, finally, is equally uncertain and depends on whether the predominant force in the investment function is the accelerator or the profitability effect. In a nutshell, macroeconomic implications may go in either direction, and are not built-in through the model closures.

To shed more light on the impact of trade liberalization in Palestine, [Table 2](#) reports the results of some simulation exercises on three different policy scenarios broadly comparable with those analyzed in earlier studies. Scenario 1 describes a non-discriminatory trade liberalization, in which tariffs on imports from all parties are reduced by 80%; in scenario 2 taxes and duties are removed only on imports from third countries, while in scenario 3 they are eliminated only with respect to imports from Israel.²³ For each scenario, two different closures are applied: a "traditional" one – introduced for the sake of comparison – in which government real expenditures and net position are kept constant at the benchmark level while revenues adjust accordingly (as in [Astrup & Dessus, 2001](#)), and an "alternative" one (our preferred option) where only government savings are held fixed and all tax-rates pre-determined (in line with the above discussions). Besides, the table also combines each scenario (as well as the status quo) with the complete transfer to the PNA of taxes and duties collected by Israel.

Admittedly the figures obtained from any simulation exercise should be taken with great caution; nonetheless a few important considerations can be drawn from [Table 2](#). First of all, the choice of the closure rule appears to be of the utmost importance for the working of the CGE model, implicitly reinforcing the call for a greater adherence of modelling assumptions to the context under consideration. With the "traditional" closure all liberalization scenarios yield an output expansion, in line with earlier findings. On the contrary, under the (preferred) "alternative" closure the budgetary implications associated with tariff cuts assume a greater relevance, ultimately lead to a slightly contractionary outcome. Put differently, not only – as in other cases – "liberalization may exacerbate the government's already difficult fiscal circumstances" ([Bevan, 1999](#): 678), but this adverse effect may bear stronger macroeconomic implications, owing to Palestine's specific context (i.e. the key contribution of the public sector to GDP and employment creation, and the various constraints to the fiscal conduct).

Second, regardless of the closure rule, trade reforms seem to have relatively small effects on output, but larger redistributive consequences, since they tend to lower the price level, thereby boosting real wages. Though the reduction in prices improves the competitiveness of exports, the fall in government revenues (and thus in real expenditure) sharply depresses aggregate demand, ultimately leading to lower rates of capacity utilization, lower profits and marginally lower

²³ It is noteworthy that the second scenario can be regarded as a way of measuring the costs of granting preferences to Israeli imports, within the current *de facto* customs' union regime.

Table 2
Trade simulations (percentage change with respect to the initial situation).

	Scenario 1			Scenario 2			Scenario 3			Scenario 4
	Elimination tariffs and purchase taxes on imports from the RoW			Elimination tariffs and purchase taxes on imports from Israel			Elimination tariffs and purchase taxes on imports from all origins			Status quo plus full tax transfer from Israel
	Traditional closure		Alternative closure	Traditional closure		Alternative closure	Traditional closure		Alternative closure	Alternative closure
	No changes in tax transfers	No changes in tax transfers	Plus full tax transfer from Israel	No changes in tax transfers	No changes in tax transfers	Plus full tax transfer from Israel	No changes in tax transfers	No changes in tax transfers	Plus full tax transfer from Israel	
Real output	1.92	−0.74	0.75	3.03	−1.19	−0.06	5.06	−1.91	−1.42	2.15
User price	−2.53	−4.31	−3.35	−3.92	−6.81	−6.12	−6.04	−11.08	−10.80	1.49
Import volumes (final good)	8.22	3.29	6.01	12.79	4.68	6.74	19.88	5.64	6.54	3.81
of which from Israel	−6.15	−10.43	−8.07	19.32	10.74	12.92	12.80	−0.60	0.24	3.81
Export volumes	1.96	3.39	2.61	3.07	5.48	4.89	4.82	9.29	9.03	−1.11
of which to Israel	2.02	3.50	2.69	3.17	5.66	5.05	4.98	9.59	9.32	−1.15
Degree of openness	1.43	1.84	1.60	2.20	2.82	2.64	3.21	4.24	4.15	−0.31
Endogenous capital inflows	4.77	−8.15	−24.50	7.41	−13.03	−24.95	11.33	−22.38	−27.27	−24.81
Real government expenditure	Fixed	−9.73	4.50	Fixed	−15.26	−4.57	Fixed	−24.87	−20.25	20.48
Real government revenues	0.89	−4.52	4.01	1.40	−7.02	−0.61	2.21	−11.25	−8.49	12.29
Real government savings	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Investment rate	0.29	−0.11	0.11	0.46	−0.18	−0.01	0.76	−0.28	−0.21	0.32
Profit rate	1.93	−0.73	0.76	3.04	−1.17	−0.04	5.08	−1.87	−1.39	2.15
Real wages	6.43	3.13	4.93	10.46	5.08	6.40	18.17	8.78	9.33	2.70
Unemployment rate	−5.46	2.11	−2.14	−8.60	3.38	0.18	−14.36	5.43	4.04	−6.12

Notes: for each variable, simulation results are expressed in percentage change with respect to the initial situation.

investments. In this context, the main effect of trade liberalization is thus a redistribution of income towards wage-earners, associated with small reductions in output and employment.

Third, it is interesting to note that the slightly contractionary impact of trade reforms could be partly – if not fully – reversed, if liberalization were to be combined with the full transfer to the PNA of the duties and taxes collected by Israel on its behalf (including those on indirect imports). These additional resources would in fact cushion the drop in government revenues, with positive effects on fiscal variables and output, in line with the demand-driven causality of the model.

In brief, with all due caution in interpreting simulation results and drawing policy implications, on the basis of [Table 2](#) trade liberalization does not appear to be a priority for Palestine's macroeconomic outlook. Other factors, including notably the multifaceted consequences of the conflict with Israel, appear to constrain the Palestinian macroeconomic performance in a more binding way. Unless these aspects are also addressed, the prevailing quasi-custom union with Israel appears to be, after all, a minor evil.

A possible objection to this argument is that the present model does not incorporate those efficiency gains, which are traditionally attached to trade openness and outward orientation. Yet, it can be already claimed that such efficiency gains should not be over-emphasized for at least two reasons. First, efficiency parameters are typically assumed to be a positive function of the degree of openness of the economy. As shown in [Table 2](#), however, trade liberalization leads to only minor increases in the latter variable (lower than 5%), hence the efficiency gains would correspondingly be rather small. Secondly, insofar as the economy operates below full capacity, re-activating aggregate demand is at least as important as increasing the level of attainable output: in this sense, however, trade liberalization is not the appropriate policy response.

A second objection that could be raised is that the current set-up, in particular the Leontieff production function and the “alternative” closure rule, is intrinsically biased towards a short- and medium-term analysis rather than a long-term one. Accordingly, the slightly contractionary impact emphasized above should be regarded as some sort of adjustment costs that may possibly be absorbed over time, as factor substitution and more efficient revenue collection systems kick in. While there is some truth in this consideration, the point does not invalidate the argument developed here. On the contrary, adopting a somewhat shorter horizon while accounting for the existing situation on the ground appears a sensible choice in a context where political developments could suddenly alter the overall picture.

5. Sensitivity analysis

The sensitivity of simulation results to parameter values, and in particular to the assumptions concerning trade elasticities, represent a well-known challenge for CGE modellers ([Zhang, 2006](#)). This circumstance is exacerbated, in the present case, by the heightened relevance of country-specific considerations, coupled with the lack of reliable data series to allow for an econometric estimation of the key parameters. In order to obviate to this situation, this section carries out a thorough sensitivity analysis, allowing for the values of baseline trade elasticities to be halved and/or doubled. Accordingly, the complete set of robustness checks involves simultaneous parametric shifts for each of the five trade elasticities (λ , θ , σ_I , σ_R , γ), for a total of $243 = 3^5$ alternative solutions of the model for each scenario considered.

For the sake of keeping the results of the sensitivity analysis sufficiently clear, [Table 3](#) presents the findings of the robustness check for only the two most important elasticities (λ and γ), and for the key macroeconomic variables. The numbers reported show that the model is marginally sensitive to changes in the values of trade elasticities. As expected, the impact of trade liberalization

Table 3

Sensitivity of changes in key macroeconomic variables, by scenario (percentage change with respect to the initial situation, “alternative closure”).

Real output			Import volume (final goods)			Export volume			Real government revenues						
$\gamma=0.4$	$\gamma=0.8$	$\gamma=1.6$	$\gamma=0.4$	$\gamma=0.8$	$\gamma=1.6$	$\gamma=0.4$	$\gamma=0.8$	$\gamma=1.6$	$\gamma=0.4$	$\gamma=0.8$	$\gamma=1.6$				
<i>Elimination tariffs and purchase taxes on imports from RoW</i>															
$\lambda=0.75$	-0.58	-0.71	-0.97	$\lambda=0.75$	1.07	2.58	5.47	$\lambda=0.75$	3.31	3.38	3.50	$\lambda=0.75$	-4.34	-4.27	-4.13
$\lambda=1.5$	-0.58	-0.74	-1.05	$\lambda=1.5$	1.49	3.29	6.76	$\lambda=1.5$	3.31	3.39	3.55	$\lambda=1.5$	-4.61	-4.53	-4.38
$\lambda=3$	-0.60	-0.82	-1.24	$\lambda=3$	2.45	4.93	9.73	$\lambda=3$	3.32	3.43	3.64	$\lambda=3$	-5.21	-5.12	-4.95
<i>Elimination tariffs and purchase taxes on imports from Israel</i>															
$\lambda=0.75$	-0.96	-1.15	-1.52	$\lambda=0.75$	1.85	3.97	8.07	$\lambda=0.75$	5.37	5.46	5.65	$\lambda=0.75$	-6.87	-6.79	-6.66
$\lambda=1.5$	-0.99	-1.19	-1.57	$\lambda=1.5$	2.47	4.68	8.94	$\lambda=1.5$	5.38	5.48	5.68	$\lambda=1.5$	-7.09	-7.02	-6.89
$\lambda=3$	-1.04	-1.25	-1.66	$\lambda=3$	3.57	5.94	10.53	$\lambda=3$	5.41	5.52	5.72	$\lambda=3$	-7.49	-7.43	-7.31
<i>Elimination tariffs and purchase taxes on imports from all countries</i>															
$\lambda=0.75$	-1.58	-1.91	-2.57	$\lambda=0.75$	2.02	5.67	12.82	$\lambda=0.75$	9.11	9.29	9.63	$\lambda=0.75$	-11.30	-11.25	-11.18
$\lambda=1.5$	-1.57	-1.91	-2.58	$\lambda=1.5$	1.93	5.64	12.93	$\lambda=1.5$	9.11	9.29	9.64	$\lambda=1.5$	-11.30	-11.25	-11.17
$\lambda=3$	-1.55	-1.90	-2.60	$\lambda=3$	1.72	5.57	13.14	$\lambda=3$	9.10	9.29	9.65	$\lambda=3$	-11.30	-11.25	-11.17

on import volumes is greater the higher the elasticity of substitution across different exporters, and the larger the import demand elasticity. Besides this aspect, though, the overall macroeconomic picture reported in [Table 3](#) is not excessively sensitive to significant variations in parameter values. Moreover, no qualitative changes are observed in terms of direction of impacts of trade liberalization. This positive impression on the sensitivity of the model to changes in key parameter values is confirmed also by the inspection of the complete set of results of the robustness check (available from the authors upon request).

6. Conclusions

The present article develops a CGE macro-model for quantifying potential gains and losses from alternative trade policy scenarios in Palestine. Conceptually – and this marks a fundamental departure from earlier studies – the present set-up recognizes the relevance of precautionary savings in a conflict-prone context. Accordingly it assumes a causal structure pivoting around the role of aggregate demand, in line with the prevalence of massive unemployment and idle capacity in Palestine. Moreover, the model takes into account several specificities of the Palestinian macroeconomic context, stemming from its asymmetric integration with Israel, as well as from the provision of the Paris Protocol. Most notably these context-specific elements constrain the fiscal conduct of the PNA, and profoundly affect the working of the balance of payment owing to the overlapping use of multiple currencies.

Policy simulations carried out here suggest that trade liberalization is not at present a real priority for economic development in Palestine: others are the binding factors hampering economic growth, while the economy is already relatively open to international trade. On the contrary, owing to the ensuing revenue losses (and the consequent public expenditure cuts), liberalization scenarios turn out to be slightly contractionary, unless they are combined with the complete transfer of taxes and duties collected for the PNA by Israel. Besides, it is worth stressing that the above findings do not hinge on microeconomic reasoning, such as the “infant industry” argument or the efficiency gains, but rather on purely macroeconomic considerations.

Promising areas for future research may include the extension of the above model to incorporate a more detailed productive structure, a distinction between skilled and unskilled workers, and possibly even a more precise formalization of residential and non-residential investments. These additions could certainly improve the CGE model and permit more sophisticated policy simulations. Nevertheless, the key economic mechanisms highlighted here – even in their macro-formalization – appear critical to grasp the specificities of the Palestinian context in the current phase.

Technical appendix.

This appendix provides the detailed specification of the computable general equilibrium model used to assess the implications of trade policy reforms in Palestine. In the notation the index F will be used to indicate trading partners, distinguished for the sake of simplicity between Israel (I) and the rest of the world (R).

A.1. Production, pricing and distribution

The composite output V is obtained through a Leontief production function, characterized by a labour-output ratio b , and an incremental-capital-output ratio indicated as ICOR. It is also assumed

that each unit of output requires a fixed quantity a_{0F} of imported intermediates M_{0F} , whose cost is determined by the product between the exchange rate e_F and the international price P_F^* . Denoting by L , K , and M_{0F} labour capital and imported intermediates respectively, the production function

$$V = \min \left[\frac{L}{b}, \frac{K}{ICOR}, \frac{M_{0F}}{a_{0F}} \right];$$

can be rearranged to obtain the demand for labour and intermediate imports:

$$L = b V; \tag{A1}$$

$$M_{0F} = a_{0F} V; \tag{A2}$$

Further, it is postulated that firms apply, in their pricing decisions, a mark up τ to their variable production costs. Thus, indicating with Q and W the producer price and nominal wage, and denoting by fi_F and tmi_F the share of intermediates on producer price and the tariff rate on intermediates imports, the following pricing equations can be obtained

$$Q = (1 + \tau)[Wb + \sum_F e_F P_F^{*mi}(1 + tmi_F)a_{0F}]; \tag{A3}$$

$$fi_F Q = e_F P_F^{*mi} a_{0F}. \tag{A4}$$

The user price follows from Eq. (A3), after applying the domestic VAT rate vat_d

$$P = Q \left[1 + (1 - \sum_F fi_F)vat_d \right]; \tag{A5}$$

while the above equations also permit to derive the degree of capacity utilization u , the profit rate r , and the labour share on total variable costs shl

$$u = \frac{V}{K}; \tag{A6}$$

$$r = \frac{\tau}{1 + \tau} \frac{Qu}{P}; \tag{A7}$$

$$shl = \frac{Wb}{Wb + \sum_F e_F P_F^{*mi}(1 + tmi_F)a_{0F}}. \tag{A8}$$

A.2. International trade

To capture imperfect substitutability between different varieties of final product, imports from Israel and the rest of the world are aggregated using a CES function with elasticity of substitution λ , share parameter δ , and efficiency φ

$$IM = \varphi [\delta M_I^{(\lambda-1)/\lambda} + (1 - \delta) M_R^{(\lambda-1)/\lambda}]^{\lambda/(\lambda-1)}. \tag{A9}$$

Accordingly, the optimal ratio between the two varieties is given by

$$\frac{M_R}{M_I} = \left[\frac{PM_I(1 - \delta)}{PM_R \delta} \right]^{\lambda}; \tag{A10}$$

while the overall demand for final imports is a log-linear function with elasticity parameters θ and γ for income and price respectively

$$IM = m f_0 V^\theta \left\{ \frac{\varphi P}{[\delta^\lambda PM_I^{1-\lambda} + (1 - \delta)^\lambda PM_R^{1-\lambda}]^{1/(1-\lambda)}} \right\}^\gamma \tag{A11}$$

Import prices, in turn, depend on those exogenously prevailing in the international markets (P_F^{*m}), duly adjusted for tariffs and VAT rates (tmf_F and vat_{mF} respectively), and converted into local currency

$$PM_F = e_F P_F^{*m} (1 + tmf_F)(1 + vat_{mF}). \tag{A12}$$

Total exports, conversely, responds to variations in the real exchange rate through an elasticity parameter σ_F , international prices (P_F^{*e}) being exogenously determined in view of the “small country assumption”

$$EXP_F = EXP_{0F} \left(\frac{e_F P_F^{*e}}{P} \right)^{\sigma_F} \tag{A13}$$

A.3. Government

Without any loss of generality, it is convenient to express the equations referring to fiscal policy in a normalized form, dividing all relevant variables by the value of the capital stock $P K$. This said, government revenues include domestic direct and indirect taxes ($dtar$ and $iitr$), aid from third governments ($trgr$), as well as those taxes collected by Israel and transferred – at least partly – to the PNA. Both the VAT taxes on indirect imports ($eirt$), and the taxes on wage income earned by the Palestinian working in Israel (tpw) belong to this latter category, and it is assumed that Israel transfers to the PNA only an exogenously determined share (ref) of the corresponding revenues. In line with all the above, total government revenues are determined as

$$tegrev = dtar + iitr + trgr + ref(eirt + tpw); \tag{A14}$$

where all revenue sources are intended to be normalized by $P K$. In turn, direct taxes are levied at the rate dtr on (normalized) non-wage income

$$dtar = r dtr; \tag{A15}$$

while the VAT on domestic production is instead calculated as the product between the rate vat_d and the domestic value added

$$iitr = vat_d \left[1 - \sum_F \hat{f}_F \frac{Qu}{P} \right]. \tag{A16}$$

Once normalized, revenues accruing from indirect taxation on imports are then determined by

$$eirt = \sum_F tmf_F \hat{f}_F \frac{Qu}{P} + \frac{1}{PK} \sum_F e_F P_F^{*m} M_F [tmf_F + vat_{mF}(1 + tmf_F)]; \tag{A17}$$

which is the sum of three components: tariffs on intermediate imports (t_{mF} being the tariff rate), tariffs on final imports (levied at the rate t_{mF}), and VAT on final imports (vat_{mF} representing the corresponding rate). The last two sources of revenue are then given by

$$tpw = \frac{trpw \text{ WFI}}{PK}; \quad (\text{A18})$$

$$trgr = \frac{e_R \text{ TRRG}}{PK}; \quad (\text{A19})$$

representing respectively the taxes collected from Palestinian working in Israel – who remit WFI and are taxed at a rate $trpw$ – and the ODA transfers received by the PNA from the rest of the world (TRRG), duly adjusted for exchange rate e_R . Consistently with the above, government net savings are finally given by

$$gsg = tegrev - \frac{G}{K} - \frac{\text{TRGH}}{PK}; \quad (\text{A20})$$

which subtracts from total revenues the public expenditure G and the transfers accorded to households in West Bank and Gaza, all duly normalized.

A.4. Labour market and saving formation

It was been noted earlier that the possibility for some Palestinian workers to earn a relatively higher wage in Israel drives up the reservation wage, distorting the domestic labour market and reducing the competitiveness of the Palestinian economy. This intuition is captured in the equation

$$W \frac{L}{LS} = \frac{\pi W_{\text{ISR}} \text{PEISR}}{(LS - L)}; \quad (\text{A21})$$

relating the wage prevailing in Palestine with the one attainable in Israel W_{ISR} . Basically this relationship establishes an arbitrage between the expected wage in Palestine (taking into account the employment rate L/LS), and the corresponding expected wage in Israel, adjusted for a risk premium π and subject to the issue of PEISR working permits by the Israeli authorities.

In line with the post-Keynesian tradition, the model assumes different saving propensities out of labour and profit income, namely sw and sr . Accordingly, private savings are given by

$$gsw = sw \left[\frac{shl}{(1 + \tau)} \frac{Qu}{P} + \frac{\text{TRGH} + e_R \text{TRRH} + \text{WFI}}{PK} \right]; \quad (\text{A22})$$

for what concerns labour income (plus government transfers, TRGH, capital transfers from abroad, TRRH, and remittances WFI), and by

$$gsr = sr[(1 - dtr)r]; \quad (\text{A23})$$

for profit-income, net of direct taxes.

Within the macroeconomic system, total savings are hence given by

$$g_S = gsg + (gsw + gsr) + \sum_F e_{FF}; \quad (\text{A24})$$

that includes public and private savings, as well as foreign savings transiting through the balance of payment. (Again, notice that in the last three equations variables have been normalized by PK , for the sake of convenience.)

A.5. Macroeconomic equilibrium

The first constraint to macroeconomic equilibrium stems from the balance of payment identity

$$\sum_F e_F t_F = \sum_F f_F \frac{Qu}{P} + \frac{1}{PK} \sum_F e_F P_F^{*m} M_F + eitr - \sum_F e_F P_F^{*e} EXP_F + -ref(eitr + tpw) - \frac{WFI}{PK} - \frac{e_R}{PK} (TRRG + TRRH); \quad (A25)$$

which basically states that foreign savings should equate net imports (including indirect taxes $eitr$), less tax refunds from Israel, remittances, and transfers from third countries to the PNA or households (TRRG and TRRH).

The second macroeconomic identity to be respected is

$$g_I = g_S; \quad (A26)$$

stating the well-known equality between investment and savings. With respect to the former, the model assumes the existence of an autonomous investment function

$$g_I = g_0 + \alpha r + \beta u; \quad (A27)$$

whose presence embodies the demand-driven causality of the model. Eq. (A27) indeed relates investment to animal spirit (through the parameter g_0), to the profit rate r and to the level of activity u , through a standard accelerator effect.

As explained in the main text, though the macroeconomic causality of the CGE model pivots around investment behaviours, the present framework does not a priori rule out the possibility that the level of activity cease to respond to aggregate demand stimuli. On the contrary, it is assumed that once full employment is achieved, further injections of aggregate demand simply trigger an augment in the price level, via a rise in the mark-up. Setting the potential output

$$V^* \equiv \min \left(\frac{LS}{b}, \frac{K}{ICOR} \right);$$

the above mechanisms is captured in the equation

$$(V - V^*)(\tau - \tau_0) = 0; \quad (A28)$$

which essentially implies that τ will rise above its “normal” level τ_0 if V will attain V^* .

In order for the CGE model to be determined, the closure rules regard the following variables as pre-determined or exogenous: the capital stock K and the nominal transfers from the PNA to households TRGH (both pre-determined), the aid disbursements TRRG and the government saving rate gsg (exogenous), the normalized capital inflows t_F and the wage bill from Israel and the settlements WFI (both exogenous, the latter being expressed in domestic currency). Finally, the nominal exchange rates e_F are normalized to 1 for simplicity.

The list of endogenous variables and parameters are listed below.

Endogenous variables

Q	Producer price of composite domestic output
W	Nominal wage rate
τ	Mark-up rate
fi_F	Share of net intermediate imports from country F on producer price
P	User price of composite domestic output
L	Total employment
V	Real GDP
M_{0F}	Intermediate imports from country F
M_F	Imports of final goods from country F
IM	Aggregate imports of final goods
PM_F	Domestic currency price of imports from country F (gross of tariffs)
EXP_F	Exports to country F, normalized by capital
u	Degree of capacity utilization
r	Profit rate
shl	Labour share on total variable cost
gsw	Normalized savings from labour income
$TRRH$	Capital transfers from R to households (in foreign currency)
gsr	Normalized savings from profit income
$dtar$	Normalized direct tax revenue
$iiitr$	Normalized internal indirect tax revenue
$eitr$	Normalized external indirect tax revenue
tpw	Normalized taxes on Palestinian labour in Israel/settlements
$trgr$	Normalized transfers from R to the PNA
$tegre$	Normalized total effective government revenue
gsf	Normalized foreign savings
gs	Aggregate saving, normalized
G	Real government expenditure
gi	Investment rate
WFI	Wage bill from Israel and the settlements (in Palestinian currency)

Parameters

τ_0	“Normal” mark-up rate
b	Labour-output ratio
P_F^{*ml}	Country F currency’s price of intermediate imports
P_F^{*m}	Country F currency’s price of final imports
$Trpw$	Average tax rate on Palestinian labour in Israel/settlements
Tmi_F	Tariff rate on intermediate imports from country F
Tmf_F	Tariff rate on final imports from country F
a_{0F}	Imported (from country F) intermediate-output ratio
vat_d	Value added tax rate on domestic production
vat_{mF}	Value added tax rate on imported production
δ	Share parameter in CES import aggregator
φ	Efficiency parameter in CES import aggregator
λ	Elasticity of substitution between imports from countries R and F
mf_0	Shift parameter in the total import function
θ	Income elasticity of the import demand function
γ	Price elasticity of the Import demand function
P_F^{*e}	Country F currency price of final exports
σ_F	Export supply elasticity
sw	Propensity to save out of labour income
sr	Propensity to save out of profit income
dtr	Direct tax rate
g_0	Animal spirit parameter in the investment function
α	Profit rate parameter of the investment function
β	Accelerator effect in the investment function

ref	Share of tax revenue refunded from Israeli govt to PNA
V*	Potential output
π	Risk premium
LS	Labour supply
W_{ISR}	Wage earned by Palestinian workers in Israel, expressed in Palestinian currency
PEISR	Quantity of Palestinian workers in Israel and the settlements

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