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An Empirical Evaluation**

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Immiserizing Growth: An Empirical Evaluation*

by

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June, 2003

Abstract

This paper examines the empirical validity of immiserizing growth in a consistent manner. A straightforward test for immiserizing growth is constructed by using the revealed preference framework of welfare evaluation, together with macroeconomic growth data. We identify 34 episodes of immiserizing growth in the post-war world economy, mostly in Africa and Latin America. This suggests the existence of large distortions that outweigh the gains from growth.

Keywords: Immiserizing Growth; Revealed Preference; Growth and Welfare.

JEL Classification: D6; F43; O57

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1. Introduction

The indicator typically employed to evaluate a country's economic development performance is the per capita economic growth rate. Strictly speaking, economic growth represents an increase in the quantity of an economy, while economic development is defined as an increase in the welfare of an economy.¹ Yet, the relationship between development and growth is not necessarily monotonic. There is a well-known phenomenon in international trade theory where increasing welfare and positive economic growth do not coincide. This is the case of immiserizing growth. The prototypical example of immiserizing growth is where export-biased growth by poor countries worsens their terms of trade so much that they are worse off than if they had not grown at all.² Although the idea of immiserizing growth has proved to be a remarkably important development in the theory of trade and welfare [Bhagwati et. al. (1998, p.369)], most economists at this time do not regard the concept of immiserizing growth as a real-world issue [Krugman and Obstfeld (2000, p.102)]. Despite the theoretical importance of this phenomenon, there is no empirical literature which evaluates the possibility of such immiserizing growth. According to the ECONLIT, 77 articles on immiserizing growth have been published between 1969 and April 2003, but none of them examined the empirical validity of the concept of immiserizing growth. This paper is an attempt to examine the empirical reality of immiserizing growth by using standard cross-country data.

The conditions for immiserizing growth were first formalized by Bhagwati (1958) in the two goods and two countries trade model. He showed that immiserizing growth could occur due to the deterioration of terms of trade despite the presence of market stability and even if the growing country faced an elastic foreign-offer curve [Bhagwati et. al. (1989, p.369)]. Moreover, even in the case of small open economies, Johnson (1967) showed the

¹ This is the Pigouvian definition. In a broader sense, the notion of economic development includes additional aspects such as sectoral transformation and income redistribution.

² Indeed, many economists from LDCs believed the continuous deterioration of terms of trade in primary product exporting LDCs during the 1950s. This is known as the Prebisch-Singer proposition. Immiserizing growth is a theoretical extreme of this line of argument.

possibility that real income could be reduced when growth occurs in protected import-substituting industries. Johnson's (1967) model indicates that a decline in a growing country's terms of trade is not a necessary condition for immiserizing growth. Subsequent studies showed that inducing foreign capital inflows by building tariff barriers can immiserize the economy [Uzawa (1969), Hamada (1974) and Brecher and Diaz-Alejandro (1977)], and large increases in the price of imported oil can drive an economy to immiserizing growth [Hamada and Iwata (1984)]. The latter is a situation where the gains arising from an advance in production technology may be outweighed by the loss from deteriorating terms of trade.³

In general, immiserizing growth must involve some form of suboptimality. What underlies the phenomenon of immiserizing growth is the fact that the country experiences economic growth subject to some distortion. Using the Hicksian equivalent-variational measures, net change in welfare from growth can be rewritten as the sum of primary gain from growth at optimal policies, which is positive, and change in loss from distortion due to growth, which is negative [Bhagwati et. al. (1998, pp.371-373)].⁴ Hence, if the incremental loss from the existing distortion outweighs the primary gains from economic growth, then immiserizing growth will follow. Conversely, the existence of immiserizing growth indicates, at least, the existence of a sufficiently large distortion in the economy and could be avoided by removal of the distortion.

In spite of the theoretical importance of immiserizing growth, there is no empirical literature which evaluates extensively the possibility of such phenomenon. This paper is devoted to investigating the empirical reality of immiserizing growth in a consistent framework. A direct approach to welfare evaluation using revealed preference theory is applied. In other words, we employ the Sen (1979)'s index approach to measure welfare and to evaluate welfare change over time. Dowrick and Quiggin (1994) used the same idea to construct a cross-sectional welfare ranking of countries. On the other hand, our study investigates the welfare movements of individual countries over time by using revealed

³ Krueger and Sonnenschein (1967) first summarized the welfare implications of changes in the terms

preference theory. This framework, together with macroeconomic growth rate data, gives a straightforward method to test for immiserizing growth. Section two discusses the framework of welfare evaluation. In section three, the actual evaluation procedure and results are presented. The final section presents concluding remarks.

2. The Framework for Evaluating Welfare Movements

Let $P(t) = [P(1, t), \dots, P(n, t)]$ and $C^*(t) = [C^*(1, t), \dots, C^*(n, t)]'$ represent the price vector and the per capita consumption quantity vector at time t , respectively, where the variable n denotes the number of commodities.⁵ We assume that the consumption data is generated by an agent's choices or preferences, and that there is a unique bundle demanded at each price and budget. Let the base year be t_0 . Then, the Laspeyres quantity index, Lq , and the Paasche quantity index, Pq , can be defined for a representative agent as follows:

Definition:

$$Lq \equiv \frac{P(t_0)C^*(t_{-1})}{P(t_0)C^*(t_0)}, \text{ and } Pq \equiv \frac{P(t_0)C^*(t_0)}{P(t_0)C^*(t_1)}, \text{ where } t_{-1} < t_0 < t_1.$$

Utilizing the Weak Axiom of Revealed Preference, we can evaluate the average welfare changes in this economy explicitly. The basic framework is summarized in the following proposition.

Proposition: If $Lq \leq 1$, then economic welfare has increased over time. On the other hand, if $Pq \geq 1$, then welfare has decreased over time.

of trade.

⁴ Note that this is an identity.

⁵ This means that we are analyzing a representative agent's consumption, since our purpose lies in the analysis of the individuals' *average* welfare change and not in the estimation of aggregate welfare. The assumption of a representative consumer requires that all consumers have linear Engel curves with identical marginal propensities to consume.

Proof: If $Lq \leq 1 \Leftrightarrow P(t_0)C^*(t_0) \geq P(t_0)C^*(t_{-1})$, then $C^*(t_0)$ is revealed preferred to $C^*(t_{-1})$. Hence, economic welfare at t_0 is higher than at t_{-1} , and thus, economic welfare has increased over time since $t_{-1} < t_0$. On the other hand, if $Pq \geq 1 \Leftrightarrow P(t_0)C^*(t_0) \geq P(t_0)C^*(t_1)$, then $C^*(t_0)$ is revealed preferred to $C^*(t_1)$. Hence, economic welfare at t_0 is higher than at t_1 , and thus, economic welfare has decreased over time since $t_0 < t_1$. *Q.E.D.*

The intuition behind this proposition is represented in Figures 1 and 2. Using data with the base year t_0 , we can identify the welfare increase from t_{-1} to t_0 by checking a movement from the point B to the point A in Figure 1. Similarly, a welfare decrease from t_0 to t_1 can be identified as a movement from the point C to the point D in Figure 2. With these criteria, two out of the four possible directions of welfare change can be identified (Table 1).

3. Data and Evaluation Procedure

Cross-country consumption data to evaluate welfare movements is taken from Summers, Kravis and Heston (1980), and Summers and Heston (1984, 88, 91). These data sets report the consumption quantity index based on the years 1970, 1975, 1980, and 1985, respectively. Therefore, we can calculate $P(70)C^*(t)$, $t=50,70,75$, by $RGDP_t \times c_t$ ⁶ in Summers, Kravis and Heston (1980), $P(75)C^*(t)$, $t=70,75,80$, by $RGDP_t \times c_t$ ⁷ in Summers and Heston(1984), $P(80)C^*(t)$, $t=75,80,85$, by $RGDP_t \times c_t$ ⁸ in Summers and Heston (1988), and $P(85)C^*(t)$, $t=80,85,88$, by $RGDP_t \times c_t$ ⁹ in Summers and Heston (1991). Thus, using the criteria in Table 1, we can identify the direction of welfare changes from actual data (Table 2). As shown in Table 2, directions are fully identified for the periods 1970-75, 1975-80 and 1980-85, while during the periods 1950-70 and 1985-88, we cannot identify the welfare decreasing case and the welfare increasing case, respectively.

⁶ $RGDP_t$ is the real per capita GDP expressed in 1970 US dollars, and c_t is the percentage of real Gross Domestic Income devoted to private consumption.

⁷ $RGDP_t$ is real Gross Domestic Income per capita (1975 international prices), and c_t is percentage of real GDP devoted to consumption.

⁸ $RGDP_t$ is the real per capita GDP (1980 international prices), and c_t is the consumption share (1980 international price).

Welfare Movements and Immiserizing Growth

The results from evaluating welfare changes employing the framework of Table 2 are reported in the Appendix Tables A1-A6. To summarize these results, we calculated the fraction of welfare increasing countries by region (Table 3). Several aspects of the development process during the post-war period become apparent. First, most developed countries achieved welfare increases during the entire post-war period. Second, since 1970, the fraction of LDCs that have experienced welfare improvements has declined, indicating divergent paths of economic development within LDCs. In particular, the fraction of African countries whose welfare increases falls more than LDCs in other regions. Finally, in the 1980s, welfare declines spread to more than half of all African and Latin American countries. In contrast, welfare increased in most Asian countries. This is especially true during the 1980-85 period when the fraction of Asian countries that experienced welfare gains was much larger than that of South American countries (81.0 % and 12.5 %, respectively).

Comparing welfare movements with data on real per capita economic growth rates gives a straightforward test of immiserizing growth. We employ per capita real consumption growth rate to capture economic growth rate so that we can control for effects of saving and investment movements. If positive economic growth coincides with declining welfare, the case is said to represent immiserizing growth. In the Appendix Tables A1-A6, thickly bordered cells indicate the cases of immiserizing growth. As identified in the Tables, there are many cases of immiserizing growth, especially in Africa and Latin America. In Africa, there are 20 cases of immiserizing growth and eight cases of immiserization with positive economic growth can be found in Latin America. The other cases are Afghanistan (1970-75), Nepal (1975-80), Netherlands (1980-85), Portugal (1980-85), Fiji (1975-80), and Papua New

⁹ $RGDP_t$ is the real GDP per capital (1985 international prices, Laspeyres Index), and c_t is the real consumption percentage of $RGDP$, 1985 international prices)

Guinea (1985-88). These cases imply that these countries suffered from Pareto inferior growth due to the existence of large distortions that outweigh the gains from growth.

4. Concluding Remarks

The principal feature of immiserizing growth is the coincidence of positive economic growth and a Pareto inferior outcome. Immiserizing growth indicates the existence of sufficiently large distortions that outweigh the gains from growth. This paper has been devoted to investigating the empirical reality of immiserizing growth in a consistent framework of revealed preference theory. Although immiserizing growth has been regarded as a theoretical issue rather than a real-world issue, our analysis identified the existence of 34 episodes of immiserizing growth in the post-war world economy, primarily in Africa and Latin America. These results imply that such countries have serious distortions of their economic activities. These episodes suggest that immiserizing growth is a real-world issue under a certain circumstance with a high-level distortion of an economy, resulting in a significant loss of welfare effects of economic growth. Therefore, it deserves further empirical studies, especially careful country-specific case studies such as Kaplinsky, Morris, and Readman (2002).

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Figure 1
The Laspeyres Quantity Index and Increasing Welfare

(two goods case)

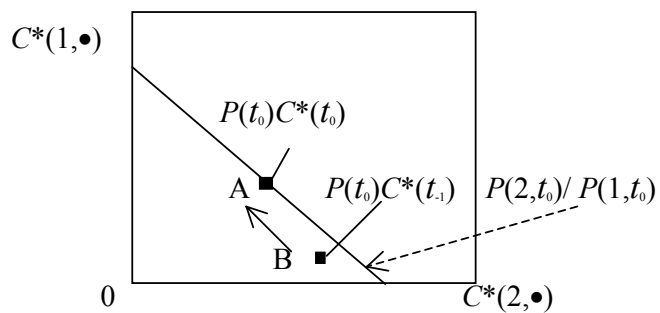


Figure 2
The Paasche Quantity Index and Decreasing Welfare

(two goods case)

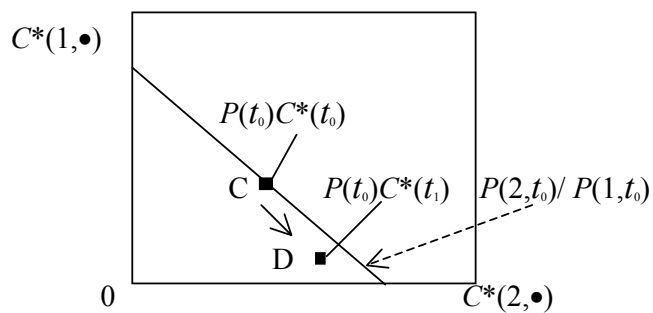


Table 1
Identifiable Direction of Welfare Change
Using Data with the Base Year t_0

Time (base year: t_0)	$t_{-1} \sim t_0$	$t_0 \sim t_1$
Index	$Lq \leq 1$ $P(t_0)C^*(t_0) \geq P(t_0)C^*(t_{-1})$	$Pq \geq 1$ $P(t_0)C^*(t_0) \geq P(t_0)C^*(t_1)$
Direction of Welfare Change Identified from data	+	-
Direction of Welfare Change <u>NOT</u> Identified from data	(-)	(+)

Table 2
Identification of Actual Welfare Change

year	1950-70	70-75	75-80	80-85	85-88	t_{-1}	t_0	t_1
base year (t_0)								
1970	+	-				1950	1970	1975
	$Lq(t_0=1970) \leq 1$	$Pq(t_0=1970) \geq 1$						
1975	+		-			1970	1975	1980
	$Lq(t_0=1975) \leq 1$		$Pq(t_0=1975) \geq 1$					
1980	+			-		1975	1980	1985
	$Lq(t_0=1980) \leq 1$			$Pq(t_0=1980) \geq 1$				
1985	+				-	1980	1985	1988
	$Lq(t_0=1985) \leq 1$				$Pq(t_0=1985) \geq 1$			

Note: See Table 1 for the basic framework.

Data Sources: P(70)C*(•) is calculated by RGDP×c in Summers, Kravis and Heston (1980), P(75)C*(•) by RGDP×c in Summers and Heston(1984), P(80)C*(•) by RGDP1×c in Summers and Heston (1988), P(85)C*(•) by RGDP×c in Summers and Heston (1991).

Table 3
Fraction of Welfare Increasing Countries by Region (%)

	1970-75	1975-80	1980-85
Africa	63.6	50.0	39.4
Asia	93.3	89.5	81.0
Europe	95.2	95.2	84.2
North and Central America	90.0	69.2	30.8
South America	88.9	81.8	12.5
Oceania	75.0	66.7	50.0

Source: Appendix Tables A1-A6

Appendix Table A1-a
Welfare Movements and Economic Growth Rates:
African Countries 1

Countries \ Year	1950-70	70-75	75-80	80-85	85-88
Algeria	+*	+ (.32)	+ (.20)	+ (.06)	- (-.16)
Angola	+*	- (-.05)	- (-.05)	- (-.10)	
Benin	+*	+ (-.06)		- (.03)	- (-.15)
Botswana	+*	+ (.44)		+ (.31)	- (-.11)**
Burkina Faso	+*	- (.11)		+ (.10)	
Burundi		- (.14)	+ (.13)	+ (.11)	- (.02)
Cameroon	+*	+ (.07)	+ (.32)	+ (.17)	- (-.10)
Central Africa	+*	- (-.08)		- (-.11)	
Chad		+ (-.05)	- (-.34)		
Congo	+*	+ (.09)	- (.13)	+ (.31)	- (-.18)**
Egypt	+		+ (.20)	+ (.24)	- (-.12)
Ethiopia	+*			- (-.05)	
Gabon	+*	+ (.66)	+ (-.29)	- (.08)	
Gambia	+*		+ (.01)		
Ghana	+*		- (.01)	- (-.16)	
Guinea		- (.05)	- (.10)	+ (.02)	
Ivory Coast	+*	+ (.21)	+ (.01)	- (-.22)	- (-.11)
Kenya		+ (.25)	+ (.02)	- (-.13)	
Lesotho	+*	+ (.41)	+ (.49)	+ (-.03)	
Liberia	+*	- (.04)	- (-.06)	- (-.22)	- (-.08)**
Madagascar		- (-.12)	- (-.07)	- (-.24)	- (-.11)
Malawi	+*	+ (.13)	+ (.00)	- (-.07)	- (-.06)
Mari	+*	+ (.06)			- (-.03)
Mauritania	+*		+ (-.03)	+ (-.20)	

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.

* Data on 1960 - 1970.

** Data on 1985 - 1987.

Appendix Table A1-b
Welfare Movements and Economic Growth Rates:
African Countries 2

Countries \ Year	1950-70	70-75	75-80	80-85	85-88
Mauritius	+*	+ (.35)		+ (.08)	
Morocco	+*	+ (.10)			
Mozambique	+*	- (-.31)	- (-.06)	- (-.42)	
Niger	+*	- (-.21)	+ (.12)	- (-.24)	- (-.04)
Nigeria	+*			- (-.38)	- (-.06)
Rwanda	+*		+ (.17)	- (.04)	- (-.10)
Senegal		- (.01)			- (-.03)
Sierra Leone	+*			- (-.13)	- (-.05)**
Somalia		+ (.17)	- (.04)	- (-.01)	- (-.06)
South Africa	+*	+ (.10)	- (-.01)		
Sudan		+ (-.07)	+ (.11)		- (-.07)
Swaziland	+*	+ (.05)	- (.13)		
Tanzania	+*	+ (.11)	- (.18)		- (.02)
Togo	+*	- (.06)		- (-.27)	- (.00)
Tunisia	+*	+ (.33)	+ (.19)	+ (.05)	- (-.06)
Uganda	+*	- (-.07)	- (-.49)	+ (.63)	
Zaire	+*		- (-.36)	- (.03)	
Zimbabwe	+*	+ (.17)	- (.16)	- (.02)	- (-.13)

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.

* Data on 1960 - 1970.

** Data on 1985 - 1987.

Appendix Table A2
Welfare Movements and Economic Growth Rates:
Asian Countries

Countries \ Year	1950-70	70-75	75-80	80-85	85-88
Afghanistan	+*	- (.06)	- (-.14)	+ (.02)	
Bangladesh		+ (-.08)	+ (.12)	+ (.04)	
Burma	+		+ (.02)	+ (.16)	
Hong Kong	+*	+ (.22)	+ (.42)	+ (.20)	
India	+			+ (.10)	
Indonesia	+*	+ (.27)	+ (.30)	+ (.18)	
Iran	+*	+ (.47)		+ (.24)	
Iraq	+*			- (-.57)	
Israel	+	+ (.23)	+ (.01)	+ (.09)	
Japan	+	+ (.16)	+ (.20)	+ (.11)	
Jordan	+*		+ (.52)	+ (.07)	- (-.15)
Korea, South	+	+ (.36)	+ (.21)	+ (.24)	
Malaysia	+*	+ (.23)	+ (.37)	+ (.07)	- (-.01)
Nepal	+*		- (.11)	+ (.06)	
Pakistan	+	+ (-.10)	+ (.09)	+ (.24)	
Philippines	+	+ (.18)	+ (.13)	- (-.15)	
Saudi Arabia	+*		+ (.13)	- (-.61)	
Singapore	+*	+ (.32)	+ (.33)		
Sri Lanka	+*		+ (.14)	+ (.21)	- (.00)**
Syria	+	+ (.61)	+ (.16)	- (-.04)	- (-.19)
Taiwan		+ (.33)	+ (.39)	+ (.18)	
Thailand	+	+ (.09)	+ (.27)	+ (.17)	

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.

* Data on 1960 - 1970.

** Data on 1985 - 1987.

Appendix Table A3
Welfare Movements and Economic Growth Rates:
European Countries

Countries \ Year	1950-70	70-75	75-80	80-85	85-88
Austria	+	+ (.19)	+ (.16)	+ (.07)	
Belgium	+	+ (.14)	+ (.15)		
Cyprus	+	- (-.16)	+ (.53)	+ (.18)	
Denmark	+	+ (.06)	+ (.13)	+ (.15)	
Finland	+	+ (.16)	+ (.16)	+ (.12)	
France	+	+ (.13)	+ (.13)	+ (.02)	
Germany(west)	+	+ (.07)	+ (.17)	+ (.06)	
Greece	+	+ (.22)	+ (.14)	+ (.04)	
Iceland	+	+ (.22)	+ (.30)	+ (.01)	
Ireland	+	+ (.12)	+ (.12)	- (-.03)	
Italy	+	+ (.11)	+ (.25)	+ (.06)	
Luxembourg	+	+ (.10)	+ (.13)	+ (.09)	
Malta	+*	+ (.26)	+ (.38)	+ (.15)	
Netherlands	+	+ (.11)	+ (.11)	- (.03)	
Norway	+	+ (.19)	+ (.25)	+ (.12)	
Portugal	+	+ (.23)	+ (.21)	- (.01)	
Spain	+	+ (.21)	+ (.02)		
Sweden	+	+ (.11)	+ (.06)	+ (.13)	
Switzerland	+	+ (.02)	+ (.09)	+ (.02)	
Turkey	+	+ (.28)	- (-.01)	+ (.06)	
United Kingdom	+	+ (.09)	+ (.10)	+ (.10)	

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.
 * Data on 1960 - 1970.

Appendix Table A4
Welfare Movements and Economic Growth Rates:
North and Central American Countries

Countries \ Year	1950-70	70-75	75-80	80-85	85-88
Barbados	+		- (.17)	+ (-.15)	
Canada	+	+ (.12)	+ (.14)	+ (.09)	
Costa Rica	+	+ (.14)	+ (.15)	- (-.10)	
Dominica	+	+ (.26)		- (-.08)	- (.05)
El Salvador	+	+ (.11)	- (.00)	- (-.06)	- (-.04)
Guatemala	+	+ (.11)	+ (.15)	- (-.18)	- (.01)
Haiti			+ (.23)	- (-.13)	
Honduras	+		+ (.21)	- (-.13)	
Jamaica	+*	- (.08)	- (-.25)		
Mexico	+	+ (.16)	+ (.19)	- (-.08)	- (-.07)
Nicaragua	+	+ (.09)	- (-.23)	- (-.18)	- (-.07)**
Panama	+	+ (.12)	+ (.17)	+ (.06)	- (-.02)**
Trinidad and Tobago	+		+ (.38)	- (-.41)	- (.55)
United States	+	+ (.05)	+ (.12)	+ (.09)	

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.

* Data on 1960 - 1970.

** Data on 1985 - 1986.

Appendix Table A5
Welfare Movements and Economic Growth Rates:
South American Countries

South America					
Argentina	+	+ (.06)		- (-.15)	
Bolivia	+	+ (.17)	+ (-.02)	- (-.16)	- (-.14)
Brazil	+	+ (.39)	+ (.18)		
Chile	+		+ (.25)	- (-.12)	
Colombia	+	+ (.16)	+ (.17)	+ (-.01)	
Ecuador	+	+ (.35)	+ (.21)	- (-.13)	- (-.02)
Guyana			- (-.14)		
Paraguay	+	+ (.17)	+ (.41)		- (.01)
Peru	+	+ (.14)	- (-.05)	- (-.15)	
Suriname	+*	- (.09)	+ (.27)		
Uruguay	+	+ (.06)	+ (.21)	- (-.27)	
Venezuela	+		+ (.00)	- (-.20)	- (.01)*

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.

* Data on 1985-1987.

Appendix Table A6
Welfare Movements and Economic Growth Rates:
Oceanian Countries

Countries \ Year	1950-70	70-75	75-80	80-85	85-88
Australia	+	+	+	+	
		(.07)	(.09)	(.07)	
Fiji	+*	+	-	-	-
		(.25)	(.11)	(-.13)	(-.05)**
New Zealand	+	+	+	+	
		(.11)	(-.04)	(.10)	
Papua New Guinea	+*	-		-	-
		(-.13)		(-.10)	(.016)

Notes: As in the framework of tables 1 and 2, '+' and '-' signs indicate that welfare is increasing and decreasing respectively. Numbers in parentheses are per capita real GDP growth rate over time, which is calculated from RGDPCH in Summers and Heston (1991). Thickly bordered cells are the cases of immiserizing growth.

* Data on 1960 - 1970.

** Data on 1985 - 1987.