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Abstract

Due to the lack of political consensus at the previous General Agreement on Trade on Services (GATS), negotiations on the temporary movement of natural persons (Mode 4) have stagnated. The growth in the economic literature surrounding this issue has also been lackluster; despite the large welfare gains that have been demonstrated to result from relatively small multilateral liberalizations on such transitory movements. This paper implements a CGE model of bilateral migration flows to quantify the benefits of liberalising GATS Mode 4 in the Pacific region. The results indicate that an increase in the labor forces of Australia and New Zealand from elsewhere within the Pacific region would raise welfare in both Australia and New Zealand. However the results show that while the Pacific Islands economies could gain substantially from the movement of unskilled workers, the loss of scarce skilled workers could lead to significant declines in the welfare of those remaining. Agreements regarding the movement of unskilled labor could therefore potentially constitute significant development policies which warrant further attention from policy makers.

Keywords: Applied general equilibrium modelling, Pacific, GATS Mode 4, labor mobility, skill, welfare.

The Impact of Liberalizing Labor Mobility in the Pacific Region

1. Introduction

The WTO's Uruguay round heralded a new wave of optimism for developing country members as the first discussions on the '*temporary presence of natural persons* (Mode 4)' got underway on the General Agreement on Trade on Services (GATS). Developing countries, against a backdrop of years of capital and goods market liberalisation, have hoped to capitalise on their abundant labour, but reticent policy makers on both sides of the GATS Mode 4 negotiations have remained defensive. Little progress has been made in spite of the fact that the welfare benefits from the future services liberalisation likely far outstrip the returns from additional goods market liberalisation (Hertel et al (2004)).

Back-of-the-envelope calculations, based on rolling temporary labour schemes, estimate global welfare gains from relatively small liberalisations, of between \$200bn (Rodrik, 2004) and \$300bn Winters (2001). More systematic approaches based on various modelling scenarios corroborate these computations. Walmsley and Winters (forthcoming) find that a 3% liberalisation on the quotas of both the skilled and unskilled from developing to developed nations would yield a global welfare gain of \$150bn. Simulations from subsequent models based on bilateral migration flows (as opposed to from a global migrant pool) show that a similar lifting of quotas would produce approximately double these gains (Walmsley, Winters, Parsons and Ahmed, 2005 and van der Mensbrugge, 2005). Indeed if these estimates be given with certainty they would certainly represent lower bound estimates since they fail to account for any dynamic effects, those associated with 'brain circulation', or the spill over and indirect effects of increased service provision (Winters 2003).

This paper implements a model of bilateral migration flows (GMig2, Walmsley, Winters, Parsons, Ahmed, 2005) to assess comparable scenarios to those previously tested, in the context of the Pacific region. The remainder of this section provides a brief background to the region. The following section gives a brief synopsis of the model and database. Section 3 analyses the results and provides a sensitivity analysis and while it is beyond the scope of the paper to discuss in detail relevant policy options some are alluded to in passing and conclusions drawn, in the final section.

Australia and New Zealand represent two of the 'big four' traditional magnets of international immigration alongside Canada and the United States; and both have experienced fairly prolonged and sustained economic growth, largely unfettered by the constraints that have hampered the development of their Pacific neighbours. Not only are the Pacific islands geographically remote they too remain on the periphery of the world economy, increasingly dependent on the wider world; the highest recipients of overseas aid on a per capita basis. Narrow production bases, declining terms of trade, failures to diversify, significant diseconomies of scale (due to incredibly small domestic markets⁴), and an inability to compete effectively in the global marketplace, have resulted in large trade deficits. Increasingly vulnerable, the Pacific Islanders remain highly susceptible to external shocks.

The countries and territories of the Pacific territories have experienced significant migration, with large internal movements toward urban conurbations, simultaneously accompanied by international emigration. Traditionally high fertility rates, coupled with rising life expectancy,

⁴ All the Pacific nations are below the richest 150 countries in the world as measured by GDP with the exception of PNG (126).

have resulted in relatively high population growth rates. International migration from the territories of the Pacific is viewed in part as a means of relieving population pressure on the already scarce resources whilst increasing both the earning potential of the migrant abroad, through higher salaries, and the income of the sending family, through remittances. Migration is primarily driven by the large disparities in the social and economic factors between the sending and host nations. Prospects of superior health standards, better education and higher wages stimulate the ever increasing expectations of living standards which fuel the spiralling aspirations of moving abroad (Connell, 2003). Migration in the region should be viewed neither as merely a response to ailing economies nor simply a development strategy, but more as an intrinsic part of life that many islanders take almost for granted. This is perhaps best demonstrated by the increasing reliance on remittance flows, particularly in Polynesia, here remittances constitute 7% and 41% of annual GDP in Tonga and Samoa respectively

Australia and New Zealand attract approximately 40% of all Pacific Island migrants (Parsons et al 2005) and these constitute 4.6% of their (2001) populations, 2.4% of Australia's and 16.9% of New Zealand's. The number of Islanders abroad relative to those at home is startling, with an equivalent 96.9% of the Cook Islanders population living in New Zealand in 2001, with Samoans (33.7%), Tongans (24.7%), Tuvaluan (10.1%) and Nauruan (5.7%). Having once flooded into New Zealand in the post-war drive to recruit unskilled and medium skilled workers, the numbers of Pacific Islanders has dramatically fallen over the medium term though. The introduction of the points system in 1991 on the one hand, combined with a falling demand for lower skilled workers on the other, has skewed immigrant arrivals away from the more traditional sending region of the Pacific, toward other Pacific Rim nations. Australia largely reflects the patterns observed in New Zealand; although on a larger scale, involving more migrants from a greater number of source countries. The existing immigrant populations together with future flows will represent a significant proportion of the total number of Pacific islanders. The reliance of Pacific Communities on sending nationals abroad is going to continue, and though their future remains far from certain, any future reductions in migration barriers could represent a significant development policy for them.

GATS Mode 4 is *not* migration and though commonly treated as synonymous to temporary migration is rather a temporary movement. As such, many of the arguments commonly cited against migration including the erosion of cultural traditions, excessive drains on the public purse and anxieties relating to assimilation, are simply not relevant in the case of GATS Mode 4 (Winters, 2003). Winters identifies within GATS Mode 4, three types of (North-South) flows; the movements of the skilled from developed to developing countries, the flows of skilled workers from developing to developed nations, and the flows of the unskilled, from developing to developed countries. Some headway has been made in the former, in the area of 'commercial presence abroad', with 'intra-corporate transferees'. As the Pacific Islands have little or no 'commercial presence abroad' it is of little use to them however. Iredale (2000) notes the great reluctance for Pacific communities to either send *or* receive skilled labour, an unwillingness exacerbated by fears of the brain drain. The outflow of skilled workers does tend to both widen wage gaps and lower average levels of skill, reducing outputs and already dwindling tax bases⁵. In the Pacific region such movements of the educational elite have left many remaining stocks of skilled works severely depleted. In the decade between 1966 and 1976, half of the total number of residents in the Cook Islands that possessed any vocational qualification emigrated (Cook Islands, 1984). Echoing this crisis, approximately 75% of all administrative and managerial workers and 25% of all professional and technical workers left Fiji between 1987 and 1995 (APMRN, 1997). Due to low domestic demand and insufficient capacities to train large numbers of skilled workers,

⁵ In the case of GATS mode 4 these 'brain drain' arguments may not be appropriate since (at least theoretically) workers return home

island communities find replacing skilled labour extremely problematic. In Fiji for example the cost of hiring a foreign worker are between double and quadruple that of a domestic worker (APMRN, 1997). Moreover island communities are often hit harder by the loss of this labour, a doctor emigrating from a rural area can represent a substantial loss of the local skilled labour force for instance. This leads in many cases to a critical weakening of service provision in rural areas. The consequences of the 'brain drain' remain far from certain. It is quite plausible that workers abroad increase their productivity to such an extent that when they return this more than compensates for their loss, the so-called 'beneficial brain drain' (Winters, 2003). The increased return to education through temporary movement also warrants attention (Commander, Kangesniemi and Winters 2002). Acquiring skills is likely to remain a high priority for many. Kiribati and Tuvalu stand out as examples of nations not just in the Pacific but in the world that specifically train people to work abroad.

These potential gains in the context of the Pacific are unlikely to be realised. If the domestic pool of skilled workers dwindles sufficiently, then even if migrants return with vastly superior productivity, net gains are improbable. If the country has had to endure an extended period when they are few, or virtually no skilled workers, a '*transitory brain drain*', a worsening of living standards, and of both the quality of education, and health care, together with dramatic reductions in wages and output. Certainly in some occupations there is simply no substitute for unskilled labour. For the Pacific communities this is the resource in which they possess a comparative advantage and relatively large endowments, and therefore an area in which they seek greater openness and better market access. This is where the differences, the fundamental basis on which trade generates net gains are greatest, and where the successful exploitation of these differences will yield the largest welfare benefits. As in most developed nations both Australia and New Zealand have an increasingly educated and more highly skilled though aging population. Over time therefore the scarcity of unskilled labour will likely increase; although this is not presently the case as unemployment among the domestic unskilled remains. Nevertheless it is (almost) inevitable that in the coming decades opportunities will arise for the Pacific communities to send more unskilled workers abroad. This would go some way to redress the skill imbalance in all of these economies and provide a source for additional future remittance earnings. The existence of bilateral agreements is surely the biggest hurdle standing in the way of future liberalisation of GATS Mode 4. However, with a greater number of stakeholders actively contributing to the present round of negotiations, optimism must remain.

2. *Model and Data*

GATS Mode 4 can be modeled at either extreme from which it can be viewed, i.e. from a perspective of pure labor migration or analogous to greater trade in goods. Here we choose to model with an increase in the population.

We use a standard global applied general equilibrium model (GTAP, Hertel, 1997) which has been adjusted to take into account bilateral labor flows. The model, termed GMig2, is similar to the model used in Walmsley and Winters (forthcoming). In that model, Walmsley and Winters (forthcoming) hypothesized a global pool to intermediate the flow of labor between countries, which circumvented the problem of the lack of bilateral data on the stocks of migrants. In this model, bilateral labor flows are modelled directly and therefore data is an important aspect of this model. The benefit of this approach is that we have bilateral data which allows us to track the bilateral flows of labor, their productivities and their remittances directly.

The data base used with the Bilateral Labor Migration Model (GMig2, Walmsley, Winters, Parsons and Ahmed, 2005) is based on the GTAP 6 Data Base (Dimaranan and McDougall,

2005) and is augmented with the bilateral migration data base developed by Parsons, Skeldon, Winters and Walmsley (2005) and remittance data from the World Bank (Ratha, 2003). These data were used to estimate bilateral wages and remittances in the model⁶ (Walmsley et al, 2005).

A number of assumptions are made in creating this data base and in the model itself, which are outlined here⁷ and provided in greater detail in Walmsley et al (2005). We assume:

- migrant's participation rates are the same as in their home region;
- labor has the same characteristics as their home region, in terms of skilled/unskilled labor splits;
- wages of migrants ($W_{i,r,c}$) are equal to the home wage ($HW_{i,r}$) plus a proportion (beta) of the difference between host and home wage ($HW_{i,c} - HW_{i,r}$):

$$W_{i,r,c} = HW_{i,r} + BETA \times (HW_{i,c} - HW_{i,r})$$

Where: BETA is the proportion of the difference obtained by a person of labor type i migrating from region r to region c (= 0.75);

- a constant remittance to income ratio to determine bilateral remittances in the data base (in the model we assume that remittances remain a constant proportion of income);
- all other income (from capital, land etc) accrues to permanent residents;
- that foreign and domestic labor are perfect substitutes;
- the quantity of skilled and unskilled labor within a region is fixed and only changes with the movement of capital from one region to another;
- that there is excess demand for the quota spaces and hence any change in quotas will be filled by the labor exporting region;
- that tax is paid by both foreign and domestic residents;
- that incomes earned by both domestic and foreign residents are aggregated and allocated across consumption, government and saving; and
- a revolving door, where temporary workers continually enter and return to their home countries. Unless otherwise stated, no changes in productivities are assumed upon their return home⁸.

In addition to the above assumptions, the authors would also like to emphasize caution when using these results. While the countries shown separately in the GTAP Data Base are based on input-output tables collected from numerous sources, the Rest of Oceania is a region which has been constructed from the input-output tables of other regions and hence problematic.⁹ For this reason we concentrate on the macroeconomic results.

⁶ Further information on the methods used to create this data base and model are available from the Walmsley et al. (2005).

⁷ Further work is still being undertaken on the GMig2 model and data base to get better data on many of these aspects and/or test their importance.

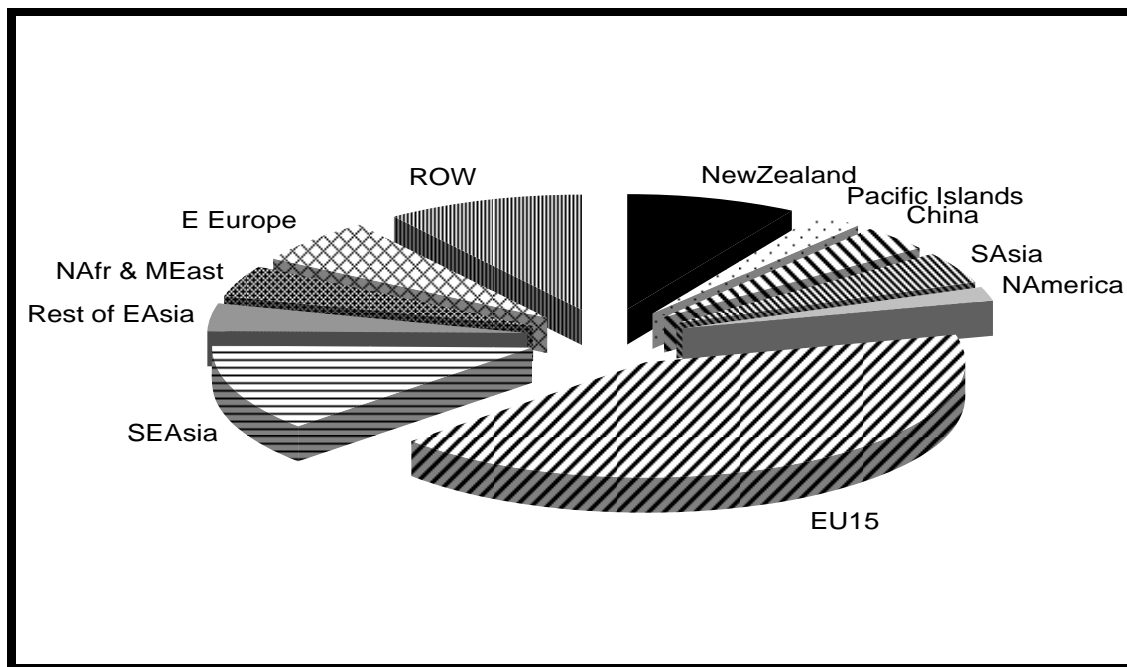
⁸ This assumption may be unrealistic given that many temporary labor schemes are designed to increase skill levels and/or productivity.

⁹ The rest of Oceania is a 'composite region'; that is it is made up of a number of countries and hence is not based on the Input-Output tables of the countries within the rest of Oceania. To obtain data for the rest of Oceania, each country

These results are the comparative static short run impacts of these policies. That is, they show how much better (or worse) off the residents of each region are in the short run, before capital has had time to respond to changes in the rates of return.

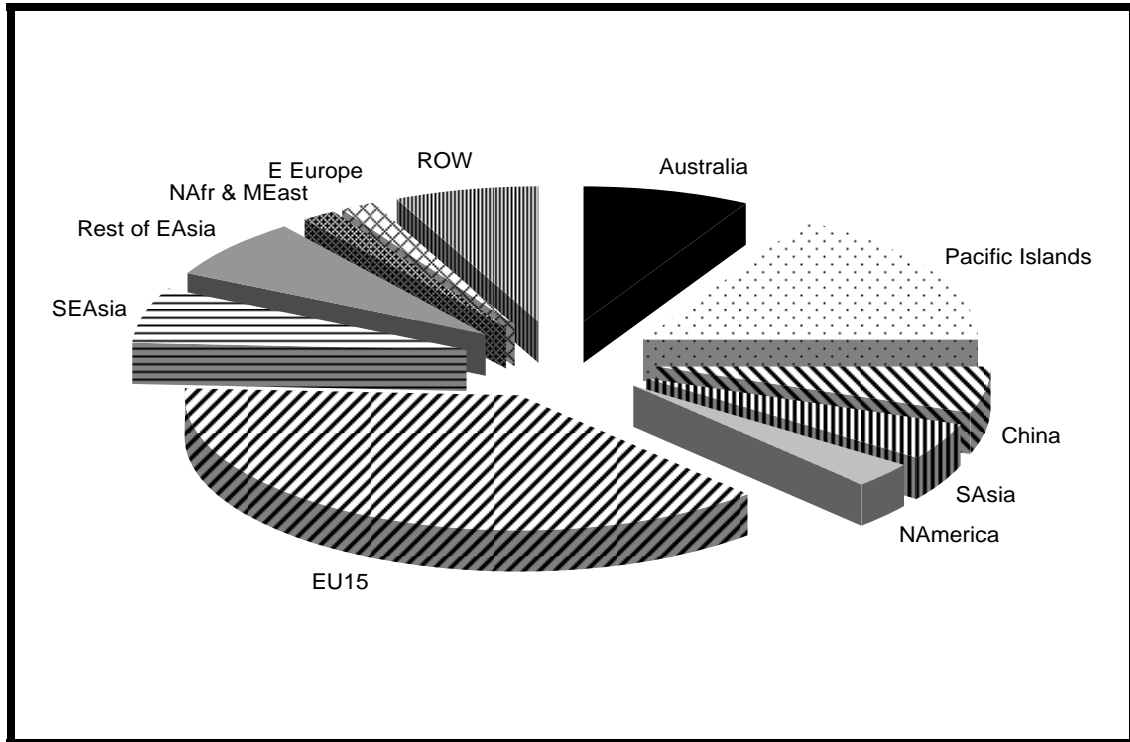
Charts 5 and 6 show the shares of foreign labor in Australia and New Zealand respectively, contained in the data base. Both charts show that Europe is the largest provider of foreign labor to both Australia and New Zealand. New Zealand is also a large supplier of foreign labor to Australia, primarily due to their geographical proximity and ties through the Closer Economic Relations agreement. South East Asia and the rest of the world are also large suppliers of labor. As mentioned above the Pacific Islands are not an important source of foreign labor for Australia, in New Zealand however, the Pacific Islands represent the second largest source of foreign workers, followed by Australia and the rest of the world.

Chart 5 Percentage Total of Foreigners Living in Australia



in the rest of Oceania is assigned a proxy input-output table which is based on a country of similar structure for which an input-output table is available. Next the proxy table is scaled to match the macro and trade data for that country. The resulting input-output tables of all of the countries in the rest of Oceania are then aggregated into one table for the Rest of Oceania. The rest of Oceania is made up American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia, Federated States of, Nauru, New Caledonia, Norfolk Island, Northern Mariana Islands, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna. Unfortunately no input-output tables for countries in the rest of Oceania have been contributed to the GTAP Data Base and hence the regional data for the rest of Oceania is unlikely to accurately reflect the structure of those economies.

Chart 6: Percentage Total of Foreigners Living in New Zealand



3. Experiments

The purpose of this paper is primarily to examine how increases in the flows of temporary labor to Australia and New Zealand from the Pacific Islands would affect Australia, New Zealand and the Pacific Islands. Quotas on Australia and New Zealand's temporary movement of natural persons were increased by 1% of the labor forces and these increased quotas were filled by labor from the Pacific Islands.

Table 1 shows the stock of Pacific Island migrants in Australia and New Zealand prior to the shock and after the quotas have been increased by 1 and 3% respectively. There are currently only about 111 thousand migrant workers from the Pacific Islands in Australia and New Zealand. As mentioned above in terms of numbers Australia and New Zealand have similar numbers of migrants from the Pacific Islands, however as a percentage of the labor force, New Zealand is an important importer of Pacific Island labor. After the 1% increase in migrant labor quotas from the Pacific Islands, this number doubles to 232 thousand. This increase of 1% in the Australian and New Zealand labor force amounts to declines in the Pacific Island's skilled and unskilled workers of 21% and 2% respectively¹⁰. While the Pacific Islands could afford to send 2% of their unskilled labor force, a loss of 21% of their skilled labor force is likely to have a significant negative effect. However, such declines in the skilled labor force of the Pacific Islands have been experienced in the past. Two examples were given above, the case of the Cook Islands where in the decade between 1966 and 1976 half of the total number of residents possessing any vocational qualification emigrated (Cook Islands, 1984); and in Fiji between 1987 and 1995 where approximately 75% of administrative and managerial workers and 25% of all professional and technical workers left (APMRN, 1997).

Table 1: Stock of Pacific Island Migrants by skill in Australia and New Zealand (Numbers of people)

	Skilled		Unskilled		Total	
	Australia	New Zealand	Australia	New Zealand	Australia	New Zealand
Initial	2350	2773	48946	57739	51296	60512
1%	41201	8966	111096	71546	152297	80512
3%	118903*	21352*	235396	99160	354299	120512

* The skilled labor forces in Australia and New Zealand were not increased by 3% since this would have significantly reduced the skilled labor force in the Pacific Islands.

The results were compared with those when quotas were filled by alternative labor exporting countries, including developing economies, developed economies and those of South East Asia. Under these assumptions the increased quotas are supplied according to the labor force shares, hence the extent to which Pacific Islanders fill these places diminishes significantly as labor is sourced from more countries, particularly in Australia.

Further sensitivity analysis was conducted to examine the impact of varying the magnitude of the increase in quotas. Specifically, the 1% increase in unskilled labor was compared with the case where the unskilled labor force was increased by 3%. A 3% increase in the quotas of Australia

¹⁰ The reason for this large difference is that while the Pacific Island's has a reasonably large population of approximately 7m only 5% of its labor force is skilled as compared to approximately 30% of Australia and New Zealand's labor forces. Hence skilled labor is a very scarce resource in the Pacific Island economies.

and New Zealand leads to over 335 thousand unskilled migrants from the Pacific Island economies. This amounted to 8.7% of the Pacific Island economies unskilled labor force. We also examine smaller increases in the flow of skilled workers between the Pacific Islands and Australia/New Zealand.

Migrants often return with increased skills and knowledge to their home countries. Moreover, some temporary migration schemes also assist with capacity building efforts in the labor exporting economy. We therefore also conduct an experiment to investigate the impact of an increase in the productivities of returning workers.

4. *Results*

In this section we examine the results of the alternative experiments outlined above. In the first section we examine the macro implications and hence the impact on welfare, in section b) the sectoral implications. Section c) compares the results with those obtained when the labor forces are increased by 3% in Australia and New Zealand. In section d) we compare the results with the case where other economies supply the increased quotas: South East Asia, developing and developed economies.

4.1 Macroeconomic Effects

The welfare changes of labor from country r residing in country s are displayed in Tables 2A to 2C. As a consequence of the increased flow of skilled and unskilled migrant workers from the Pacific Islands into Australia and New Zealand, the welfare of Australians and New Zealanders residing in Australia and New Zealand rises by 302.61m and 26.5m respectively (Table 2A). This is due to the fact that the increased labor endowment in Australia and New Zealand has increased the returns to capital (Table 3 and 4) and tax revenues, which offsets the fall in wages. Most of the gains come from the increase in quotas on unskilled labor (Table 2B and 2C). Tables 2B and 2C decompose the total according to skilled and unskilled movement of labor.

Existing foreign workers in Australia and New Zealand, including those from the Pacific Islands, lose (Table 2A) as these wages fall (Table 3 and 4). Since foreign workers are temporary, they do not own capital and therefore the rise in returns to capital does not compensate for the loss in labor income. Foreign workers from the EU lose the most due to the large proportion of workers already located in Australia in the initial data base (42% of migrants in Australia are from the EU) and New Zealand (37% of migrants are from the EU)¹¹.

¹¹ Note that when **only** the quotas on skilled labor (Table 2C) are increased, the welfare of some foreign workers in Australia and New Zealand rises (e.g. Chinese workers in Australia, Table 2C, experience an increase in welfare of 1.3m). This is due to the fact that China supplies mostly unskilled labor to Australia and New Zealand. The increase in quotas on skilled workers causes the wage of unskilled to rise and hence the gains to existing unskilled Chinese workers living in Australia and New Zealand are greater than the losses made by existing skilled Chinese workers as their wages decline.

Table 2A: Bilateral Welfare Changes for 1% Shock to Unskilled and Skilled Labor (Millions of US\$)

Home Region ¹³	Host Region ¹²				Total welfare of home region
	Australia	New Zealand	Pacific Islands	Other ¹⁴	
Australia	302.61	-0.85	1.77	0.00	303.53
New Zealand	-6.88	26.55	0.94	0.00	20.61
Pacific Islands	1386.10	168.07	-488.02	0.00	1066.14
China	-2.89	-0.63	0.50	1.70	-1.32
South Asia	-1.40	-0.18	0.03	-4.12	-5.67
North America	-2.55	-0.66	16.49	-4.02	9.26
EU 15	-44.08	-7.14	5.05	-12.66	-58.83
South East Asia	-8.23	-0.61	3.87	0.70	-4.28
Rest of East Asia	-3.99	-1.13	2.53	-11.16	-13.76
North Africa & Middle East	-1.12	-0.10	0.15	0.82	-0.25
Eastern Europe & Former Soviet Union	-4.92	-0.20	3.73	-1.74	-3.13
ROW	-6.35	-0.65	0.77	-2.62	-8.85
Total welfare of host region	1606.28	182.46	-452.19	-33.10	1303.44

Table 2B Bilateral Welfare Changes for 1% Shock to Unskilled Labor (Millions of US\$)

Home Region	Host Region				Total Welfare of Home Region
	Australia	New Zealand	Pacific Islands	Other	
Australia	199.84	-0.38	0.07	0.00	199.53
New Zealand	-4.88	17.90	0.04	0.00	13.07
Pacific Islands	775.05	104.13	22.03	0.00	901.21
China	-4.20	-0.76	0.10	0.96	-3.90
South Asia	-1.95	-0.21	0.01	-3.78	-5.94
North America	-1.52	-0.35	0.97	-3.92	-4.82
EU 15	-24.86	-3.36	0.26	-6.50	-34.46
South East Asia	-9.47	-0.57	0.13	0.19	-9.73
Rest of East Asia	-3.98	-0.91	0.22	-3.83	-8.51
North Africa & Middle East	-1.44	-0.11	0.01	0.67	-0.86
Eastern Europe and Former Soviet Union	-4.19	-0.15	0.12	-1.02	-5.24
ROW	-7.01	-0.55	0.06	-1.82	-9.33
Total welfare of host region	911.39	114.67	24.02	-19.06	1031.02

¹² Host region is the region where the person is currently residing either temporarily or permanently. Hence the host region of an Australian who lives in the United Kingdom is the United Kingdom.

¹³ Home region is the region where people are permanent residents or in this database the region of birth. Hence the home region of an Australian who lives in the United Kingdom is Australia. Hence \$1386.10m is the welfare gained by Pacific Islander's living in Australia from the increase in Australia and New Zealand's quotas equal to 1% of their labor force and supplied by workers from the Pacific Islands only. This positive value reflects the increase in numbers of Pacific Islander's in Australia earning the Australian wage. On the other hand, \$4.88m is the welfare loss of New Zealander's currently living in Australia when Australia and New Zealand increase their quotas, and these quotas are supplied by workers from the Pacific Islands. This negative reflects the fall in wages which these existing workers will endure (note there is no change in the number of New Zealand workers in Australia, as New Zealand does not supply more labor to Australia as a result of the change in quotas).

¹⁴ Other contains all other regions except Australia, New Zealand and the Pacific Islands. Welfare changes are simply aggregated. There is no change in the labor force of these regions as a result of the experiment.

**Table 2C Bilateral Welfare Changes for 1% Shock to Skilled Labor
(Millions of US\$)**

Home Region	Host Region				Total Welfare of Home Region
	Australia	New Zealand	Pacific Islands	Other	
Australia	102.77	-0.47	1.70	0.00	103.99
New Zealand	-2.00	8.64	0.90	0.00	7.54
Pacific Islands	611.05	63.94	-510.06	0.00	164.93
China	1.30	0.13	0.40	0.73	2.57
S. Asia	0.55	0.03	0.02	-0.33	0.27
N. America	-1.04	-0.32	15.52	-0.10	14.07
EU 15	-19.23	-3.77	4.79	-6.16	-24.37
S. East Asia	1.24	-0.04	3.74	0.51	5.46
Rest of E. Asia	-0.01	-0.22	2.32	-7.33	-5.24
N. Africa & Middle East	0.32	0.01	0.14	0.16	0.62
E. Europe & Former Soviet Union	-0.74	-0.05	3.60	-0.71	2.10
ROW	0.66	-0.10	0.71	-0.80	0.48
Total welfare of host region	694.88	67.79	-476.21	-14.04	272.42

Table 3 Percentage Changes In Real Factor Returns And Real GDP Due To Unskilled Labor

I Regions	II % Change in Real Wage of Skilled Labor	III % Change in Real Wage of Unskilled Labor	IV % Change in Rental Price of Capital	V % Change in Real GDP	VI % Change in Terms of Trade
Australia	0.20	-0.41	0.23	0.27	-0.01
New Zealand	0.18	-0.44	0.21	0.26	-0.03
Pacific Islands	-0.01	1.26	-0.23	-0.52	0.36
China	0.00	0.00	0.00	0.00	0.00
S. Asia	0.00	0.00	0.00	0.00	0.00
N. America	0.00	0.00	0.00	0.00	0.00
EU 15	0.00	0.00	0.00	0.00	0.00
S. East Asia	0.00	0.00	0.00	0.00	0.00
Rest of East Asia	0.00	0.00	0.00	0.00	0.00
N. Africa & Middle East	0.00	0.00	0.00	0.00	0.00
Eastern Europe & Former Soviet Union	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

Table 4: Percentage Changes in Real Factor Returns and Real GDP Due to Skilled Labor

I	II	III	IV	V	VI
Regions	% change in Real Wage of Skilled Labor	% change in Real Wage of Unskilled Labor	% Change in Rental Price of Capital	% Change in Real GDP	% Change in Terms of Trade
Australia	-0.56	0.13	0.17	0.21	-0.02
New Zealand	-0.65	0.09	0.11	0.16	-0.02
Pacific Islands	18.69	-1.93	-2.57	-4.00	0.65
China	0.00	0.00	0.00	0.00	0.00
South Asia	0.00	0.00	0.00	0.00	0.00
North America	0.00	0.00	0.00	0.00	0.00
EU 15	0.00	0.00	0.00	0.00	0.00
South East Asia	0.00	0.00	0.00	0.00	0.00
Rest of East Asia	0.00	0.00	0.00	0.00	0.00
North Africa & Middle East	0.00	0.00	0.00	0.00	0.00
Eastern Europe & Former Soviet Union	0.00	0.00	0.00	0.00	0.00
ROW	0.00	0.00	0.00	0.00	0.00

The Pacific Islanders located in Australia and New Zealand gain significantly due to the fact that they are supplying the increased quotas. The welfare of the permanent residents of the Pacific Islands however, falls considerably (-\$488m). This loss is the result of the increase in quotas on skilled labor which reduces welfare by 510m (Table 2C). This loss from skilled labor is the result of a substantial rise (18.7%) in real skilled wages in the Pacific Islands, which is not offset by increased remittances sent back home by the skilled temporary workers. The loss of unskilled labor actually raises the welfare of permanent residents by 22m (Table 2B). In this case the loss of labor is more than offset by their remittances.

The welfare loss of the Pacific Islands' permanent residents is dwarfed by the gains enjoyed by the migrant labor in Australia and New Zealand, leading to an overall positive change in welfare for Pacific Islanders as a whole. However, as indicated above this is done at great expense to Pacific Islanders at home.

Two assumptions made in the model may affect these results. First, returning migrants do not experience an increase in productivity as a result of their temporary work abroad. However temporary worker schemes are often linked with capacity building and hence returning migrants are expected to experience increased productivities. Table 5 shows the impact of increasing the productivity of returning skilled and unskilled labor. The increase in productivity is determined by assuming that returning 80% of Pacific Islanders continue to gain 50% of the difference between their productivities abroad and at home¹⁵. This leads to a 32% increase in the productivity of skilled temporary workers, which is equivalent to a 6% increase in the

¹⁵ Remember that a Pacific Islander living in the USA will gain 75% of the difference in productivities between a Pacific Islander working at home and an American person working in America. Hence when they return we assume they keep 50% of this difference.

productivity of the skilled workforce. The increase in productivity of unskilled is much larger, primarily because wage differentials (on which productivity is assumed) are much larger. The increased productivities of skilled and unskilled returning migrants raise the welfare of Pacific Islanders. These gains also offset the initial loss of skilled labor and hence overall welfare is positive (18.84m). However most of the gains are from returning unskilled workers with higher productivities. The benefits from increased productivity of returning skilled workers do not offset the initial loss resulting from more skilled workers temporarily moving abroad¹⁶.

The second assumption is that the quotas are assumed to be filled. It could be argued that an increase in the real wages of skilled workers in the Pacific Islands of 18% might provide a large enough incentive to skilled Pacific Islanders that they choose not to move to Australia and New Zealand. High levels of previous permanent migration however do not confirm this. There are many reasons other than wages which affect a persons decision to migrate, including job satisfaction, the quality and amount of public services such as health and education, the availability and cost of transport and telecommunication to overcome isolation, etc.

Table 5: Welfare of Pacific Islanders in the Pacific Islands with an Increase in Productivity of Returning Migrants

	Skilled Labor		Unskilled Labor	
	Productivity	Initial Loss of Labor	Productivity	Initial Loss of Labor
Welfare of Pacific Islanders in the Pacific Islands (\$US millions)	-397.37	416.20		
Decomposed into productivity and loss of labor force (\$US millions)	124.80	-522.17	395.70	20.51
Productivity increase of migrants ^a	32.01%		627.05%	
Equivalent Productivity increase of Labor force	6.27%		9.95%	

a. Assumes 80% of workers return with 50% of gains

The permanent residents of China and South East Asia gain from increased trading opportunities with Australia and New Zealand: while the more skilled labor intensive countries – such as Europe, East Asia, and North America – lose.

Real GDP rises in Australia and New Zealand due to the greater access to labor endowments, both skilled and unskilled (columns V, Tables 3 and 4). The rental price of capital rises reflecting the increased demand for capital which accompanies the abundance of skilled and unskilled labor.

Real GDP in the Pacific Islands falls, particularly with the movement of skilled labor to Australia and New Zealand. The scarcity of skilled labor raises the real wage of skilled labor by 18% and reduces the returns to capital and hence the rental price also falls significantly (2.57% in Table 4). The 1.26% rise in unskilled real wages on the other hand is relatively small and has a much smaller impact on the returns to capital and Real GDP. Given that the increased quota amounts to only 2% of the Pacific Islands unskilled workforce, this rise in the real wages of unskilled

¹⁶ This experiment assumes that the temporary flow of labor is continuous. As workers move home with higher productivities they are immediately replaced with other temporary workers such that the labor supply in the Pacific Island's is permanently lower. This is the revolving door feature referred to above.

workers might not occur at all if the movement of unskilled labor merely reduces the level of unemployment in the Pacific Islands.

Alongside the improvement in the real wages of skilled workers (18%), the Pacific Islands also experiences a 1 percent improvement in terms of trade as the price of its exports rises relative to imports. This is due to a real exchange rate appreciation resulting from the substantial rise in skilled wages.

4.2 Sectoral Output

Chart 7 illustrate the effects of the liberalization on the sectoral output of Australia¹⁷.

Output in Australia and New Zealand increases in all sectors, although the magnitude of the increases are much smaller than the decreases experienced by the Pacific Islands. Australia gains most heavily in the Electronics sector, while New Zealand does best in Manufacturing, Other Services, and Capital Goods. Both countries see large improvements in their Textiles sector output. Again most of the gains are the result of increases in unskilled labor.

4.3 Skilled Labor

As mentioned above an increase in Australia and New Zealand's skilled labor force of 1% is equivalent to a fall in the Pacific island's skilled labor force of 21%. In this section we examine the impact of alternative shocks. Table 6 shows that reducing the quota to an increase of 0.2% of the Australian and New Zealand skilled workforce reduces the losses to the Pacific Island economies considerably, from \$510m under the previous experiment to \$93m. The skilled labor force in the Pacific Island economies would fall by just over 4%, much less than the previous case where 21% of the Pacific Island's skilled labor force moved. As less skilled labor moves abroad the welfare losses diminish considerably. It is interesting to note that the movement of just 1% of the Pacific Island's skilled labor force would offset all gains made from sending 2% of its unskilled labor force.

¹⁷ We choose not to display the results for the Pacific Island's given that the sectoral detail of the Pacific Islands underpinning this analysis is unlikely to be accurate. The effects on New Zealand are similar to those on Australia. The effects on the other regions are mostly negative and insignificant.

Chart 7 Impact of Increased Unskilled and Skilled Labor Movement on Sectoral output in Australia (%)



4.4 Unskilled Labor

In the case of unskilled labor the gains to the Pacific Islander's living in the Pacific Islands increases as the quota is further increased to 2% and 3% respectively (Table 7). Similarly the gains to Australia and New Zealand also increase as more unskilled labor is obtained from the Pacific Islands.

Table 7: Sensitivity Analysis: The Impact of Alternative Changes in Unskilled Labor Quotas on Welfare

% increase in Australia and New Zealand's Unskilled Labor Forces (shock)	1%	2%	3%
% of Pacific Islander's unskilled worker population	-1.94%	-3.88	-5.82
Welfare of Pacific Islanders in Pacific Islands (Millions of US\$)	22.03	41.46	58.82
Welfare of Australian's in Australia (Millions of US\$)	199.84	402.18	605.87
Welfare of New Zealander's in New Zealand (Millions of US\$)	17.9	36.23	54.88

4.5 Alternative Labor Exporters

In the following sections we examine the case where Australia and New Zealand increase their quotas on the temporary movement of labor, however this new labor is supplied by South East Asia (only), South East Asia and the Pacific Islands, all developing countries, and all developed countries.

4.5.1 Pacific Islands Versus South East Asia

In this section we examine the welfare implications of expanding quotas by 1% to persons from South East Asia and compare this with the case where the quotas are increased for persons from Pacific Island economies only and for the case where both South East Asians and Pacific Islanders fill the 1% increase in quotas (Table 8).

In the case where quotas are increased for only South East Asian persons the gains to Australia and New Zealand are slightly less than the Pacific Island case (Table 8). The reason for this is that the Pacific Islanders send less remittances back home as a proportion of their income than South East Asians¹⁸. Of course the gains are now obtained by South East Asian labor in Australia and New Zealand. The remaining residents of South East Asia also gain as a result of the movement of labor. Almost all of the gains are made from the movement of unskilled labor, however unlike the Pacific Islands the loss of skilled labor does not result in an overall decline in welfare, but a small positive change.

In the second case we have assumed that quotas would be opened to both Pacific Island economies and South East Asia and these economies would supply the labor in accordance with their existing shares. As expected the Pacific Islands supply a larger portion (74.7%) of New Zealand's increased quota for unskilled labor, although in absolute numbers they send more

¹⁸ As noted by Freud et al (2005) these remittance rates may be lower due to informal flows. Increases remittance rates would lead to larger transfers from Australia/New Zealand to the Pacific Islands.

unskilled labor to Australia (11,274). This unskilled labor represents a small proportion of the Pacific Island's unskilled labor supply (0.55%, Table 8). In terms of skilled labor the numbers of people are relatively small (Table 9) however they represent a reasonable percentage of the Pacific Island's labor supply (2.45%, Table 8).

In this case the impact on Australia and New Zealand is similar to that in the other cases. The Pacific Island's lose less from the skilled labor. However, they also lose some of the gains made from supplying unskilled labor. South East Asia on the other hand gains from sending both, more so from unskilled labor than skilled.

Table 8: Comparison of Welfare Results from alternative sources of Labor (Millions of US\$)

Quotas filled by:	Home Region	Host Region					Total Welfare of Host Region	
		Australia	New Zealand	Pacific Islands	S.East Asia	Other		
Pacific Islands Only	Unskilled	Australia	199.84	-0.38	0.07	0.00	0.00	199.53
		New Zealand	-4.88	17.90	0.04	0.00	0.00	13.07
		Pacific Islands	775.05	104.13	22.03	0.00	0.00	901.21
	Skilled	Australia	102.77	-0.47	1.70	0.00	0.00	103.99
		New Zealand	-2.00	8.64	0.90	0.00	0.00	7.54
		Pacific Islands	611.05	63.94	-510.06	0.00	0.00	164.93
S.East Asia Only	Unskilled	Australia	190.67	-0.41	0.00	0.01	0.00	190.28
		New Zealand	-5.11	16.69	0.00	0.00	0.00	11.59
		Pacific Islands	-2.55	-2.01	0.22	0.00	0.00	-4.34
		S. East Asia	693.43	99.11	0.00	147.68	0.01	940.23
	Skilled	Australia	91.08	-0.44	0.00	0.02	0.00	90.66
		New Zealand	-1.98	8.36	0.00	0.00	0.00	6.39
		Pacific Islands	0.68	0.30	0.47	0.00	0.00	1.46
	S. East Asia	1.24	-0.04	3.74	0.51	5.46	0.00	
S. East Asia & Pacific Islands	Unskilled	Australia	192.08	-0.39	0.02	0.00	0.00	191.72
		New Zealand	-5.07	17.62	0.01	0.00	0.00	12.57
		Pacific Islands	138.41	77.26	4.55	0.00	0.00	220.22
		S. East Asia	566.00	24.66	0.04	111.41	0.00	702.10
		% change in labor force	1%	1%	-0.55%	-0.02%		
	Skilled	Australia	91.55	-0.45	0.16	0.02	0.00	91.28
		New Zealand	-1.98	8.97	0.08	0.00	0.00	7.07
		Pacific Islands	37.84	28.74	-52.84	0.00	0.00	13.74
		S. East Asia	483.12	30.00	0.35	26.73	-0.01	540.19
	% change in Labor force	1%	1%	-2.45%	-0.17%			

4.5.2 All Developing Countries

Under this scenario we consider the implications of Australia and New Zealand increasing their quotas on skilled and unskilled labor and allowing these quotas to be filled by all developing countries. This scenario represents a North-South liberalization of GATS Mode 4. The

developing labor exporting regions comprise the Pacific Islands, China, South Asia, South East Asia, North Africa and the Middle East, Eastern Europe and the Former Soviet Union, and the Rest of the World.

Once again looking first at welfare changes in Tables 10A and 10B, it can be seen that Australia and New Zealand again experience significant welfare gains, although the sizes of the gains are smaller than in the scenario where the increased labor was imported from the Pacific Islands only.

The gains to the Pacific Islands are reduced as they supply less of the unskilled labor, just 0.25% of their labor force as compared to 1.94% when only they filled the quotas. It is also not surprising that they lose considerably less from skilled labor.

Migrants from South East Asia, the Rest of the World, China and Eastern Europe gain considerably as a result of the increased quotas (Tables 10A and B). These are also the countries with the highest shares of the unskilled quotas: 30, 20, 11 and 13% respectively of Australia's quotas. While most countries gain more from unskilled labor than from skilled, Eastern Europe gains more from the increase in skilled labor quotas (Tables 10A and B); this is due to the fact that Eastern Europe supplies almost 30% of the increased skilled labor quota as opposed to only 13% of the unskilled.

Most of the remaining residents of the labor exporting countries gain, at least from the increase in quotas on unskilled labor (Table 10A). The results are more mixed from skilled labor movement (Table 10B).

4.5.3 All Developed Countries

The final simulation considers North-North liberalization, where quotas are filled by workers from other developed countries. The developed countries in this simulation are considered to be roughly the following regions: the EU 15, the Rest of East Asia, and North America¹⁹.

The results from this scenario are shown in Tables 11A and 11B, for unskilled and skilled labor respectively. In this scenario the permanent residents of Australia and New Zealand have the largest welfare gains of all the simulations. This is due to the fact that the skilled and unskilled labor from Europe, North America and the Rest of Asia are also the most productive and hence add considerably to the effective labor force. The wages of the skilled and unskilled in Australia and New Zealand also decline the most when labor from developed economies fills the increased quotas.

¹⁹ Note that movement between Australia and New Zealand is not included because of the CER agreement which already allows for the free movement of labor between these countries.

Table 10A Welfare Results from Removal of Unskilled Labor, Supplied by Developing Economies (Millions of US\$)

Home region	Host Region									
	Australia	New Zealand	Pacific Islands	China	S.Asia	S. East Asia	N. Africa & Middle East	E. Europe & Former Soviet Union	ROW	Other Developed
Australia	186.16	-0.39	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Zealand	-5.19	16.80	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pacific Islands	48.36	41.77	1.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
China	81.39	16.49	0.01	7.17	0.00	0.08	0.01	0.00	0.01	0.02
S. Asia	38.31	4.65	0.00	0.00	54.39	0.01	0.13	0.00	0.01	0.00
N. America	-1.63	-0.36	0.13	0.00	0.04	0.03	0.05	0.01	0.05	-1.87
EU 15	-26.82	-3.46	0.03	0.00	0.09	0.05	0.09	0.03	0.17	-3.36
South East Asia	198.14	13.35	0.02	0.00	0.00	42.67	0.04	0.00	0.01	0.00
Rest of East Asia	-4.17	-0.93	0.03	0.00	0.02	0.01	0.01	0.00	0.01	2.66
N. Africa & Middle East	28.96	2.40	0.00	0.00	0.00	0.01	33.83	0.00	0.01	0.00
E. Europe & Former Soviet Union	98.41	3.75	0.02	0.00	0.03	0.04	0.19	-2.80	0.04	0.01
ROW	148.83	13.26	0.01	0.00	0.02	0.02	0.06	0.02	7.03	-0.01
Total welfare of host region	790.76	107.33	2.15	7.18	54.60	42.93	34.42	-2.73	7.35	-2.55
% of Labor force	1.00	1.00	-0.25	0.00	0.00	-0.01	-0.01	-0.01	0.00	0.00

Table 10B Welfare Results from Removal of Skilled Labor, Supplied by Developing Economies (Millions Of US\$)

Home Region	Host Region									
	Australia	New Zealand	Pacific Islands	China	S.Asia	South East Asia	N. Africa & Middle East	E. Europe & Former Soviet Union	ROW	Other Developed
Australia	91.84	-0.45	0.06	0.00	0.00	0.01	0.00	0.00	0.00	0.00
New Zealand	-2.00	8.75	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pacific Islands	13.05	12.89	-20.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
China	18.23	3.98	0.01	-3.36	0.00	0.00	0.00	0.00	0.00	-0.01
South Asia	12.60	1.53	0.00	0.00	12.79	0.00	0.04	0.00	0.00	0.00
North America	-1.03	-0.30	0.57	0.00	0.04	0.12	0.11	0.02	0.24	-1.31
EU 15	-19.01	-3.59	0.18	0.00	0.12	0.17	0.24	0.14	0.66	-5.63
South East Asia	161.43	13.25	0.14	0.00	0.01	10.27	0.05	0.00	0.01	-0.01
Rest of East Asia	-0.05	-0.20	0.08	0.00	0.02	0.03	0.02	0.01	0.04	-1.94
N. Africa & Middle East	15.41	1.47	0.00	0.00	0.00	0.01	1.90	0.00	0.00	0.00
E. Europe & Former Soviet Union	162.24	6.25	0.13	0.00	0.04	0.09	0.46	-8.90	0.15	0.00
ROW	137.66	17.60	0.03	0.00	0.03	0.03	0.07	0.02	-44.22	-0.01
Total Welfare of Host Region	590.38	61.17	-19.05	-3.35	13.05	10.73	2.90	-8.71	-43.12	-8.90
% of Labor force	1.00	1.00	-0.96	-0.01	-0.01	-0.06	-0.02	-0.03	-0.02	0.00

Table 11a: Welfare Results from Removal of Unskilled Labor, Supplied by Developed Economies (Millions Of US\$)

	Host Region							Total Welfare of Home Region
	Australia	New Zealand	Pacific Islands	North America	Europe	Rest of Asia	Other Developing	
Australia	271.73	-0.63	0.00	0.00	0.09	0.00	0.00	271.19
New Zealand	-6.77	30.09	0.00	0.00	0.09	0.00	0.00	23.41
Pacific Islands	-3.43	-3.21	0.13	0.03	0.05	0.00	0.00	-6.43
China	-5.81	-1.27	0.00	0.25	0.85	0.59	1.29	-4.12
S. Asia	-2.70	-0.36	0.00	0.10	0.98	0.01	-1.92	-3.89
N. America	50.26	12.66	0.01	-93.27	1.32	0.01	0.00	-29.02
Europe	846.31	128.73	0.00	0.42	-1307.09	0.00	-0.01	-331.65
S.East Asia	-13.13	-0.96	0.00	0.43	1.37	0.06	1.65	-10.58
Rest of E. Asia	104.52	28.05	0.00	0.35	0.81	-166.43	0.00	-32.69
N. Africa and Middle East	-1.99	-0.18	0.00	0.09	2.78	0.00	0.31	1.01
E. Europe & Former Soviet Union	-5.80	-0.25	0.00	0.27	4.15	0.01	-3.42	-5.04
ROW	-9.72	-0.92	0.00	1.29	9.55	0.04	-2.07	-1.83
Total Welfare of Host Region	1223.46	191.75	0.15	-90.03	-1285.06	-165.70	-4.19	-129.62
% of Labor Force	1.00	1.00	0.00	0.00	-0.05	-0.01	0.00	

Migrant labor from Europe gains the most as they supply between 72-92% of the increased quotas in Australia and New Zealand. The remaining residents in Europe however lose considerably as a result of the loss of both skilled and unskilled labor, unlike the developing economies where some gains could be made. Another important difference with the developing economies is that the losses were less from the movement of skilled labor than from unskilled. This result reflects the relative abundance of skilled labor in these developed economies. Residents in North America and the Rest of Asia also lose, but to a lesser extent. The Pacific Islands gain only marginally from this policy, as a result of trade ties.

Table 11B Welfare Results From Removal of Skilled Labor, Supplied by Developed Economies (Millions Of US\$)

	Host Region							Total Welfare of Home Region
	Australia	New Zealand	Pacific Islands	N. America	Europe	Rest of Asia	Other Developing	
Australia	132.68	-0.68	0.00	0.00	0.11	0.00	0.00	132.12
New Zealand	-2.56	14.71	0.00	0.00	0.04	0.00	0.00	12.21
Pacific Islands	0.95	0.46	0.57	-0.01	-0.01	0.00	0.00	1.96
China	1.69	0.21	0.00	-0.08	-0.28	0.03	-0.85	0.71
South Asia	0.71	0.05	0.00	-0.03	-0.32	0.00	-1.13	-0.73
N. America	37.08	6.45	0.01	-80.97	0.69	0.03	-0.02	-36.73
Europe	658.79	73.66	0.00	0.31	-1097.61	0.02	-0.06	-364.90
S. East Asia	1.62	-0.05	0.00	-0.06	-0.20	0.04	1.16	2.51
Rest of E. Asia	35.57	7.29	0.00	-0.02	0.00	-92.99	-0.01	-50.15
N. Africa & Middle East	0.41	0.01	0.00	-0.02	-0.56	0.00	-0.74	-0.90
E. Europe & Former Soviet Union	-0.94	-0.07	0.00	0.02	0.27	0.02	-2.35	-3.04
ROW	0.87	-0.14	0.00	-0.27	-1.47	0.02	-3.11	-4.10
Total Welfare of Host Region	866.88	101.90	0.58	-81.13	-1099.35	-92.82	-7.12	-311.05
% of Labor Force	1.00	1.00	0.00	0.00	-0.07	-0.01	0.00	

5. Conclusion

This paper provides further evidence of the potential gains to be made by both labor exporting and importing regions from negotiations under GATS Mode 4. Here we examine the impact on welfare, Real GDP and wages of Australia and New Zealand increasing their quotas on skilled and unskilled labor from the Pacific Islands economies by 1% of their labor force. The results show that Australia and New Zealand would gain considerably from increasing these quotas through GATS Mode 4. Although most of the negotiations have focussed on the mobility of skilled labor, this paper provides further evidence that the gains from North-South agreements under GATS Mode 4 are greatest when applied to unskilled labor. This result is consistent with other findings, such as Walmsley and Winters (2005).

The paper also found that Australia's and New Zealand's choices of sending partners among developing economies do not affect the welfare gains accruing to them. The gains made by Australia and New Zealand were similar regardless of whether labor came from the Pacific Islands, South East Asia or a combination of developing economies. Of course the choice of sending region had a considerable impact on the welfare of the sending economies themselves.

The Pacific Island economies gained substantially from sending unskilled labor to Australia and New Zealand under GATS Mode 4. In the case of skilled labor, however, the loss of scarce skilled labor was shown to have a significant negative impact on the permanent residents remaining in the Pacific Islands and significantly increased the wages of the remaining skilled workers.

However, when GATS Mode 4 is linked to capacity building efforts it was assumed that 80% of skilled and unskilled workers would return with increased productivities. Under this assumption, the results for the permanent residents remaining in the Pacific Islands were positive, albeit again most of the gains were from increases in the productivities of unskilled workers. Hence, while unskilled labor movements result in unambiguously positive gains, the impact of increased mobility of skilled labor is clearly negative and needs to be considered carefully. Remittances do not completely offset the loss of skilled workers in the Pacific Islands and nor do capacity building efforts aimed at increasing the productivities of returning migrants. However if skilled migration is an inevitable part of Pacific Island economies, then temporary schemes which incorporate capacity building efforts and encourage higher remittance rates are likely to go some way to mitigating the losses of skilled migration.

Finally, this paper also examined the case where the quotas were met by an increase in labor from developed economies. In this case, the gains made by Australia and New Zealand were much greater than when labor was supplied by developing economies. However Europe, North America and the rest of Asia, the three sending economies, all lost significantly as a result of the lost labor supply, particularly from the loss of unskilled labor.

A FINAL WARNING! Analysis of the Pacific Island economies is always fraught with difficulties and this paper is no exception. The lack of country specific data on the rest of Oceania in the GTAP Data Base is a cause for concern. Further work improving the availability of data in this region would improve this analysis considerably.

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References

- Asia Pacific Migration Research Network (APMRN) (1997) 'Migration Issues in the Asia Pacific', Working paper no. 1 compiled by Patrick Brownlee and Colleen Mitchell, Published by the APMRN Secretariat Centre for Multicultural Studies - Institute for Social Change & Critical Inquiry ; University of Wollongong, Australia.
- Bertram, G. and R.F. Watters (1985) 'The MIRAB economy in South Pacific microstates', *Pacific Viewpoint*, No. 26, pp. 497-520.
- Chambers, A. (1986) 'Reproduction in Nanumea: An Ethnography of Fertility and Birth', Working Papers in Anthropology No. 72, Auckland, University of Auckland.
- CIA World Factbook <http://www.cia.gov/cia/publications/factbook/>
- Commander S, Kangesniemi M and Winters L A (2002) 'The brain drain: curse or boon? A survey of the literature', paper for the International Seminar on International Trade, Stockholm, May.
- Connell, J (2003) 'Migration Patterns and Policies in the Asian and Pacific Region', Asian Population Studies Series No. 160
- Cook Islands (1984) 'Cook Islands Development Plan', Rarotonga, Cook Islands.
- Dimaranan, Betina V. and Robert A. McDougall, Editors (2005, forthcoming) *Global Trade, Assistance, and Production: The GTAP 6 Data Base*, Center for Global Trade Analysis, Purdue University.
- Freund, C. and Spatafora, N (2005) 'Remittances: Costs, Determinants and Informal Flows', mimeo.
- Hertel, Thomas W., Kym Anderson, Joseph Francois, and Will Martin, (2004) 'The Global and Regional Effects of Liberalizing Agriculture and Other Trade in the New Round', Chapter 11 in *Agriculture and the New Trade Agenda: Creating a Global Trading Environment for Development*, M. Ingco and A. Winters (eds.), Cambridge University Press.
- Hertel, T. W. (ed), (1997) *Global Trade Analysis: Modeling and Applications* Cambridge: Cambridge University Press.
- Iredale, Robyn (2000) 'Skilled migration policies in the Asia-Pacific region', *International Migration Review*, vol. 34, pp. 882-906.
- Munro, D. and R. Bedford (1980) 'Historical backgrounds', in A Report on the Results of the Census of Tuvalu, Funafuti, Government of Tuvalu, 1-13.
- Parsons, C. R., R. Skeldon, L. A. Winters and T. L. Walmsley (2005) 'Quantifying the international bilateral movements of migrants', presented at the 8th Annual Conference on Global Economic Analysis, Lübeck, Germany, June 9-11.
- Ratha, D. (2003) 'Workers' remittances: an important and stable source of external development finance, How important are remittances as a source of development finance?' World Bank
- Ratha, D. (2004) Understanding the Importance of Remittances, Migration Policy Institute, <http://www.migrationinformation.org/Feature/display.cfm?id=256>
- Rodrik, D (2004) 'How to Make the Trade System Work for Development'. Mimeo <http://ksghome.harvard.edu/~drodrik.academic.ksg/How%20to%20Make%20Trade%20Work.pdf>

- van der Mensbrugge, D., (2005) 'Assessing the Impacts of Increased migration into High-income countries', Development Prospects Group, Draft May 2005
- Walmsley, Terrie L. (2002) 'Modelling the Movement of Natural Persons', mimeo
- Walmsley, Terrie L. and L. Alan Winters (forthcoming) 'Relaxing the Restrictions on the Temporary Movement of Natural Persons: A Simulation Analysis', *Journal of Economic Integration*
- Walmsley, Terrie L., L. Alan Winters, Chris Parsons and Amer Ahmed, (2005) 'Measuring the Impact of the Movement of Labor Using a Model of Bilateral Migration Flows', 8th Annual Conference on Global Economic Analysis, Lübeck, Germany, June.
- Winters L Alan (2001) 'Assessing the Efficiency Gain from Further Liberalization: A Comment,' in Sauve, P and Subramanian, A (eds) *Efficiency, Equity and Legitimacy: The Multilateral Trading System and the Millennium*. Chicago: Chicago University Press. 106-113
- Winters, L Alan (2003) 'The Economic Implications of Liberalising Mode 4 Trade', Chapter 4 in Mattoo A and Carzaniga A (eds) *Moving People to Deliver Service*. Oxford: Oxford University Press. 59-92.
- Winters, L Alan (2005) 'Developing Country Proposals for the Liberalisation of Movements of Natural Service Suppliers', Development Research Centre on Migration, Globalisation and Poverty Working Paper T8, University of Sussex.