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**Has Globalisation Increased
Australian Inequality?**

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I. Introduction

The rapidly growing literature on the personal distribution of income and labour market earnings inequality bears testimony to the renewed interest by economic researchers on an issue traditionally central for political economy (see Atkinson, 1997). Recent interest has been stimulated by the growth of income inequality in most developed countries during the 1980s and 1990s. Australia is no exception; Leigh (2005) shows that while income inequality fell in the 1950s and the 1970s, it rose during the 1980s and 1990s.

From a purely economic perspective, increases in earnings inequality could be viewed as resulting from the normal and healthy functioning of a market economy (Welch, 1999; Henry and O'Brien, 2003). However, social and political concern about the increased dispersion in the personal distribution of income and wealth, and the closely associated increases in labour earnings inequality, is quite pervasive.¹ For instance, a higher incidence of low-paid and low-quality jobs is usually associated with greater earnings inequality (see OECD, 1996). In addition, for some countries the increases in inequality have been so steep so as to demand the increased attention by researchers.

While most OECD economies experienced increased inequality in labour earnings during the 1980s, there were considerable differences in these developments across countries. For example, the timing of the increases was far from uniform. Among the developed nations, two countries experienced large increases (the United States and the United Kingdom); some experienced moderate increases in inequality (e.g., Japan and Australia); some experienced small increases (e.g., the Scandinavian countries); and a few experienced slight increases or reductions (notably the Netherlands and Germany).²

While the recent increases in inequality are pervasive and indisputable, considerable controversy still exists over which factors have been the most important causes of the trends. However, one of the essential claims in much of the popular writing on globalisation, and surely a major source of the general social concern about globalisation, is its potential impact on inequality. The role played by globalisation on labour market outcomes and income inequality in developed countries has been a particularly fertile ground for research during a time when international trade liberalisation has progressed and concerns about imports from low-skill abundant less-developed countries (LDCs) have been prominent. Some authors, using a variety of methodologies, have found significant labour market effects attributable to increasing import penetration.³ Rather persuasively Rodrik (1997) argues that it is difficult to believe that there are simultaneously great economic advantages associated with freer trade and little importance of trade in determining wages (e.g., by arguing that trade is a relatively small economic force). If one argues that trade is important, as most

¹ Borland (1999) shows that earning inequality and income inequality are highly correlated for Australia.

² See Katz and Autor (1999), tables 9 and 10.

³ Borjas and Ramey (1994) found that U.S. earnings inequality (from 1963 to 1988) and the durable goods trade deficit are co-integrated, i.e., they have the same long-run trend. Also, Wood (1994) argues that freer trade, especially with less developed countries, will adversely affect the low wage workers in developed economies.

economists are wont to do, it follows that trade must surely also be important for the labour market, earnings inequality and the distribution of income.

In this paper, we examine the relationship between income inequality and globalisation for Australia. In the next section, we provide the background for the common presumption that globalisation exacerbates earnings inequality. In section III, we conduct our empirical analysis. Section IV concludes.

II. Income inequality: globalisation presumed guilty

Rodrik (1997) poses the question “*Has Globalisation Gone Too Far?*” He highlights the links between globalisation and domestic social and political destabilisation. Specifically, he identifies three sources of social and political tension: that globalisation accentuates the asymmetry between groups that can and cannot cross national boundaries; that there will be an increasing number of conflicts between nations which involve differences in norms, particularly environmental and labour norms; and governments have increasing difficulty providing social insurance. All three developments are particularly troublesome for the most vulnerable and least-skilled workers in developed economies.

At the outset, it should be noted that increased earnings dispersion in the developed economies does not appear to have been primarily the result of shifts in employment from manufacturing to services. For the countries that witnessed the greatest increases in earnings dispersion, the phenomenon has been observed *within* narrowly-defined industries across the entire economy. On the face of things, the latter observation seems to rule out the most naïve of the trade-related explanations. Trade economists have long argued that the natural framework for thinking about the long-run effect of trade on labour markets, at least from a maintained assumption of competitive markets, is the Stolper-Samuelson theorem and its various generalisations.⁴ Simply stated, the implication of the theorem for skilled-labour abundant developed economies is that a reduction in the relative price of unskilled-labour intensive goods caused by more liberal trade with LDCs will lower the relative return to unskilled labour in the developed economies. The simplest trade model therefore predicts that increased trade with countries like China and India would worsen the distribution of earnings in developed countries.

The trade-theoretic account of trade shocks as running from commodity-price changes to factor-price changes provides a compelling equilibrium mechanism, and some useful rough empirical checks. The interpretation of the empirical results, as well as the appropriate implementation of the framework, is not without controversy, but the aggregate professional prior would seem to have settled on the conclusion that trade has a relatively small effect on the skill-premium, but that other factors (especially technological change) are more important.

Examining the impact of trade on the Australian labour market, Gaston (1998) finds that the declines in manufacturing employment were barely affected by lower levels of trade

⁴ The surveys of this literature are now almost sufficiently numerous to warrant a survey of their own. We make do with a reference to Slaughter’s (2000) survey of work explicitly rooted in the Stolper-Samuelson theorem. See also the Garnault (1983) for the enduring importance of this theorem for both academic and policy concerns in Australia.

protection. However, while the estimates are generally small (i.e., a less than one per cent reduction in employment for each ten per cent reduction in the effective rate of industry assistance), the effect approximately doubled in the time period after the programme of general tariff reductions that were announced in 1988. Gaston also finds that Australian real earnings have been extremely resilient in view of the (then) most recent recession and trade liberalisation. In addition, he finds that the adverse employment developments were at most weakly linked to this real wage resistance.⁵

It is an extremely difficult task to unravel the roles of technical change and international trade in affecting labour market outcomes. For example, globalisation may lower the costs of diffusing new technology and encourage capital for labour as well as skilled for unskilled labour substitution. More speculatively, the rate of technical progress may be an endogenous response to the need to maintain competitiveness in the global marketplace. The same type of argument can also be made about increasing global competition and institutional changes, such as deunionisation and the decentralisation of wage bargaining, that are both features of many developed economies, including Australia.

Furthermore, since countries with similar standards of living and economic development generally have access to labour and capital of similar quality, it is quite likely that the magnitude and nature of any technical changes will also be similar. In fact, it has been argued that this *must* also be true for any changes on the demand-side, since European Union countries were also affected by import penetration from countries abundant in unskilled labour (see Katz *et al.*, 1995). Given this similarity in aggregate endowment, technology and shocks, it seems quite natural to investigate the institutional forces operating in each country to explain cross-country differences in the trends and structure of earnings dispersion. In the United Kingdom and the United States, deunionisation has been a significant labour market development, in economies in which structures are already relatively decentralised (see Katz, 1993 and Layard *et al.*, 1994). Naturally, these changes are not independent of growing international competition. During the 1990s, Australia implemented a number of labour market reforms to decentralise its traditionally centralised form of wage bargaining, the argument made by employer groups has been that such changes were inevitable because of the need to maintain international competitiveness (see Borland, 1999).⁶

In developed countries, even more controversial than growing trade with LDCs has been immigration of unskilled workers from LDCs. The analysis of immigration would appear to be very different, but in fact contains strong similarities to the story about trade. The obvious problem with the trade-theoretic framework from the perspective of evaluating immigration shocks is that, as long as we assume that commodity and factor markets are competitive and, as seems quite the most plausible assumption, that the number of goods exceeds the number of factors, then we are stuck with what Leamer (1995) calls the *factor-price insensitivity theorem*. This result, which is the single-country analogue of the factor-price equalisation theorem, asserts that as long as the economy produces the same types of

⁵ Gaston's findings were confirmed using more disaggregated data and different empirical techniques by Murtough *et al.* (1998). Borland (1999) reaches a similar conclusion.

⁶ Interestingly, the Australian union movement supported the reforms (see Gaston, 2002).

goods before and after an immigration shock (i.e., the endowment remains inside the same cone of diversification), the change in endowment will leave relative factor-prices unchanged. Since the goal has been to find globalisation effects that might help account for the rising earnings inequality, this feature of the trade-theoretic model would seem to be a problem. However, it turns out that most studies found, and continue to find, only extremely small effects of immigration on wage inequality (see Gaston and Nelson, 2007).⁷

The usual motivation for research on foreign direct investment (FDI) or multinational firms and labour market effects is relatively straightforward. The most prominent concern for source countries, relates to whether multinational corporations outsource certain parts of their productive activity to lower labour cost locations. Firms 'delocalising' is often allied to a concern that increasing import penetration and immigration, particularly from low-wage countries, has adverse labour market consequences for domestic unskilled workers.⁸ Even Australia, which is usually a net importer of capital, is not immune to outsourcing concerns.⁹

As economists, it is easy for us to share our profession's overall sentiment about the positive and progressive aspects of globalisation. However, this is most definitely at odds with the sentiments of the average citizen, who seems extremely worried about globalisation. Fears about the potentially adverse effects of globalisation on the labour market are central to popular concerns. It is surely true, but unproductive, to say that the citizen and the economist simply do not understand the benefits and costs of globalisation in the same way. There are good reasons why the economist feels comfortable arguing that, at least at an aggregate level, globalisation is either no big deal or a substantial boon. It would be comforting to conclude that the citizen is simply wrong, with the obvious implication being that a little bit more effort at public education would help reduce 'globa-phobia'.

There may be a significant element of truth here, but it seems to us to be useful to consider the possibility that the widespread concern with globalisation emerges as a result of changes that are, to some extent, obscured when we use standard economics tools to study the labour market effects of globalisation. Gaston and Nelson (2004) distinguish between the *direct* and the *indirect* effects of globalisation. The flows of goods and factors of production have direct effects on labour markets and have been the primary focus of the existing literature. The

⁷ This is hardly surprising given the generally small scale of immigration. For Australia, between 2000 and 2005 the annual rate of net migration was 5 per 1,000 of population (United Nations, International Migration, 2006). Obviously, these are not large enough supply shocks to affect the overall income distribution.

⁸ In assessing the recent research, the safest conclusion is that the evidence is mixed (see Gaston and Nelson, 2002). On the one hand, the 'direct' impact of FDI on domestic wage and employment outcomes for most countries appears to be quite small. The evidence supporting outsourcing to low-wage locations is also far from conclusive. However, multinational activity does seem to be associated with a greater use of more skilled workers in larger, capital intensive plants. In this sense, unlike immigration, FDI could have played some role in the widening wage inequality.

⁹ "Blundstone's boot factory in Hobart will shut its doors after 137 years of operation and move to Thailand and India to reduce high manufacturing costs. Up to 300 workers in Tasmania will get the boot." Source: Business in Asia Today - January 17, 2007. Further, since 1999 Australian FDI inflows have been skewed towards the primary and tertiary sectors, while its FDI outflows are skewed towards the secondary and tertiary sectors (see UNCTAD, 2006).

indirect effects operate on the labour market by transforming the structures that support one set of equilibria and induce change in those equilibria. Because economic and political structures are related, changes in the relationship of a national economy to the global economy can produce profound changes in the political-economic arrangements of a country. In addition to affecting equilibrium wages and employment, such changes could well be unsettling in themselves.

The altered roles of labour unions and the welfare state provide obvious examples of the importance of institutional differences. Part of the support for an equilibrium in which relatively unskilled workers receive higher incomes comes from the mutually supporting institutions of unions and welfare states. That is, as a result of labour market institutions, such as labour unions, some workers receive a higher wage than other otherwise identical workers. A common finding is that measures of wage centralisation are generally negatively associated with wage dispersion (e.g., Blau and Kahn, 1996). Likewise, higher rates of unionisation and collective bargaining tend to be associated with a lower incidence of low-paid employment and less earnings inequality.¹⁰ In fact, the increases in inequality in recent years have coincided with more decentralised wage bargaining and deunionisation.

It should be clear that globalisation could affect the union bargaining strength and workers' incentive to unionise, with straightforward implications for equilibrium relative wages. There is now a sizable body of research examining the relationship between the institutional structure of the unionised sector of an economy (i.e., the extent and centralisation of organisation) and various measures of macroeconomic performance. Countries with encompassing labour market institutions (i.e., large unionised sectors with centralised bargaining) are characterised by: lower wage inequality (Rowthorn, 1992; OECD, 1997); lower unemployment (OECD, 1997); and higher growth (Rowthorn, 1992; Calmfors, 1993; Danthine and Hunt, 1994). The usual explanation involves the ability of centralised bargaining institutions to internalise negative wage externalities (Calmfors, 1993; Garrett, 1998). That is, where strong sectoral unions pursue wage gains relative to some perceived market wage, resulting in cost-push inflation, reduced employment, lower growth and inter-sectoral inequality, the centralised union recognises these negative externalities and takes them into account in its bargaining. Thus, as unionisation has declined, there is some evidence that wage inequality has increased (Freeman, 1998).¹¹

¹⁰ DiNardo and Lemieux (1997) conclude that the greater deunionisation of the workforce in the United States relative to Canada can explain much of the difference in male earnings inequality between the two countries.

¹¹ The membership of unions fell in most OECD countries in the 1980s. An associated trend in many of these countries is varying degrees of decentralisation in wage bargaining institutions since the beginning of the 1980s. According to Wallerstein and Western (2000), two crucial longitudinal features of union organisation and the centralisation of wage setting are as follows. First, labour market regulation, unionisation and bargaining centralisation in industrialised countries steadily diverged over the three decades from 1950. Second, there was a convergent pattern of decline in union density and centralised wage setting during the 1980s. Falling unionisation was especially severe in the English-speaking countries, where union density fell by 15 points in the United Kingdom, by 12 points in Australia and by 10 points in Ireland and the United States (Wallerstein and Western, 2000, pp.357-8).

Increased inequality, and real deterioration in the labour market outcomes of unskilled workers, is also directly related to changes in demand for welfare state provision. For example, it has been observed that despite increases in the dispersion of earned incomes that, in some countries at least, inequality in post-transfer and post-tax income inequality has *not* grown (see, e.g., Gottschalk and Smeeding, 1997). This suggests that political pressures have been brought to bear on the generosity of public transfers at a time when earned incomes have become more unequally distributed. From a political economic perspective, the growing inequality of income could be associated with strong compositional effects on the demand for public insurance. In particular, it seems to be the case that the growing size and economic significance of sectors of the economy that pay higher wages for certain types of workers, could somewhat paradoxically result in political pressures that lead to higher levels of transfer payments to disadvantaged workers. It has been suggested that this could result from changes in the identity of the median voter or as an optimal response to increased income risk in an increasingly open economy (Alesina and Rodrik, 1994; Persson and Tabellini, 1994).

Some scholars argue that the increased mobility of capital not only erodes the tax base, reducing the state's ability to fund welfare programs, but by shifting taxes onto labour, the capacity of the state to redistribute is reduced (Tanzi, 1995). For example, some European countries, in the face of increased international competition, have tried to reduce the "generosity" of their social programmes (Blank and Freeman, 1994; Gaston and Nelson, 2004 and Gaston and Rajaguru, 2007). In ways that are harder to quantify, but seem *prima facie* plausible, the decreasing cost of the exit option increases the relative power of business in policy-making (Huber and Stephens, 1998). Finally, it has been argued that globalisation increases the general credibility of orthodox (i.e., market-oriented) policy advice, thus reducing the plausibility of arguments supporting welfare state expansion and enhancing the credibility of arguments in favour of welfare state retrenchment (Krugman, 1999; Quiggin, 1999). In the popular consciousness, at least, coincident with the recent onset of globalisation has been a move towards privatisation, deregulation, neo-liberalism and "economic rationalism".

On the other hand, there are a number of reasons for believing that the sources of pressure for change are, at a minimum, not overwhelming. First, changes to cash transfer and income tax systems have arisen to ensure acquiescence by the potential losers from globalisation and microeconomic reforms, such as trade liberalisation (Rodrik, 1998). That is, greater "progressive" redistribution may be "the price to pay" for political or social compliance with the labour market and microeconomic reforms necessitated by globalisation. In addition, current welfare states show considerable heterogeneity in response to the increases in globalisation experienced over the last few decades. Here it has been widely argued that heterogeneity of domestic political (as well as labour market) institutions support heterogeneity of responses to globalisation (Ehrenberg, 1994; Garrett, 1998).

Finally, it is being increasingly recognised that globalisation has important social and political dimensions in addition to the usual economic dimensions of primary interest to economists. For example, recent research finds that social integration contributed to deunionisation in OECD countries, while economic globalisation mattered far less (Dreher and Gaston, 2007a). Although largely neglected in the economics literature, both political integration and social integration are likely to be important for income inequality. For

example, in the absence of restrictions on capital mobility, a country is more likely to competitively lower taxes or offer subsidies to attract investment, the closer is a potential host country's culture to that of a source country and the easier it is to exchange information. Lower taxes may also lower social standards and this is one channel through which the social dimension of globalisation may be important for income inequality. On the other hand, political integration may ameliorate a potential 'race to the bottom' which may be induced by economic globalisation. Hence, while economic globalisation may increase inequality, political globalisation could actually serve to reduce it.

In the debate about the consequences of globalisation it is important not to take an overly narrow perspective of globalisation as this may severely bias conclusions about the "true" effects, direct and indirect, on labour markets and income inequality. In addition to the more standard supply and demand factors and changes in labour market institutions, such as unionisation and the nature of wage determination, Atkinson (1997) argues that changes in *social* norms have also been very important. Moreover, trade liberalising policies are often bundled with privatisation and deregulation measures as well as changes to social policies (Lindert and Williamson, 1991). Overall, the view is that inequality may be adversely affected by social integration, i.e., the variety of non-economic and non-political factors which seemed to have simultaneously affected many economies. For example, globalisation is sometimes equated with "Americanisation".¹² Hence, if globalisation implies institutional convergence to some common (U.S.) benchmark, then developed country labour markets are in the process of becoming less unionised and less regulated and, more unequal.

Dreher and Gaston (2007b) use data on industrial wage and household income inequality as well as measures of the economic, social and political dimensions of globalisation for a large panel of countries to examine the contribution of the separate elements of globalisation. They find that overall globalisation has exacerbated inequality - particularly for OECD countries. In contrast, they find no robust impact of globalisation on inequality in less-developed nations. Their findings therefore provide an empirical "justification" for Bhagwati's (1999) observation that it is the developed countries, rather than the developing countries, that oppose greater integration. That is, the developed countries do so because of increased inequality and the implied political consequences in their economies.

We now turn to a detailed time-series analysis for Australia. As Borland (1999) notes, very little is known about the determinants of the increases in Australian inequality experienced in the last two decades of the last millennium.

III. The Empirical Realities of Australian Income Inequality and Globalisation

3.1 Data. In this section of the paper, we investigate the short-run and the long-run relationship between various measures of income inequality and globalisation for Australia. We begin our analysis by describing the data and its properties. Following that, a time series analysis of the data is conducted. The descriptive statistics of the variables used appear in Table 1. The data are yearly for the period 1970 to 2001.

¹² For example, see Friedman (1999). According to Ritzer (1993), "McDonaldization" is a better descriptor.

Table 1. Descriptive Statistics

	<i>GiniPre</i>	<i>GiniPost</i>	<i>p9050</i>	<i>KOF</i>	<i>ToT</i>	<i>OPEN</i>	<i>Union</i>	<i>RMW</i>
Mean	0.319	0.237	1.88	65.1	83.1	33.2	34.2	276.23
Std. Dev.	0.040	0.037	0.14	10.0	7.8	5.1	6.1	25.48
Median	0.310	0.238	1.82	65.2	82.0	32.7	37.3	281.90
Range	0.122	0.124	0.39	33.7	34.9	19.4	18.8	88.80
Minimum	0.261	0.180	1.70	47.2	71.7	25.4	21.4	221.21
Maximum	0.383	0.304	2.09	80.9	106.5	44.8	40.1	310.01
Change 1970-2001 (%)	21.9%	10.0%	16.1%	71.5%	-11.4%	61.0%	-42.1%	27.7%

The income inequality data were computed by Andrew Leigh (2005) using Australian taxation statistics. He imputes the incomes of non-taxpayers and derives the underlying distribution of income. Leigh shows that the distribution of adult male incomes and the distribution of family incomes are highly correlated.¹³ We use three measures – *GiniPre* is the Gini coefficient for pre-tax income, *GiniPost* is the Gini coefficient for post-tax income and *P9050* is the ratio of the income of an individual at the 90th percentile divided by the income of an individual at the 50th percentile. The reason for using both of the first two measures is to distinguish the impact of the progressivity of the taxation system in possibly neutralising the effects of globalisation. The third measure focusses on the issue of whether individuals at the top of the income distribution have done particularly well during the latest wave of globalisation (as argued by Atkinson, 1997; 2003, for example).

Observe that all three measures increased over the 32 year time span – with pre-tax income inequality rising by almost 22 per cent. Leigh shows that inequality fell in the 1950s and the 1970s, and rose during the 1980s and 1990s. He notes the similarity with changes in the income distribution for the United Kingdom in particular and goes on to speculate (p.S66): “While it is difficult to be sure what explains the similarity between Australia and the UK since 1960, possible factors are that both countries have experienced similar trends in unemployment and unionisation; both reduced top marginal tax rates at a similar time; and both were similarly affected by the internationalisation of the market for English-speaking chief executives.”

To be in a position to evaluate the consequences of globalisation in a rational and scientific manner, objective indicators are needed. To assess the extent to which any country is more (or less) globalised at any particular point requires much more than employing data on flows of trade, migration or FDI. Instead we employ a measure of globalisation that is defined in a very broad manner. Specifically, we use the KOF index (see Dreher *et al.*, 2007), which we simply label this as *KOF*. It is based on 25 variables that relate to different dimensions of globalisation (displayed in Appendix Table 1). More specifically, the sub-index on actual economic flows includes data on trade, FDI and portfolio investment. Trade is the sum of a country’s exports and imports and portfolio investment is the sum of a

¹³ In this paper, we use the data from Leigh’s Table 1: *Inequality Among Male Adults in Australia* for the years 1970-2001. The Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality). It is defined as the area between the Lorenz curve and the perfect equality line, divided by the total area underneath the perfect equality line. The inequality data are for financial years so, in the empirical work that follows, the inequality measures are automatically led by six months.

country's assets and liabilities (all standardised by GDP). The KOF index includes the sum of gross inflows and outflows of FDI and the stocks of FDI (again, both standardised by GDP). While these variables are standard measures of globalisation, income payments to foreign nationals and capital are included to proxy the extent to which a country employs foreign labour and capital in its production processes.

The second sub-index refers to restrictions on trade and capital using hidden import barriers, mean tariff rates, taxes on international trade (as a share of current revenue) and an index of capital controls. Given a certain level of trade, a country with higher revenues from tariffs is less globalised. To proxy restrictions on the capital account, the KOF index includes data collected by Gwartney and Lawson (2006). This index is based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions and includes 13 different types of capital controls. The indices on mean tariff rates and hidden import barriers are also from Gwartney and Lawson (2006).

The KOF index classifies social globalisation in three categories. The first covers personal contacts, the second includes data on information flows and the third measures cultural proximity. The index on personal contacts measures the direct interaction of people living in different countries. It includes international telecom traffic (outgoing traffic in minutes per subscriber) and the extent of tourism (incoming and outgoing). Government and workers' transfers received and paid (as a percentage of GDP) measure the extent to which countries interact, while the stock of foreign population is included to capture existing interactions with people from other countries. Finally, the average cost of a phone call to the United States measures the cost of international interaction.

While personal contact data are meant to capture interactions among people from different countries, the sub-index on information flows measures the potential flow of ideas and images. It includes the number of internet hosts and users, telephone mainlines, cable television subscribers, number of radios (all per 1,000 people) and sales of daily newspapers. Cultural proximity is arguably the dimension of globalisation most difficult to grasp. One indicator is the number of McDonald's restaurants located in a country. For many people, the global reach of McDonald's is symbolic of globalisation itself.

To proxy the degree of political globalisation in each country the KOF index includes the number of embassies and high commissions, the number of international organisations in which a country has membership and the number of United Nations peace missions participated in.

The variables are combined into six groups: actual flows of trade and investment, restrictions, variables measuring the degree of political integration, data quantifying the extent of personal contact with people living in foreign countries, data measuring trans-border flows of information and a proxy for cultural integration. These dimensions are then combined into an overall index of globalisation with an objective statistical method.¹⁴ Appendix Table 1 reports the weights of the individual components.¹⁵ As can be seen,

¹⁴ Dreher *et al.* (2007) describe the method in more detail. The annual data are publicly available at: http://globalization.kof.ethz.ch/static/rawdata/globalization_2007_short.xls.

¹⁵ To construct the indices of globalisation, each variable (in Appendix Table 1) is converted into an index with a zero to ten scale. Higher values denote greater globalisation. When higher values of

economic, political and social integration obtained roughly equal weights. Table 1 shows that globalisation has increased dramatically.

As for the other data, *ToT* is the 'terms of trade' and is measured as the ratio of the implicit price deflator of exports of goods and services and the implicit price deflator of imports of goods and services.¹⁶ In the case of Australia, rising terms of trade are predicted to result in a movement of labour and capital from manufacturing to primary industries. Depending on these structural changes and any impediments to labour mobility, this could adversely affect the distribution of earnings via a straightforward reinterpretation of the Stolper-Samuelson theorem (see Henry, 2006).

All other data are from the OECD.¹⁷ These include data on unionisation. *UNION* is union membership standardised by the total labour force (i.e., expressed as a percentage). As discussed in the previous section, the usual prediction is that deunionisation worsens earnings and income inequality. From Table 1, note that the rate of unionisation fell by an astounding 42 per cent. The minimum wage is converted to real terms using the CPI. This measure is included to capture the response of the welfare state to increased global uncertainty. Interestingly, this measure rose strongly over the 32-year period.¹⁸ On the face of things, this rise is consistent with the argument made by Rodrik (1998) discussed in the previous section. Finally, *OPEN* is the usual openness measure, i.e., the ratio of total trade (imports plus exports) divided by GDP. It displays extraordinary growth from 1970 to 2001. It is included separately from the broad index of globalisation to focus on growing economic

the original variable indicate greater globalisation, the formula $((V_i - V_{min}) / (V_{max} - V_{min}) * 10)$ is used for transformation. Conversely, when higher values indicate less globalisation, the formula is $((V_{max} - V_i) / (V_{max} - V_{min}) * 10)$. The weights for the sub-indices are calculated using principal components analysis. The base year is 2000. For this year, the analysis partitions the variance of the variables used. The weights are then determined in a way that maximises the variation of the resulting principal component, so that the index captures the variation as fully as possible. If possible, the weights determined for the base year are then used to calculate the indices for each single year back to 1970. Where no data are available, the weights are re-adjusted. See Dreher *et al.* (2007) for further details of the computational method.

¹⁶ The terms of trade data are from the Reserve Bank of Australia (which, in turn, are derived from ABS Cat No 5206.0). The implicit price deflators are indexed with a reference year 2004/05 = 100. Available at: <http://www.rba.gov.au/Statistics/Bulletin/G04hist.xls>.

¹⁷ The OECD data are from: <http://stats.oecd.org/wbos/default.aspx>. Akira Kawaguchi noted the possible importance of demographic factors (which would almost certainly be important for Japan), however, subsequent analysis post-Conference found that including a variable for persons aged 65 or older as a percentage of the population was found to be statistically insignificant in the long-run equations of the three models we estimate below.

¹⁸ Keith Hancock made the point that the annual percentage rise in the real minimum wage is small when considering the effects of compounding and productivity growth in the Australian economy. However, two related points are noteworthy here. First, in 2000 the Australian minimum was the second highest in the OECD (see Martin and Immervoll, 2007). Secondly, all bargaining models predict that the wages for non-minimum wage workers are anchored by minimum wages.

integration in particular.¹⁹ Based on previous research, we anticipate small effects on the income distribution.

3.2 Unit Roots. It is well known that the data generating process for most macroeconomic time series are characterised by unit roots, which rules out the use of standard econometric methods. Therefore, it is important to analyse the time series properties of the data in order to avoid spurious results generated by unbounded variances of parameter estimates due to unit roots in the data. To ensure the robustness of the test results, the three most commonly used unit-root tests are applied here, namely the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and KPSS unit root tests, on the relevant variables. The distinguishing feature of these tests is that the null hypothesis in the ADF and PP is the alternative hypothesis in KPSS. In particular, while the former (ADF and PP) are derived under the null hypothesis of unit roots the latter (KPSS) is obtained under the stationary null hypothesis. The results reported in Table 2 show that all variables are non-stationary at the five per cent level of significance. The non-rejection of the unit root hypothesis leads to testing for the second unit root, i.e., a unit root in first differences. The test results in first differences are reported in Table 2. All the series are I(1). The results based on stationary alternative (ADF and PP) and non-stationary alternative (KPSS) in our exercise ensure that the results are robust and are not affected by the weak power of the standard unit root test procedures.

- Table 2 here -

3.3 Co-integration. In order to capture the dynamic relationships between these variables, we test for co-integration among them. Since the three inequality measures (*GiniPost*, *GiniPre* and *P9050*), the globalisation index (*KOF*), terms of trade (*TOT*), openness (*OPEN*), union density (*UNION*) and the natural logarithm of real minimum wage (*LRMW*) are all integrated processes of order one, i.e., I(1), the linear combination of one or more of these series may exhibit a long-run relationship. The multivariate co-integration test based on the Johansen and Juselius (1990) method is used to test for these relationships. This procedure involves estimating the following n -variate, p^{th} -order Gaussian vector autoregression (VAR) process

$$z_t = \mu + \sum_{i=1}^p \Pi_i z_{t-i} + \sum_{i=1}^k \Phi_i w_{t-i} + \xi_t, \quad t = 1, 2, \dots, T, \quad (1)$$

where μ is a vector of constants and ξ_t is a normally and independently distributed n -dimensional vector (in our case, $n = 6$) of innovations with a zero mean, non-singular covariance matrix, Ω . The lag length, p , is determined by Schwarz criterion. The vectors $z_t = (\text{Inequality}_t, \text{KOF}_t, \text{ToT}_t, \text{OPEN}_t, \text{Union}_t, \text{LRMW}_t)$ and w_t are composed of endogenous

¹⁹ From Appendix Table 1 note that this customary measure of trade openness receives just a 5.76 per cent (i.e., 0.36×0.16) weight in the overall KOF globalisation index. Furthermore, multicollinearity in time series analysis is not a serious problem if the model is adequate (i.e., statistically and in terms of each coefficient being of a plausible magnitude and having an appropriate sign). In theory, the presence of multicollinearity might inflate the standard errors of the estimated coefficients and make them statistically insignificant. Since the estimated coefficients from the long-run equations are statistically significant in the results reported below, we conclude that the statistical significance of our results is not influenced by the presence of collinear variables in the model.

and exogenous variables, respectively. However, w_t is a null vector because all variables are treated as being endogenous. The inequality measures are used in the analysis to examine the robustness of our results. It is convenient to rewrite the above process in the following error correction form

$$\Delta z_t = \mu + \sum_{i=1}^{p-1} \Gamma_i \Delta z_{t-i} + \Gamma_p z_{t-1} + \xi_t, \quad (2)$$

where $\Gamma_i = \sum_{j=1}^p \Pi_j$, $i=1,2,\dots,p-1$. The long-run $n \times n$ matrix, $\Pi = I - \sum_{i=1}^p \Pi_i$, is equal to $-\Gamma_p$ and determines how many independent linear combinations of the elements of z_t are stationary. In particular, the rank (r) of Π gives the number of independent co-integrating vectors. The rank, $0 < r < n$, can be formally tested using both the trace test and the maximum eigen value test.

The trace test (i.e., the λ_{trace} statistic) tests the null hypothesis that $H_0 : r = g$ vectors against the alternative that $r > g$ and is given by

$$\lambda_{trace}(g) = -T \sum_{i=g+1}^n \ln(1 - \lambda_i), \quad (3)$$

where the λ_i 's are the eigen values of Π , such that $\lambda_1 > \lambda_2 > \dots > \lambda_n$. The λ_{trace} statistic sequentially tests the null hypothesis that the number of co-integrating vectors is at most g against the alternative that the number of co-integrating vectors is more than g , where $g = 0, 1, 2, \dots, n-1$.

The maximum eigen value test (λ_{max} statistic) tests the null hypothesis that $H_0 : r = g$ vectors against the alternative that $r = g + 1$ and is given by

$$\lambda_{max}(g) = \lambda_{trace}(g) - \lambda_{trace}(g+1). \quad (4)$$

The λ_{max} statistic tests the null hypothesis that the number of co-integrating vectors is equal to g against the alternative that the number of co-integrating vectors is $g+1$.

The results of the trace test and the maximum eigen value test are reported in Table 3. The optimal lag length p ($= 2$) is determined by the Schwartz criteria. The results based on the Johansen-Juselius procedure indicate that the null of $r=0$ (i.e., no co-integrating relationship) is rejected at the five per cent level of significance. The sequential testing fails to reject the null hypothesis that the number of co-integrating vectors is at most one at the five per cent level of significance.

- Table 3 here -

3.4 Vector Error-Correction Model. Since the inequality measures, *KOF*, *TOT*, *OPEN*, *Union* and *LRMW* are co-integrated with one co-integrating vector, the following vector error correction model (VECM) is estimated to establish the long-run and short-run relationships between the variables.

$$\begin{pmatrix} \Delta Inequality_t \\ \Delta KOF_t \\ \Delta TOT_t \\ \Delta OPEN_t \\ \Delta Union_t \\ \Delta LRMW_t \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \\ \alpha_6 \end{pmatrix} e_{t-1} + \begin{pmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15} & \gamma_{16} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25} & \gamma_{26} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35} & \gamma_{36} \\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} & \gamma_{45} & \gamma_{46} \\ \gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} & \gamma_{55} & \gamma_{56} \\ \gamma_{61} & \gamma_{62} & \gamma_{63} & \gamma_{64} & \gamma_{65} & \gamma_{66} \end{pmatrix} \begin{pmatrix} \Delta Inequality_{t-1} \\ \Delta KOF_{t-1} \\ \Delta TOT_{t-1} \\ \Delta OPEN_{t-1} \\ \Delta Union_{t-1} \\ \Delta LRMW_{t-1} \end{pmatrix} + \begin{pmatrix} \xi_{1t} \\ \xi_{2t} \\ \xi_{3t} \\ \xi_{4t} \\ \xi_{5t} \\ \xi_{6t} \end{pmatrix}, \quad (5)$$

where $e_t = Inequality_t - \beta_2 KOF_t - \beta_3 ToT_t - \beta_4 OPEN_t - \beta_5 Union_t - \beta_6 LRMW_t$ is an error process from the long-run static equation.²⁰ The α_i 's denote the speed of adjustment parameter for the i^{th} equation, i.e., these parameters explain the speed at which the process approaches the long-run through i^{th} equation. The significance of β_j and α_i denote the long-run causality from the j^{th} variable to the i^{th} variable. (For example, the significance of β_2 and α_1 indicates the long-run relationship from globalisation to the inequality measures.) Moreover, the sign of β_j explains the nature of the long-run relationship between the variables. On the other hand, the short-run dynamic relationships between the variables of interest can be assessed by the statistical significance and the sign of the γ_{ij} parameters. (For example, the statistical significance of γ_{12} indicates the short-run causal relationship from globalisation to the inequality measures.)

- Tables 4.1 to 4.3 here -

3.5 Results. First, the multivariate residual-based test statistics for the estimated VECM models show that standard assumption about residuals (i.e., normality, no autocorrelation and constant variance) are satisfied at the one per cent level of significance.

All the standardised beta coefficients for the long-run relationships are summarised in Table 5.²¹ First, note that a one standard deviation increase in *KOF* leads to 0.52 standard deviation increase in *Ginipre* (pre-tax income inequality), ceteris paribus. That is, globalisation, as measured by *KOF*, unambiguously increases income inequality. This is in line with the findings of Dreher and Gaston (2007b) who found that globalisation increases income inequality in a panel of OECD countries.²² The finding mirrors the unease with which non-economists and the public generally view globalisation. While the academic literature fails to find consistent evidence that traditional measures of economic openness and integration – such as international trade flows and immigration – adversely impact the labour market, this may be attributable to an overly narrow view of globalisation generally adopted by most economists.²³

²⁰ The long-run relationship, or static equation, is represented by a contemporaneous relationship between the variables of interest rather than a relationship with lags.

²¹ While interesting in themselves, the short-run results are not the focus for the present exercise.

²² Exploring the Dreher and Gaston (2007b) result in greater depth, Dreher *et al.* (2007) found that it is the social dimension of globalisation that has had the most significant impact on OECD earnings and income inequality.

²³ The speed of adjustment parameters (i.e., the α_i 's) indicate that, of the variables that we consider, *KOF* is likely to be exogenous, i.e., it is highly significant in the three long-run relationships but

Perhaps a more surprising result is that improving terms of trade and greater trade openness are equity-*enhancing* for Australia. While Australia has always been regarded as the quintessential small open economy of international trade textbooks (see Garnault, 1983), Australia is somewhat ‘peculiar’ for a developed economy in that it mainly exports primary commodities and imports manufactured goods. Pope and Selten (2002) note the importance of improved terms of trade for Australia’s manufacturing sector. Of course, a depreciation of the Australian dollar raises the price of imports and improves the attractiveness of local manufactures. However, this beneficial effect is more than offset by the effect of higher import prices on the variable costs of local producers. Clearly, not only do greater openness and improved terms of trade boost Australian welfare and income, they also have a beneficial impact on equity.

The results for *Union* are large and significantly negative as well as straightforward to interpret. It’s quite clear that the impact of deunionisation has been to exacerbate income inequality. The result for the minimum wage varies across the different measures of income inequality. A higher real minimum wage lowers pre-tax income inequality. The impact on post-tax inequality is positive and significant, albeit at just the ten per cent level. This may indicate that the progressivity of taxes is relatively more important for generating a more equitable income distribution than are increases in the minimum wage, at least for Australia. Unsurprisingly, the minimum wage has no impact on the income distribution for the more wealthy.

Table 5. Summary of the long-run relationships: standardised beta coefficients

	Eq.	KOF	ToT	OPEN	Union	LRMW
<i>GiniPre</i>	4.1	0.52***	-0.51***	0.00	-0.39***	-0.36***
<i>GiniPost</i>	4.2	0.81**	-1.76***	-3.42***	-2.48***	0.26*
<i>p9050</i>	4.3	1.24***	-0.59***	-3.34***	-4.57***	0.03

Note: *, ** and *** denote rejection of the null at 10%, 5% and 1% significance levels, respectively.

IV. Conclusion

The academic literature (to say nothing of the popular literature) on the labour market effects of globalisation is enormous. The essential empirical issue has been macroeconomic in nature: accounting for the *economy-wide* rise in earnings and income inequality. One of the other striking developments of the last quarter century in virtually every country is the increase in something widely called “globalisation”. Globalisation is manifested by, amongst other things, growth in the international trade of goods and services and growth in foreign direct investment (FDI). Outwardly, the driving forces seem to be the decline in

insignificant in each of the speed of adjustment equations. This obviously contradicts the view espoused by Quiggin (1999, p.240): “*Increased inequality is the result of the neoliberal reform program as a whole. The role of globalisation per se has been overstated*”. On the other hand, the conclusions drawn by Henry and O’Brien (2003) may be overly sanguine.

administrative barriers to trade, sharp falls in the costs of transportation and communication, and the fragmentation of production processes. However, also significant has been rapidity of technological progress, institutional changes as well as increased political and social integration.

This paper examined the key determinants of Australia's income inequality. Surprisingly, particularly given the increases in Australian income inequality over the last quarter century, little research has been done for Australia. The present paper can therefore be viewed as a preliminary exploration. The findings are intriguing and will hopefully encourage other researchers to further explore the issue. Among our findings is that more trade and improved terms of trade are equity-enhancing. Institutionally, deunionisation of the labour force is having the anticipated adverse effect on income inequality. On the other hand, the welfare state has responded, rising minimum wages - the anchor upon which low-skilled and semi-skilled workers have their own incomes determined - have reduced income inequality. In addition, the progressivity of the income tax system has served to lessen the impact on low income workers. Our main finding is that globalisation – broadly-defined – has increased income inequality. Notably, the result is not attributable to increased trade openness and falling trade barriers. In fact, quite the opposite is the case. The global environment, and Australia's role in that environment, is a starkly different and possibly more uncertain one than Australians found ourselves in a quarter century ago.

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Table 2: Unit root tests

	<i>Variables in levels</i>			<i>Variables in first differences</i>		
	ADF	PP	KPSS	ADF	PP	KPSS
<i>GiniPost</i>	-2.81	-2.83	0.15**	-5.48***	-5.46***	0.26
<i>GiniPre</i>	-3.05	-3.09	0.15**	-5.21***	-5.25***	0.31
<i>P9050</i>	-2.53	-2.56	0.16**	-5.89***	-5.96***	0.31
<i>KOF</i>	-3.20	-3.21	0.18**	-7.50***	-7.61***	0.06
<i>ToT</i>	-3.81	-2.23	0.15**	-6.04***	-5.31***	0.05
<i>OPEN</i>	-2.95	-2.99	0.15**	-4.96***	7.45***	0.27
<i>Union</i>	-1.62	-1.62	0.19**	-5.04***	-4.89***	0.23
<i>LRMW</i>	-1.93	-2.18	0.18**	-3.09***	-3.02***	0.08

Note:

- 1) *, ** and *** denote rejection of the null at 10%, 5% and 1% significance levels, respectively;
- 2) time trend and intercept used in all regressions;
- 3) intercept used in all regressions in first differences;
- 4) the lag length in the ADF test is determined by the Schwarz Criterion. For the sake of brevity, the optimal length is not reported here.

Table 3

Johansen-Juselius procedure for testing co-integration between the inequality measures, *KOF*, *ToT*, *OPEN*, *UNION* and *LRMW*

Inequality →	Trace Statistic			Maximum Eigen Values Statistic		
	<i>GiniPost</i>	<i>GiniPre</i>	<i>P9050</i>	<i>GiniPost</i>	<i>GiniPre</i>	<i>P9050</i>
r = 0	123.47**	135.22**	130.17**	55.77**	68.10**	62.58**
r ≤ 1	67.71	67.12	67.59	20.91	20.47	23.47
r ≤ 2	46.80	46.65	44.12	17.68	19.18	15.78
r ≤ 3	29.11	27.47	28.34	15.73	13.89	15.96
r ≤ 4	13.39	13.58	12.38	13.38	13.51	11.70
r ≤ 5	0.00	0.08	0.68	0.00	0.08	0.68

Note: * and ** denote rejection of null at 5% and 1% significance levels, respectively.

Table 4.1: Vector error correction model for *GiniPre*

Long-run contemporaneous relationship:

$$GiniPr e_t = 0.002KOF_t - 0.003TOT_t - 0.0003OPEN_t - 0.003Union_t - 0.15LRMW_t + e_t$$

s.e (0.0006)*** (0.0004)*** (0.001) (0.0009)*** (0.03)***

Short-run dynamic relationships:

	$\Delta (GiniPre)$	$\Delta (KOF)$	$\Delta (ToT)$	$\Delta (OPEN)$	$\Delta (Union)$	$\Delta (LRMW)$
e_{t-1}	-0.35*** (0.04)	-5.52 (14.30)	-94.65*** (38.88)	-6.21 (13.19)	-5.90 (6.18)	-0.20 (0.49)
$\Delta (GiniPre(-1))$	-0.28** (0.11)	12.22 (36.58)	-227.58** (99.45)	-41.83 (33.74)	-18.80 (15.81)	-0.47 (1.25)
$\Delta (KOF(-1))$	-0.002*** (0.001)	-0.23 (0.18)	-0.16 (0.50)	-0.18 (0.17)	0.06 (0.08)	-0.004 (0.01)
$\Delta (ToT(-1))$	0.0010*** (0.0002)	0.05 (0.07)	0.52*** (0.20)	0.06 (0.07)	0.05* (0.03)	-0.001 (0.002)
$\Delta (OPEN(-1))$	-0.0004 (0.001)	-0.34 (0.24)	-1.13* (0.65)	-0.24 (0.22)	0.10 (0.10)	0.0004 (0.01)
$\Delta (Union(-1))$	-0.002* (0.001)	-0.26 (0.37)	-0.77 (1.01)	-0.39 (0.34)	0.51*** (0.16)	0.01 (0.01)
$\Delta (LRMW(-1))$	0.09*** (0.02)	3.22 (6.36)	30.33* (17.30)	2.13 (5.87)	-1.23 (2.75)	0.09 (0.22)
C	0.004*** (0.001)	1.26*** (0.44)	0.91 (1.21)	0.81** (0.41)	-0.34* (0.19)	0.01 (0.02)

Multivariate Residual Diagnostics:

	Test statistic	P-values
Normality (Chi-square)	17.03	0.15
Heteroscedasticity (Chi-square)	298.02	0.42
Autocorrelation (Chi-square): Lag1	37.26	0.41
Autocorrelation (Chi-square): Lag2	29.83	0.96

Notes:

- (1) *, ** and *** denote rejection of the null at 10%, 5% and 1% significance levels, respectively;
- (2) standard errors in parentheses.

Table 4.2: Vector error correction model for *GiniPost*

Long-run contemporaneous relationship:

$$GiniPost_t = 0.003KOF_t - 0.009TOT_t - 0.025OPEN_t - 0.015Union_t + 0.10LRMW_t + e_t$$

s.e (0.001)** (0.0009)*** (0.0003)*** (0.002)*** (0.06)*

Short-run dynamic relationships:

	$\Delta (GiniPost)$	$\Delta (KOF)$	$\Delta (ToT)$	$\Delta (OPEN)$	$\Delta (Union)$	$\Delta (LRMW)$
e_{t-1}	-0.12*	0.39	-90.61***	-14.46**	-4.77	0.02
	(0.07)	(8.05)	(17.11)	(6.78)	(3.43)	(0.28)
$\Delta (GiniPost(-1))$	-0.07	-20.06	-75.06	-31.88	-11.22	-0.17
	(0.21)	(25.42)	(54.03)	(21.41)	(10.83)	(0.88)
$\Delta (KOF(-1))$	-0.001	-0.19	-0.36	-0.20	0.06	-0.003
	(0.002)	(0.19)	(0.39)	(0.16)	(0.08)	(0.01)
$\Delta (ToT(-1))$	0.0003	0.06	0.61***	0.10*	0.06**	-0.002
	(0.001)	(0.07)	(0.15)	(0.06)	(0.03)	(0.002)
$\Delta (OPEN(-1))$	0.002	-0.41	0.06	-0.10	0.14	-0.001
	(0.002)	(0.28)	(0.60)	(0.24)	(0.12)	(0.01)
$\Delta (Union(-1))$	-0.001	-0.40	1.44*	-0.07	0.61***	0.01
	(0.003)	(0.42)	(0.89)	(0.35)	(0.18)	(0.01)
$\Delta (LRMW(-1))$	0.04	3.28	11.80	0.92	-2.20	0.07
	(0.05)	(6.04)	(12.83)	(5.09)	(2.57)	(0.21)
C	0.0004	1.25***	1.20	0.87**	-0.33*	0.01
	(0.004)	(0.44)	(0.94)	(0.37)	(0.19)	(0.02)

Multivariate Residual Diagnostics:

	Test statistic	P-values
Normality (Chi-square)	17.45	0.13
Heteroscedasticity (Chi-square)	298.46	0.42
Autocorrelation (Chi-square): Lag1	24.72	0.92
Autocorrelation (Chi-square): Lag2	28.28	0.81

Notes:

- (1) *, ** and *** denote rejection of the null at 10%, 5% and 1% significance levels, respectively;
- (2) standard errors in parentheses.

Table 4.3: Vector error correction model for P9050

Long-run contemporaneous relationship:

$$P9050_t = -0.02KOF_t - 0.01TOT_t - 0.09OPEN_t - 0.11Union_t + 0.05LRMW_t + e_t$$

s.e (0.006)*** (0.0004)*** (0.01)*** (0.009)*** (0.26)

Short-run dynamic relationships:

	$\Delta (P9050)$	$\Delta (KOF)$	$\Delta (ToT)$	$\Delta (OPEN)$	$\Delta (Union)$	$\Delta (LRMW)$
e_{t-1}	0.06** (0.03)	0.23 (1.74)	-11.04** (5.13)	-3.82** (1.49)	-1.25* (0.67)	0.07 (0.06)
$\Delta (P9050(-1))$	-0.50* (0.27)	-16.95 (17.83)	23.57 (52.42)	25.99* (15.21)	-5.67 (6.88)	-0.74 (0.60)
$\Delta (KOF(-1))$	0.002 (0.003)	-0.16 (0.19)	-0.23 (0.55)	-0.28* (0.16)	0.07 (0.07)	-0.001 (0.01)
$\Delta (ToT(-1))$	0.001 (0.001)	0.08 (0.07)	0.21 (0.21)	-0.02 (0.06)	0.05* (0.03)	-0.001 (0.002)
$\Delta (OPEN(-1))$	-0.01* (0.005)	-0.50* (0.32)	-0.51 (0.94)	0.16 (0.27)	0.10 (0.12)	-0.01 (0.01)
$\Delta (Union(-1))$	-0.01* (0.01)	-0.35 (0.36)	-0.93 (1.06)	-0.40 (0.31)	0.46*** (0.14)	0.01 (0.01)
$\Delta (LRMW(-1))$	0.02 (0.09)	2.34 (5.92)	16.54 (17.40)	1.71 (5.05)	-2.18 (2.28)	0.04 (0.20)
C	0.01* (0.01)	1.45*** (0.50)	-0.26 (1.47)	0.30 (0.43)	-0.37* (0.19)	0.02 (0.02)

Multivariate Residual Diagnostics:

	Test statistic	P-values
Normality (Chi-square)	17.31	0.14
Heteroscedasticity (Chi-square)	304.53	0.32
Autocorrelation (Chi-square): Lag1	19.63	0.99
Autocorrelation (Chi-square): Lag2	23.37	0.95

Notes:

- (1) *, ** and *** denote rejection of the null at 10%, 5% and 1% significance levels, respectively;
- (2) standard errors in parentheses.

Appendix Table 1: Components of the KOF index of globalisation

	Indices and Variables	Weights
A.	Economic Globalisation	[36%]
	i) Actual Flows	(50%)
	Trade (per cent of GDP)	(16%)
	FDI, flows (per cent of GDP)	(21%)
	FDI, stocks (per cent of GDP)	(23%)
	Portfolio investment (per cent of GDP)	(19%)
	Income payments to foreign nationals (per cent of GDP)	(22%)
	ii) Restrictions	(50%)
	Hidden import barriers	(24%)
	Mean tariff rate	(28%)
	Taxes on international trade (per cent of current revenue)	(28%)
	Capital account restrictions	(20%)
B.	Social Globalisation	[38%]
	i) Data on Personal Contact	(29%)
	Outgoing telephone traffic	(14%)
	Transfers (per cent of GDP)	(8%)
	International tourism	(27%)
	Foreign population (per cent of total population)	(25%)
	International letters (per capita)	(27%)
	ii) Data on Information Flows	(35%)
	Internet hosts (per 1000 people)	(20%)
	Internet users (per 1000 people)	(24%)
	Cable television (per 1000 people)	(20%)
	Trade in newspapers (per cent of GDP)	(14%)
	Radios (per 1000 people)	(23%)
	iii) Data on Cultural Proximity	(37%)
	Number of McDonald's restaurants (per capita)	(40%)
	Number of Ikea outlets (per capita)	(40%)
	Trade in books (per cent of GDP)	(20%)
C.	Political Globalisation	[26%]
	Embassies in country	(35%)
	Membership in international organisations	(36%)
	Participation in U.N. Security Council missions	(29%)