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The Economic Society of Australia warmly welcomes you to the Gold Coast, Queensland, Australia for the 37th Australian Conference of Economists.

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This year we have a large number of papers dealing with Infrastructure, Central Banking and Trade.

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At the time of preparing for this conference we could not have known that it would have been held during the largest credit crisis since the Great Depression. The general public and politicians both look to central banks for the answers.

We are also very pleased to see a wide selection of papers ranging from applied economics to welfare economics. An A – Z of economics (well, almost).

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The Determinants of New Zealand Migration: Comparing Migration to and from Australia and the United Kingdom

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Abstract

The paper investigates the determinants of New Zealand migration flows. New Zealand migration flows are of particular interest as New Zealand experiences high immigration as well as emigration. The impact of macroeconomic conditions on the arrivals from and departures to the two main migration partner countries, namely Australia and the United Kingdom, are analyzed. The findings using quantile regressions suggest that macroeconomic conditions are important for the flows to and from the United Kingdom but not for the Australian migration. Further, the impact of macroeconomic conditions declines over the sample period -1979 to 2007- suggesting that the recent migration may be motivated by other factors.

Keywords:

New Zealand, Immigration, Time-series analysis, Quantile regression

JEL Classification:

F22, J61

1. Introduction

New Zealand has a long and interesting migration history. New Zealand experiences high levels of immigration as well as emigration. Further as illustrated by Figure 1, both of these flows are large in magnitude and volatile in nature. This paper contributes to the understanding of migration flows by analyzing the trends in New Zealand migration flows and exploring its determinants. We focus on analyzing the migration flows- both arrivals and departures- between Australia and New Zealand and between the United Kingdom and New Zealand. As seen from Figure 1 the arrivals and departures do not necessarily mirror each other (the correlation coefficient is 0.222). Hence, instead of focusing on net migration, we analyze the arrivals and departures separately.

INSERT FIGURE 1

The studies on New Zealand migration flows are reviewed in Section 2. Section 3 documents the time series data used for the analysis. Section 4 describes the quantile regression methods while section 5 contains the results. Lastly, conclusions and further directions are discussed in Section 6.

2. Literature Review

The studies analyzing New Zealand's migration flows have concentrated on immigration from Fiji to New Zealand. Gani and Ward (1995) explore the migration of Fijian professional to New Zealand and find that previous year's migration, real income in New Zealand and political instability have a positive impact while number of New Zealand graduates in the same occupational group has a negative impact. Gani (1998) analyses the determinants of long term migration from Fiji to New Zealand using an error correction model over the period 1970-1994. The study concludes that lagged values of the dependent variable

(migrants as a proportion of Fiji's population), wage differentials and differences in unemployment rates have the expected significant impact while differences in living standards, political instability and moving costs do not exert a statistically significant effect. Narayan and Smyth (2003) reassess these findings using the bounds testing procedure and find that political instability has a positive and statistically significant effect in the short run but not in the long run. However, the impacts of standard of living and real wage differentials remain statistically insignificant in all time periods.

Trans-Tasman migration is of particular interest due to the large and volatile flows across the two countries and its relatively unrestricted nature. Brosnan and Poot (1987) investigate the factors behind the fluctuations in the volume and direction of Australia-New Zealand flows by estimating a four equation model. They estimate the probability of migration of the Australian population (emigration rate per 1000 of the population) and the proportion of emigrants moving to New Zealand as well as similar probabilities for New Zealand emigrants. They find that the proportion of youth (aged 15-29), cost of travel and economic conditions such as relative employment opportunities are important in determining these flows. Earnings differential have an expected significant effect on emigration from New Zealand but have little impact on Australian emigration flows to New Zealand.

Findings from Poot (1995) suggest that though Trans-Tasman flows respond to the differences in income and employment opportunities; there are border effects and these flows are statistically different than the labour movements within Australia. Gorbey *et al.* (1999) use a Bayesian or unrestricted VAR model to forecast migration between Australia and New Zealand which in turn, can be used for population forecasting. Their analysis reinforces the conclusions drawn by other studies about the importance of the differences in the levels of

economic activity in Australia versus New Zealand and of Australian labour market conditions.

Shan *et al.* (1999) investigate the causality between immigration and labour market variables such as unemployment, wages, capacity utilization, unemployment benefits and changes in industrial structure, using VAR approach. They find no Granger causality between immigration and unemployment but there is an evidence of two-way causality between capacity utilization and immigration.

A common feature of these studies is that they analyze net migration. While net migration is the variable of ultimate interest; as noted in Section 1, it is important to explore the different behavior of the inflow and the outflow. This paper contributes to the literature by analyzing the arrivals and departures separately. The studies so far have also concentrated on analyzing either the total migration or concentrating on one partner country (Australia or Fiji) at a time. This paper follows a different approach by investigating migration to and from two partner countries, Australia and the United Kingdom. Concentrating on these two countries enables a comparison of the trends and determinants of migration. Since these two countries are the main origin and destination countries for New Zealand's migration, the analysis also captures the main features and drivers of overall migration flows. The population movement between Australia and New Zealand is an important contributor to the fluctuation in New Zealand's net migration (Gorbey et al., 1999).

3. Data

We analyze arrivals to New Zealand from Australia and the United Kingdom and departures from New Zealand to Australia and the United Kingdom. Time period of analysis runs from third quarter of 1979 to third quarter of 2007. The independent variables include the price

indices (CPI for New Zealand and Australia and RPI for UK) as the proxy for the cost of living, average weekly earnings (as the proxy for income) and unemployment rate from all these countries. All macroeconomic data is sourced from Datastream and migration data is available from Statistics New Zealand. Migration is defined in terms of Permanent and long term arrivals to and departures from New Zealand. All data are seasonally adjusted.

INSERT FIGURE 2

INSERT FIGURE 3

Arrivals and departures data are presented in Figure 2 and Figure 3 shows arrivals and departures as percentage of total arrivals to New Zealand and total departures from New Zealand. Though there are changes in arrivals and departures as a proportion of the total, no upward or downward dominant trend can be observed in Figure 3. Arrivals from Australia dominated the arrivals from the United Kingdom for approximately two thirds of the sample, until approximately 1996, when this trend reversed. Prior to 1986 arrivals from the United Kingdom and Australia mirrored each other. In relation to departures, throughout the entire sample, departures to Australia dominated departures to the United Kingdom. Two cycles, 1978-1984 and 1984-1993, were very sharp, while from 1993 there was an upward trend for Australian departures and downward trend for the United Kingdom departures.

INSERT FIGURE 4

Figure 4 graphs net arrivals as the difference between arrivals and departures. Note that net arrivals from Australia are negative for almost all sample period indicating that most of the time departures from New Zealand to Australia were greater than corresponding arrivals from Australia. As compared to Australian net arrivals, the United Kingdom net arrivals differ in magnitude and are cyclical.

The appendix (Table 6 and Table 7) contains descriptive statistics for the macroeconomic data and migration data. Average weekly earnings are in nominal terms. Based on Table 6, New Zealand had the highest average earnings, but in all three countries, earnings have been increasing throughout the sample period. The United Kingdom experienced the smallest increase in the wage rates while Australia experienced the largest increase. Interestingly, the cycle in Australian weekly earnings from 1984 to 1994 coincided with the cycle in New Zealand departures to Australia. Over the entire sample period New Zealand inflation was the highest as compared with the United Kingdom and Australia while Australian inflation was the lowest.

In relation to unemployment rates, prior to 1990 unemployment rate in the United Kingdom was the highest and that in New Zealand the lowest. From 1983 to the end of 1980s, the unemployment rate in the United Kingdom and Australia were in decline, while the New Zealand unemployment rate was on the rise. Since the end of 1980s unemployment rates of these three countries moved in close alignment. Comparing the three countries, the United Kingdom unemployment rate was the lowest and Australian unemployment rate was the highest. This development in Australian unemployment rates coincides with the increase in Australian arrivals to New Zealand.

Table 1 presents the results of the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests. Since some of the series were found to be non-stationary (i.e. Australian CPI and the United Kingdom earnings index) while some were stationary (i.e. United Kingdom unemployment rate and arrivals to New Zealand from Australia). Arrivals from the United Kingdom and Australia (AU_A and UK_A) and departures to the United Kingdom and Australia (AU_D and UK_D) are found to be stationary, the rest of the series are transformed to the first difference form. Thus the arrivals and departures are explained by the

change in CPI, change in unemployment rates and change in weekly earnings. All differenced data series are stationary.

INSERT TABLE 1

4. Methodology

In this paper we compare two approaches to modeling the relationship between migration flows to and from New Zealand – the standard OLS and quantile regressions.

The model is given in equation (1)

$$Y_{i,t} = c + \beta_1 NZ_CPI_t + \beta_2 NZ_UR_t + \beta_3 NZ_W_t + \beta_4 PI_{i,t} + \beta_5 UR_{i,t} + \beta_6 W_{i,t} + e_{i,t} \quad (1)$$

Where $Y_{i,t}$ represents either arrivals or departures to and from New Zealand from country i , $e_{i,t}$ is the error term, NZ_CPI_t , NZ_UR_t , NZ_W_t are the New Zealand CPI, unemployment rate and average weekly earnings, $PI_{i,t}$, $UR_{i,t}$ and $W_{i,t}$ stand for the price index (CPI for Australia and RPI for the UK), unemployment rate and wages in country i .

In addition to OLS regression specified in (1) we estimated quantile regressions. Following Hao and Haiman (2007, chapter 3) “when the mean and the median of a distribution do not coincide, the median may be more appropriate to capture the central tendency of the distribution.” This approach is potentially superior to standard OLS since it is robust to the presence of outliers in the data, does not require independence of the error terms and is relatively asymptotically efficient to DGPs with heavy tails.

Following Koenker and Bassett (1978) let (y_i, x_i) , $i=1,..N$ are the variables where y_i is the dependent variable (i.e. arrivals or departures from and to New Zealand to and from country

i) and x_i is the $K \times 1$ vector of independent variables. Suppose that $Quant_\theta(y_i | x_i) = x_i' \beta_\theta$ is the θ^{th} quantile ($0 < \theta < 1$) of y_i conditional on x_i . Then y_i can be modelled as

$$y_i = x_i' \beta_\theta + u_{\theta i}, \quad (2)$$

where $Quant_\theta(u_{\theta i} | x_i) = 0$.

θ^{th} quantile estimator for β can be solved from:

$$\min_{\beta} \left\{ \sum_{i: y_i \geq x_i' \beta} \theta |y_i - x_i' \beta| + \sum_{i: y_i < x_i' \beta} (1 - \theta) |y_i - x_i' \beta| \right\}. \quad (3)$$

For example, median (i.e. $\theta = 0.5$) quantile estimator for β can be calculated as follows:

$$\min_{\beta} \sum |y_i - x_i' \beta| \quad (4)$$

In this study, we use $\theta = 0.25$, $\theta = 0.5$ and $\theta = 0.75$ to compare the changes in the migration flows associated with different quantiles.

5. Analysis

INSERT TABLE 2

Table 2 reports the results for arrivals from Australia. Results from OLS regression are supported by the quantile regression. The values of R^2 and *pseudo* R^2 are very low and most of the variables except constant are statistically insignificant in all the estimations. This finding is discussed more below.

INSERT TABLE 3

The results for departures are reported in table 3 and seem to conform to the intuition that migrants give consideration to macroeconomic conditions while making the migration decision. Differences in the Australian CPI and Australian wages are positively related to the

departures from New Zealand to Australia. Difference in the New Zealand unemployment rate has a significant positive impact, mainly driven by 0.25 and 0.5 quantile. Changes in Australian CPI and wages as well as the New Zealand unemployment rates and wages are important variables at different quantiles. For example, Australian CPI is found to be important in the OLS regression as well as in all quantiles except for 75th quantile. All these variables are of positive sign. Also, the R^2_{pseudo} increases from bottom to top quantiles. The estimates from the mean and median regressions are very similar in terms of explaining departures with the same set of significant variables outlined above.

INSERT TABLE 4

There are similarities between the arrivals from the United Kingdom and the Australian arrivals to New Zealand since changes in New Zealand CPI and weekly earnings were found to be significant. But the model seems to fit the data better in case of the United Kingdom as indicated by higher R^2 and lower AIC criteria. Further, the change in the United Kingdom wage index is significant in OLS regression.

INSERT TABLE 5

In terms of departures from New Zealand to the United Kingdom, all three New Zealand macroeconomic variables as well as the United Kingdom wage index are significant (at different levels of significance). In relation to departures to the United Kingdom from New Zealand, it seems that the importance of macroeconomic factors changed as the time went by; at the bottom quantile all macroeconomic variables are important and significant at 1% level and at the top quantile none of the variables except for the intercept, is really significant in affecting the decision to migrate to the United Kingdom. This finding suggests that at the end of the sample period there might be other factors affecting the decision to relocate from New

Zealand to the United Kingdom. Comparing the mean and median estimates shows that the changes in the United Kingdom earnings index, New Zealand CPI and weekly earnings were the most important variables affecting the departures. Moreover, the increased difference in the United Kingdom earnings index contributes to higher level of departures from New Zealand.

Overall, the analysis suggests that the impact of macroeconomic factors on migration flows is not symmetric for Australia and the United Kingdom and the importance of these factors have changed over time. Unlike arrivals from the United Kingdom, changes in macroeconomic conditions do not explain the changes in arrivals from Australia. Changes in the New Zealand unemployment rate had an effect on departures to Australia, but this effect weakens in later years. Arrivals from and departures to the United Kingdom, on the other had, respond to the macroeconomic changes in the two countries, though their importance has declined in recent years.

6. Conclusion

This paper analyses the effect of changes in prices, wages and unemployment rates on the New Zealand migration flows. The paper contributes to existing literature on New Zealand migration in three aspects. First, we analyze arrivals and departures separately to explore the different nature of inflows and outflows. Secondly, investigation and comparison of migration flows from Australia and the United Kingdom offers an insight into similarities and differences of the two main components of New Zealand migration. Finally, employing quantile regression techniques in addition to the standard analysis enables us to explore the changes in the role of macroeconomic determinants over time.

Given the insights gained from the analysis so far, other possible determinants of migration will be explored in further analysis. We plan to include factors such as stock of earlier migrants and other motivations for migration to New Zealand. Further, the model can be extended to simultaneously analyze the migration flows between Australia, New Zealand and the United Kingdom to allow for alternative destinations in migration decision. Given the nature of New Zealand migration flows, deepening the understanding of the trends, changes and drivers of these flows is an important tool for policy makers.

Figure 1: New Zealand: Total Arrivals and Departures

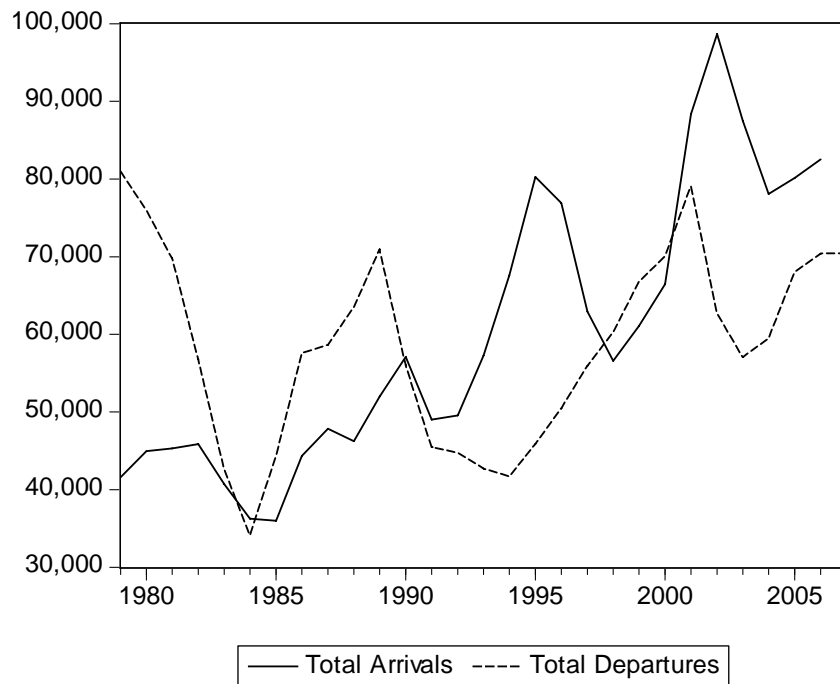
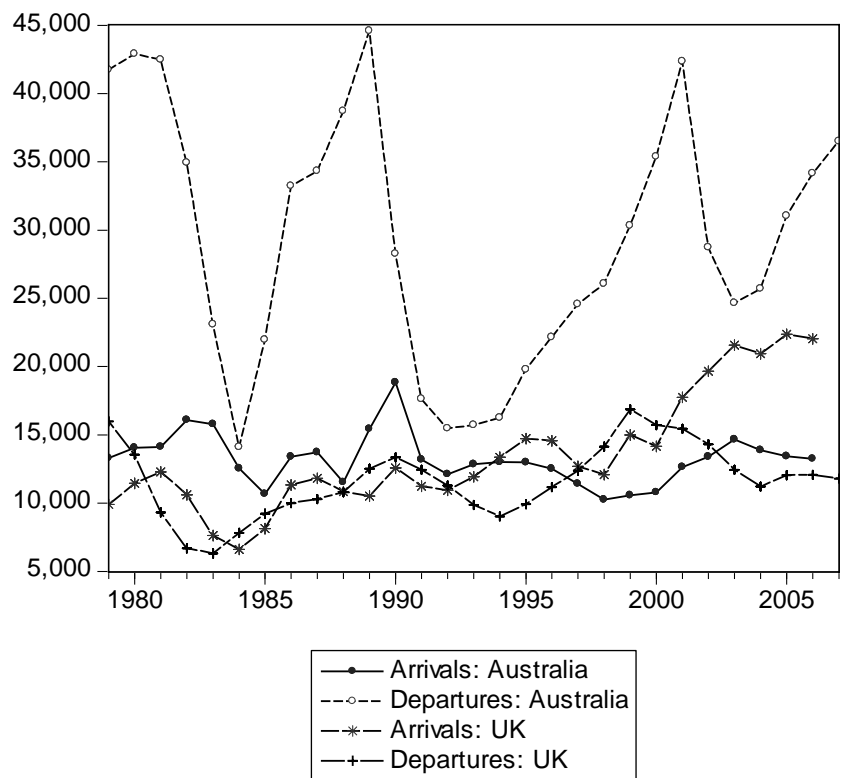


Figure 2: Australia and UK: Arrivals and Departures



Notes: Figure 2 shows total arrivals from Australia and the UK to New Zealand and total departures from New Zealand to Australia and the UK.

Figure 3: Australia and UK: Arrivals and Departures as percent of the total

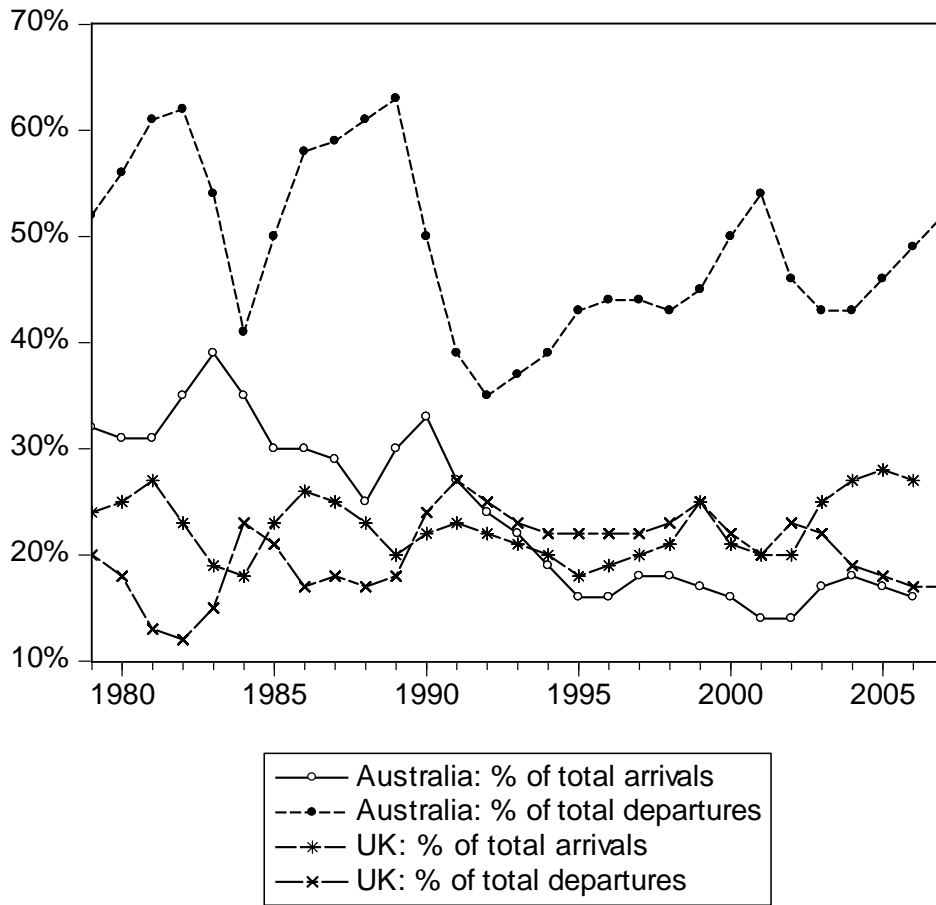
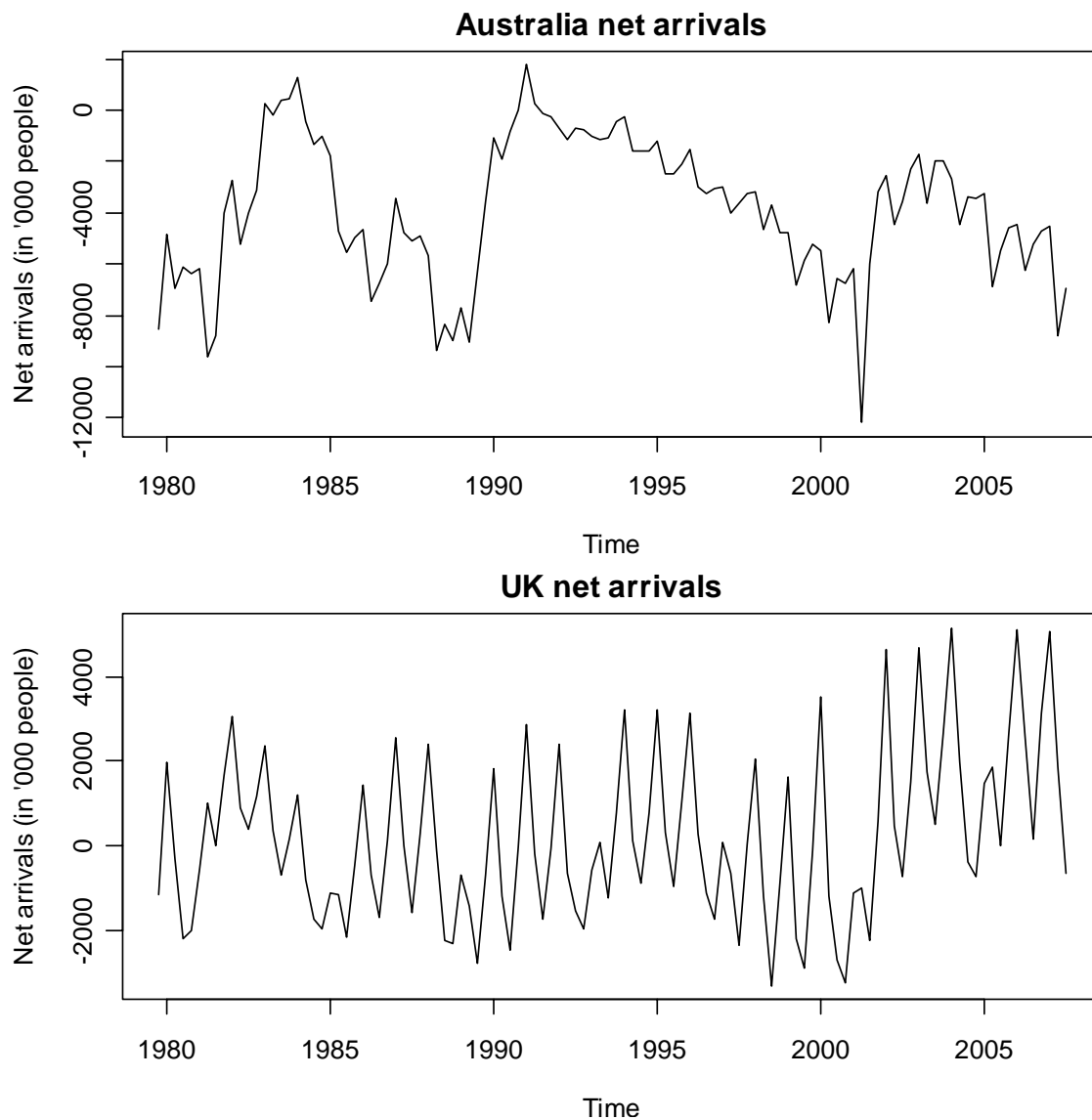


Figure 4: Net Arrivals from Australia and the UK to New Zealand



Notes: Figure 3 shows the net arrivals to New Zealand from the UK and Australia calculated as the difference between arrivals and departures.

Table 1: ADF and Phillips-Perron unit root tests

Variable	<i>ADF unit root test</i>		<i>Phillips-Perron unit root test</i>	
	Constant	Constant and trend	Constant	Constant and trend
AU_UR	-2.750* (0.069)	-3.013 (0.133)	-1.717 (0.420)	-1.902 (0.647)
NZ_UR	-1.883 (0.339)	-1.422 (0.849)	-1.665 (0.446)	-1.017 (0.937)
UK_UR	-2.713* (0.075)	-3.881** (0.016)	-1.300 (0.627)	-2.334 (0.412)
AU_CPI	-1.033 (0.740)	-1.867 (0.665)	-1.160 (0.690)	-1.493 (0.826)
NZ_CPI	-2.178 (0.215)	-1.677 (0.755)	-2.405 (0.143)	-1.189 (0.907)
UK_RPI	-1.523 (0.518)	-2.621 (0.272)	-1.815 (0.371)	-2.223 (0.472)
AU_W	1.267 (0.998)	-0.148 (0.993)	1.205 (0.998)	-0.328 (0.989)
NZ_W	-1.955 (0.306)	-2.317 (0.421)	-2.979** (0.040)	-1.931 (0.632)
UK_W	0.687 (0.991)	-2.180 (0.495)	1.779 (0.100)	-1.1691 (0.911)
AU_A	-3.308** (0.017)	-3.381* (0.059)	-5.392*** (0.000)	-5.387*** (0.000)
UK_A	-1.708 (0.424)	-3.566** (0.037)	-1.445 (0.558)	-3.545** (0.039)
AU_D	-2.669* (0.082)	-2.607 (0.278)	-2.624* (0.091)	-2.554 (0.302)
UK_D	-4.300*** (0.000)	-4.672*** (0.001)	-4.084*** (0.001)	-4.514*** (0.002)
TA	-1.300 (0.628)	-2.967 (0.146)	-1.334 (0.612)	-3.130 (0.104)
TD	-3.142** (0.026)	-3.275* (0.076)	-2.947** (0.043)	-3.069 (0.119)

Notes: AU_UR, NZ_UR and UK_UR are Australian, New Zealand and the UK unemployment rates respectively. AU_CPI, NZ_CPI and UK_RPI are Australian, New Zealand and the UK price indices respectively. AU_W and NZ_W are Australian and New Zealand average weekly earnings respectively while and UK_W is the UK earnings index. AU_A and UK_A are arrivals to permanent residence in New Zealand from Australia and the UK. AU_D and UK_D are departures from New Zealand to permanent residence in Australia and the UK. TA and TD are the total arrivals and departures to and from New Zealand. *p*-values for the ADF and Phillips-Perron statistics are given in parentheses. *significant at 10%, ** significant at 5% level, *** - significant at 1% level.

Table 2: OLS and Quantile Regressions; Arrivals from Australia to New Zealand

	<i>OLS</i>		<i>Quantile</i>			
	Mean	0.05	0.25	0.5	0.75	0.95
Constant	3384.34*** (140.42)	2198.71*** (219.07)	2829.04*** (183.05)	3292.39*** (201.73)	3672.07*** (220.36)	4088.72*** (486.79)
DAU_CPI	-186.09* (104.78)	-179.01 (164.85)	-129.19 (137.25)	-234.84 (158.67)	-279.05 (211.72)	-375.54 (321.84)
DAU_UR	252.36 (245.76)	-154.62 (328.36)	480.69 (297.42)	82.39 (405.21)	491.73 (389.36)	-258.80 (555.19)
DAU_W	20.24 (17.52)	22.48 (29.59)	12.34 (32.18)	7.25 (25.69)	27.58 (25.03)	70.72 (49.11)
DNZ_CPI	10.61 (11.97)	21.54 (15.42)	5.15 (12.31)	7.26 (20.83)	31.39 (31.71)	96.14 (47.95)
DNZ_UR	390.55* (197.93)	-189.72 (283.42)	128.41 (258.08)	440.74 (291.42)	505.02 (343.22)	1360.60** (574.57)
DNZ_W	-17.90* (10.54)	0.78 (13.53)	-6.28 (12.93)	-2.25 (17.29)	-19.45 (16.69)	-53.61*** (19.08)
R^2	0.11	0.08	0.04	0.05	0.09	0.17

Notes: DAU_UR and DNZ_UR are first differences in the Australian and New Zealand unemployment rates respectively. DAU_CPI and DNZ_CPI are first differences in the Australian and New Zealand price indices respectively. DAU_W and DNZ_W are first differences in the Australian and New Zealand average weekly earnings respectively. Standard errors are given in the parenthesis. For quantile regression standard errors are based on 1000 bootstrap replications and the R^2_{pseudo} is reported. *Significant at 10%; **significant at 5%; ***significant at 1%.

Table 3: OLS and Quantile Regressions; Departures from New Zealand to Australia

	<i>OLS</i>		<i>Quantile</i>			
	Mean	0.05	0.25	0.5	0.75	0.95
Constant	4879.75*** (410.82)	2803.16*** (316.06)	3479.94*** (575.20)	4972.57*** (515.40)	6056.27 (543.81)	6388.10*** (715.36)
DAU_CPI	888.71** (351.19)	836.36*** (258.91)	873.41** (371.58)	572.53 (498.17)	902.09* (467.90)	1107.46** (544.71)
DAU_UR	567.66 (673.14)	1251.31 (833.19)	1028.95 (672.41)	410.28 (761.76)	844.91 (1040.86)	-39.03 (1225.21)
DAU_W	144.35*** (45.39)	131.28*** (38.59)	107.68* (64.59)	89.61 (72.01)	122.20** (58.50)	99.03 (73.65)
DNZ_CPI	26.33 (43.81)	-33.52 (27.64)	-24.24 (58.23)	-10.83 (69.91)	91.24 (65.34)	201.33* (101.67)
DNZ_UR	1347.41** (578.68)	-331.97 (807.37)	1653.17*** (647.89)	1771.75** (697.92)	597.90 (894.00)	254.93 (832.48)
DNZ_W	40.98 (52.84)	-13.27 (10.93)	104.33 (78.59)	131.60*** (48.42)	48.39 (57.83)	123.99* (65.75)
R^2	0.26	0.16	0.15	0.20	0.20	0.24

Notes: DAU_UR and DNZ_UR are first differences in the Australian and New Zealand unemployment rates respectively. DAU_CPI and DNZ_CPI are first differences in the Australian and New Zealand price indices respectively. DAU_W and DNZ_W are first differences in the Australian and New Zealand average weekly earnings respectively. Standard errors are given in the parenthesis. For quantile regression standard errors are based on 1000 bootstrap replications and the R^2_{pseudo} is reported. *Significant at 10%; **significant at 5%; ***significant at 1%.

Table 4: OLS and Quantile Regressions; Arrivals from the UK to New Zealand

	<i>OLS</i>		<i>Quantile</i>			
	Mean	0.05	0.25	0.5	0.75	0.95
Constant	2927.01*** (282.16)	1996.93*** (379.92)	2833.08*** (230.56)	3045.27*** (240.75)	3129.37** (472.09)	3617.77*** (532.69)
DUK_RPI	35.37 (171.76)	-213.53* (125.60)	-48.66 (123.37)	11.21 (145.95)	348.36 (371.77)	1195.88*** (320.71)
DUK_UR	21.27 (225.27)	112.87 (417.30)	-219.60 (307.70)	-69.90 (189.97)	-12.87 (499.23)	-566.89 (1456.94)
DUK_W	723.55** (294.62)	530.70 (351.24)	275.93 (257.63)	371.61 (245.64)	718.51 (540.96)	399.65 (353.06)
DNZ_CPI	-46.48*** (14.85)	-7.67 (27.71)	-39.70** (16.20)	-27.37* (14.49)	-38.54 (24.37)	-68.98*** (18.76)
DNZ_UR	-322.10 (230.65)	253.38 (290.23)	97.66 (224.92)	-208.71 (153.86)	-866.58* (468.65)	-1351.69** (644.01)
DNZ_W	-32.31*** (10.87)	-35.85** (14.29)	-41.08*** (12.33)	-39.99*** (14.24)	-49.72* (28.89)	-44.92 (46.01)
R^2	0.21	0.20	0.18	0.14	0.13	0.20

Notes: DUK_UR and DNZ_UR are first differences in the UK and New Zealand unemployment rates respectively. DUK_CPI and DNZ_CPI are first differences in the UK and New Zealand price indices respectively. DUK_W and DNZ_W are first differences in the UK and New Zealand average weekly earnings respectively. Standard errors are given in the parenthesis. For quantile regression standard errors are based on 1000 bootstrap replications and the R^2_{pseudo} is reported. *Significant at 10%; **significant at 5%; ***significant at 1%.

Table 5: OLS and Quantile Regressions; Departures from New Zealand to the UK

	<i>OLS</i>		<i>Quantile</i>			
	Mean	0.05	0.25	0.5	0.75	0.95
Constant	2497.32*** (246.99)	1597.12*** (111.82)	1711.51*** (206.62)	2436.74*** (230.85)	3413.10*** (307.95)	4197.09*** (840.32)
DUK_RPI	91.30 (171.49)	-271.98*** (80.20)	103.21 (161.06)	23.51 (130.93)	224.77 (146.08)	61.23 (358.67)
DUK_UR	-374.44 (255.17)	-675.05*** (200.25)	-189.63 (235.42)	-144.08 (284.64)	-570.13 (385.69)	-503.81 (827.39)
DUK_W	577.44** (228.15)	1038.68*** (125.50)	751.78*** (236.17)	675.91*** (206.18)	140.31 (254.20)	-48.58 (808.61)
DNZ_CPI	-40.62*** (12.50)	-50.59*** (9.28)	-54.71*** (16.54)	-57.55*** (19.93)	-34.47** (14.22)	-28.97 (70.24)
DNZ_UR	-365.61** (186.16)	-271.55*** (79.59)	-429.27** (176.96)	-133.92 (251.24)	-606.45*** (228.81)	-23.02 (945.03)
DNZ_W	25.59*** (9.53)	36.46*** (5.19)	36.17*** (10.03)	28.20** (0.0435)	3.82 (11.85)	40.22 (52.78)
R^2	0.197	0.38	0.22	0.13	0.11	0.05

Notes: DUK_UR and DNZ_UR are first differences in the UK and New Zealand unemployment rates respectively. DUK_CPI and DNZ_CPI are first differences in the UK and New Zealand price indices respectively. DUK_W and DNZ_W are first differences in the UK and New Zealand average weekly earnings respectively. Standard errors are given in the parenthesis. For quantile regression standard errors are based on 1000 bootstrap replications and the R^2_{pseudo} is reported. *Significant at 10%; **significant at 5%; ***significant at 1%.

APPENDIX

Table 6: Summary statistics for macroeconomic data

	<i>AU_UR</i>	<i>NZ_UR</i>	<i>UK_UR</i>	<i>AU_CPI</i>	<i>NZ_CPI</i>	<i>UK_RPI</i>	<i>AU_W</i>	<i>NZ_W</i>	<i>UK_W</i>
Mean	7.418	5.391	6.365	100.578	666.158	130.025	492.096	788.534	70.430
Median	7.200	5.150	6.200	107.527	744.622	138.611	505.100	866.203	72.900
Maximum	10.800	10.900	10.600	155.466	1005.476	199.216	835.700	1142.261	127.000
Minimum	4.700	1.300	2.600	38.948	193.237	49.163	179.900	268.823	19.500
Std. Dev.	1.588	2.422	2.727	33.326	236.916	42.167	178.442	239.808	31.141
Skewness	0.442	0.378	0.087	-0.294	-0.608	-0.209	0.000	-0.624	0.077
Kurtosis	2.262	2.564	1.488	1.919	2.056	1.841	2.068	2.217	1.816
Jarque-Bera	6.294**	3.615	11.002***	7.187**	11.248***	7.207**	4.125	10.310	6.774
	(0.043)	(0.164)	(0.004)	(0.027)	(0.004)	(0.027)	(0.127)	(0.006)	(0.034)

Notes: AU_UR, NZ_UR and UK_UR are Australian, New Zealand and the UK unemployment rates respectively. AU_CPI, NZ_CPI and UK_RPI are Australian, New Zealand and the UK price indices respectively. AU_W and NZ_W are Australian and New Zealand average weekly earnings respectively while and UK_W is the UK earnings index. *p*-values for the Jarque-Bera test for normality are given in parentheses. *significant at 10%, ** significant at 5% level, *** - significant at 1% level.

Table 7: Summary statistics for migration data

	<i>AU_A</i>	<i>AU_D</i>	<i>UK_A</i>	<i>UK_D</i>	<i>TA</i>	<i>TD</i>
Mean	3252.456	7192.595	3122.505	3083.596	14378.65	14725.69
Median	3098.000	6942.540	2984.436	2988.476	13456.97	14550.69
Maximum	5635.000	13209.460	6325.965	5876.545	24990.21	22857.84
Minimum	1905.000	3175.510	890.314	1393.173	6305.377	7973.011
Std. Dev.	707.514	2377.082	1136.934	864.874	4566.240	3263.515
Skewness	0.807	0.225	0.757	0.558	0.590	0.141
Kurtosis	3.515	2.234	3.214	3.768	2.408	2.477
Jarque-Bera	13.625*** (0.001)	3.753 (0.153)	11.110*** (0.004)	8.728** (0.013)	8.283** (0.016)	1.674 (0.433)

Notes: AU_A and UK_A are arrivals in New Zealand from Australia and the UK.

AU_D and UK_D are departures from New Zealand to Australia and the UK.

TA and TD are the total arrivals and departures to and from New Zealand. *p*-values for the Jarque-Bera test for normality are given in parentheses.

*significant at 10%, ** significant at 5% level, *** - significant at 1% level.

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