Decomposition of ethnic heterogeneity on growth

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28 January 2012

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Abstract

Ethnic heterogeneity influences economic growth through various channels such as efficiency improvement, capital accumulation, and technological progress. However, it is open to discussion exactly how ethnic heterogeneity affects these channels. Hence, this paper attempts to examine the effects of heterogeneity on economic growth using data envelopment analysis. The empirical results of the estimations show that heterogeneity has a negative effect on efficiency improvements. However, heterogeneity has no effect on technological progress and capital accumulation. This implies that ethnic heterogeneity hinders positive externalities such as information spillover, which hampers economic growth.

Running title: Ethnic heterogeneity on growth

Keywords: Ethnic fractionalization, Ethnic polarization, Efficiency improvement, Capital accumulation.

JEL classification: H11, O43

1. INTRODUCTION

Since the 1990s, there has been a growing interest among economic researchers in the relationship between ethnic diversity and economic performance (Alesina and La Ferrara, 2005). Easterly and Levine (1997) showed a negative association between ethnic heterogeneity and economic growth. Ethnic heterogeneity may influence economic growth through a variety of channels. First, ethnic heterogeneity is found to reduce investment (Mauro, 1995; Montalvo and Reynal-Querol, 2005a, 2005b).[1] Hence, the heterogeneity reduced capital accumulation, impeding economic growth[2]. Second, ethnic heterogeneity is positively associated with the probability of conflict (Montalvo and Reynal-Querol, 2005a, 2005b), while heterogeneity is negatively related to trust (Dincer, 2011)[3]. Trust plays a key role in reducing transaction costs in the market (Zak and Knack, 2001). Thus, I predict that ethnic heterogeneity impedes not only market transactions but also information spillover (learning from others). This inevitably hinders economic growth. Third, heterogeneity, however, appears to have a contrasting effect: social diversity (which seems to be captured partly by ethic heterogeneity) is thought to cause innovation (Jacobs, 1969, 1984). If this is true, then heterogeneity is thought to enhance economic growth. Therefore, the effect of ethnic heterogeneity on growth is open for discussion. Thus, it is worthwhile to investigate through which channels ethnic heterogeneity affects growth.

Data envelopment analysis (hereafter, DEA) enables me to analyze channels of economic growth. DEA constructs a world production frontier and then decomposes labor productivity growth to three components: technological catch-up, capital deepening, and technological change (Kumar and Russell, 2002). In addition, researchers can use regression analysis to examine how initial outputs per worker influence these components (Yamamura and Shin, 2007a, 2007b, 2008; Yamamura, 2011). Hence, this paper uses DEA.

This paper aims to examine influence of heterogeneity on growth and so provide new empirical evidence by analyzing the channels through which the heterogeneity affects growth. The key finding is that heterogeneity has a negative effect on efficiency improvements, which results in the impediment of growth. In contrast, heterogeneity has no effect on technological progress and capital accumulation. The rest part of this paper is organized as follows: a testable hypothesis is proposed in Section 2; Section 3 describes the

[1] Previous works examined the effect of religious heterogeneity on economic development, which relate to works exploring the influence of ethnic heterogeneity (Alesina et al., 2003; Montalvo and Reynal-Querol, 2003).

[2] Alesina et al. (1999) used United States data to show that shares of spending on productive public goods are inversely related to a city's (metro area's/county's) ethnic fragmentation.

[3] Heterogeneity is found to influence government size (Lind, 2007). This also possibly affects economic performance and growth.

data and estimation strategy; Section 4 exhibits the estimation results; and Section 5 concludes.

2. HYPOTHESIS

The engine of economic growth seems to stem from information spillover (Marshall, 1920). Positive externalities, via information spillover among various firms and groups, are expected to arise if face-to-face interaction among workers occurs.[4] Information spillover is considered to enhance efficiency improvement, resulting in economic growth. However, various types of workers including experts are less likely to interact if workers are polarized. Easterly (2001) argued, "Suppose that people in linguistic groups associated primarily with people from their group and not with people from other groups. Then the knowledge creation coming from highly educated is valuable to you only if those people consist of your own group. Knowledge leaks within ethnic groups and not across ethnic groups" (Easterly, 2001, 271–272). This is consistent with the argument that information flows are weaker in a heterogeneous population, which prevents individuals from learning about their neighbors' experiences (Munshi, 2004). If this holds true, heterogeneity has a detrimental influence on information spillover. Furthermore, there appears to be a further mechanism. It is argued that trust contributes to economic growth (e.g., Beugelsdijk, et al., 2004; Beugelsdijk and van Schaik, 2005; Zak and Knack, 2001). This is in part because trust reduces the transaction cost among agents. However, Dincer (2011) provided evidence that ethnic heterogeneity is negatively associated with the level of trust. If this is true, then heterogeneity reduces trust and therefore increases transaction costs. Inevitably, the market does not function well, which in turn reduces positive externalities such as information spillover. Accordingly, economic growth is hindered. This argument leads me to postulate Hypothesis 1[5]:

Hypothesis 1: Racial heterogeneity impedes efficiency improvements, which hampers economic growth.

Ethnic heterogeneity is considered to increase the number of interest groups because the interests of each group are diverse and conflicting. A rent-seeking model

[4] Thornton and Thompson (2001), using micro-level data on wartime shipbuilding, suggest that learning spillovers were a significant source of productivity growth.

[5] Mauro (1995) exhibits a negative and significant correlation between ethnic heterogeneity and institutional efficiency. Institutional efficiency is positively associated with economic efficiency. It follows then, with the exception of the information spillover channel, that ethnic heterogeneity impedes efficiency improvements.

shows that resources spent by each group to obtain political power can be considered a social cost (Mueller, 2003). In this model resources are allocated to nonproductive behavior and not into productive investments. To put it in another way, heterogeneity causes rent-seeking behavior and so reduces investment. It is also possible that that ethnic heterogeneity increases the likelihood of political conflict, creating an instable and uncertain country. As a consequence, investment is reduced in a heterogeneous society (Montalvo and Reynal-Querol, 2005a, 2005b)[6]. Considering the arguments above, I propose hypothesis 2.

Hypothesis 2: Racial heterogeneity impedes capital accumulation, which hampers economic growth.

Diversified cities play an important role in enlarging the possibility of innovation (Jacobs, 1969, 1984). This role is more important for new industries where new products and production methods are established through trial and error, than compared with mature industries (Hendrson et al., 1995). Based on United States data, Glaeser et al. (1992) provided evidence that the more diverse an industrial structure is, the higher the growth rate of productivities.[7] Different ethnic groups are likely to work in different industries. Therefore, ethnic heterogeneity seems to create diversity within a country. Assuming that the diversity of industrial structure is captured by ethnic heterogeneity, racial heterogeneity enhances technology progress through innovation, resulting in economic growth.

3. DATA AND ESTIMATION STRATEGY

Kumar and Russell (2002) used DEA to construct a cross-country data set by decomposing labor productivity growth into three components. They conducted a simple OLS regression model with output per worker from 1965 as the independent variables and the dependent variables were the percentage changes between 1965 and 1990 for output per worker, technological change, the efficiency index, and the capital accumulation index. In their estimations, both unobservable individual and time effects were ignored. This led to estimation bias.

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[6] A secured property right is considered to provide an incentive to invest and therefore creates capital accumulation. Isaksson (2011) used cross-countries data to present evidence that social division measured in terms of ethnic fractionalization weakens the association between property rights institutions and income. If this is true, then heterogeneity reduces the incentive to invest even when property rights are well secured.

[7] Yamamura and Shin (2007b) used Japanese data to conduct similar estimations. However, they found that industrial diversity did not have a positive effect on technological progress and labor-productivity.

Following Kumar and Russell (2002), this paper also uses DEA to construct a panel dataset for 57 countries, from 1965 to 1990, using the Penn World Table.[8] With this dataset, I used random-effects estimations to reduce omitted variable bias caused by the time-invariant features of the various countries.[9] I also incorporated year dummies into this model to capture individually invariant time-specific effects. The estimated function takes the following form:

$$Gr_{iT\text{-}t0} = \alpha_0 + \alpha_1 \text{Ln}(Output)_{it0} + \alpha_2 (Ethnic\ polarization)_i + \alpha_3 (\text{Number of natural disasters})_{it0} + \alpha_4 (Government\ size)_{it0} + \alpha_5 (Years\ of\ schooling)_{it0} + \alpha_6 (French\ legal\ origin)_i + \alpha_7 (British\ legal\ origin)_i + \alpha_8 (Latitude)_i + \alpha_9 (Land\ size)_i + \quad_i + \quad_t + u_{it},$$

where $Gr_{iT\text{-}t0}$ represents labor productivity growth and the change in any of the three dependent variables (i.e., *Efficiency, Capital,* and *Technique*) in country *i* from each base year t0 to year T (t0 = 1965, …, 1989 and *T* = 1966, …, 1990). α represents regression parameters, is the time-invariant individual effect of each country, represents the year specific effects, and *u* is an error term. As stated earlier, and are controlled. The key independent variable that captures ethnic heterogeneity is the ethnic polarization index. Classical works have previously used an ethnic fractionalization index to capture ethnic heterogeneity (Mauro, 1995; Easterly and Levine, 1997). The index is defined as

$$\text{Fractionalization} = 1 - \sum_{i=1}^{n} \pi_i^2$$

where, if I consider ethnic diversity, π_i is the proportion of people who profess to belong to ethnic group i. Basically, this indicator can be interpreted as measuring the probability that two randomly selected individuals in a country will belong to different groups.

In addition to the ethnic fractionalization index, an ethnic polarization index has also been developed and used as an alternative measure (Montalvo and Reynal-Querol, 2005a, 2005b; Reynal-Querol, 2002). The ethnic polarization index can be defined as

$$\text{Polarization} = 1 - \sum_{i=1}^{n} \left(\frac{0.5 - \pi_i}{0.5} \right)^2 \pi_i .$$

This index measures the normalized distance of a particular distribution of ethnic groups within a bimodal distribution.

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[8] Kumar and Russell (2002) admitted that their method includes the possibility of an implosion of the technological frontier. Henderson and Russell (2005) precluded an implosion of the frontier over time. In this paper, it is also precluded.

[9] The independent variables used in this paper were not available for 10 of the 57 countries. Hence, the data from only 47 countries were used in the estimation.

To check the robustness of the estimation results, I used both ethnic fractionalization and ethnic polarization as proxy variables for ethnic heterogeneity.[10] Ethnic heterogeneity is expected to result in conflict, hampering the cooperation and communication required to enhance technology diffusion, and therefore efficiency improvements. Proxies for ethnic heterogeneity hold time-invariant features. Hence, their effects cannot be estimated when a fixed-effects model is used. To examine these effects, a random-effects model is used in this paper. If the coefficients of the proxies take the negative sign when efficiency improvement (and capital accumulation) is a dependent variable, then Hypothesis 1 (and 2) are supported.

The other independent variables used in this model are the values in the base year t0. I have incorporated per capita GDP taken in log-form in t0 to control for initial levels of productivity. These data are sourced from the Penn World Table (PWT 6.3).[11] Natural disasters are considered to influence economic growth (Skidmore and Toya, 2002). To capture this effect, the number of natural disasters that have occurred in the sample countries are included.[12] As suggested by Yamamura (2011), government size hinders capital accumulation and so hampers economic growth. Hence, government size is included as an independent variable. Government size is measured by a country's general government final consumption expenditure (% of GDP) sourced from the World Bank (2006). To capture the human capital effect, the number of years at school is incorporated, as used by Easterly and Levine (1997).[13]

Institutional factors appear to play an important role in determining economic growth. A number of previous works have shown that legal origin is profoundly associated with incentives for economic agents and, therefore, economic performance (e.g., La Porta et al., 1997, 1998, 1999, 2008). Better-developed financial systems contribute to growth in capital-intensive sectors (Rajan and Zingales 1998). Further, Levine (1998) argued that legal origin exogenously determined the degree of financial development that promoted economic growth. La Porta et al. (1998) asserted that French civil-law countries offer the weakest legal protection to investors while British common law countries offer

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[10] Data on ethnic fractionalization and polarization is available at http://www.econ.upf.edu/~reynal/data_web.htm (accessed on June 1, 2011).

[11] The data are available from Center of International Comparisons at the University of Pennsylvania. http://pwt.econ.upenn.edu/ (accessed May 1, 2007).

[12] The data were obtained from the International Disaster Database http://www.emdat.be (accessed on June 1, 2011).

[13] The number of years at school is available only for 1960, 1970, and 1980. Therefore, to construct the panel data, additional data were generated by interpolation based on the assumption of constant changes in rates to compensate for this deficiency. After 1980, the value for 1980 is used. The data are available from http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20700002~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html (accessed June 2, 2011).

the strongest. French and British legal origin dummies are incorporated to capture these effects.[14] Apart from institutional factors, geographical factors such as latitude and land size are incorporated as independent variables to capture the existence of natural resources and climate.

4. RESULTS

The estimation results of the random-effects model with year dummy variables from 1966 to 1990 are reported in Tables 1–4. Table 1 presents the results when labor-productivity growth is used as a dependent variable. Tables 2, 3, and 4 show the results when efficiency improvement, capital accumulation, and technological progress are used as independent variables. The ethnic fractionalization and ethnic polarization indexes are used as a proxy for ethnic heterogeneity in each table. In all columns in Tables 1–4, with the exception of column (3), Table 4, the Hausman test does not reject the null-hypothesis that the differences in coefficients between a fixed-effects model and a random-effects model are not systematic. This result implies that the random-effects model is valid and preferred.

I see from Table 1 that ethnic fractionalization yields the negative sign in columns (1)–(3) and that ethnic polarization produces the negative sign in columns (4)–(6). Furthermore, they are statistically significant at the 1% level in all columns. This implies that ethnic heterogeneity hampers labor-productivity growth. In addition, number of natural disasters shows a significant positive sign in columns (1)–(3) and (4), which is consistent with the argument of Skidmore and Toya (2002), where natural disasters may stimulate economic growth. Other variables do not show a significant sign, with the exception of latitude in column (3), and hence they do not influence growth.

With respect to Table 2, the coefficient signs of ethnic fractionalization are negative in columns (1)–(3), and that of ethnic polarization are also negative in columns (4)–(6). In addition, they are statistically significant at the 1% level in all columns. I interpret this result as suggesting that ethnic heterogeneity impedes information spillover. The result of the proxy of ethnic heterogeneity in Table 2 is similar to that in Table 1. Hence, the detrimental effect of ethnic heterogeneity on growth comes in part from the detrimental

[14] Besides legal origins, institutional factors captured by, for instance, corruption and transparency of government appear to influence economic growth. However, the variables used to capture them are regarded as endogenous variables because the causality between these factors and economic growth is ambiguous. Hence, these variables lead to estimation bias and are not used in this paper. In contrast, legal origin is related to historical event. Therefore, legal origin dummies can be considered as exogenous variables and are used in this paper.

effect of ethnic heterogeneity on information spillover. Thus, Hypothesis 1 is not strongly supported by the result. Concerning the other variables, the results are almost identical to the results presented in Table 1.

I see from Table 3 that the signs of the proxies for ethnic heterogeneity are negative in all columns. However, they are not statistically significant with the exception of column (1). Ethnic heterogeneity does not affect capital accumulation, which is not consistent with the argument that ethnic heterogeneity reduces investment (Mauro, 1995). Hence, Hypothesis 2 is not supported by the results. Considering Tables 1–4 jointly, I assert that ethnic heterogeneity impedes information spillover rather than investment. Furthermore, ethnic heterogeneity does not affect innovation. The combined effects of ethnic heterogeneity become negative on growth. Thus, I conclude that ethnic heterogeneity is an obstacle rather than an engine of economic growth.

Turning to Table 4, ethnic fractionalization and polarization take negative signs, with the exception of column (5). They do not become statistically significant in any of the columns. It follows from this result that ethnic heterogeneity does not enhance innovation. This is not in line with the argument of Jacobs (1969, 1984).[15] The other independent variables do not show any results, and do not change according to the specifications.

5. CONCLUSIONS

There are conflicting views regarding the role of heterogeneity (or diversity) on growth. Social heterogeneity is considered to impede investment, reducing capital accumulation. What is more, heterogeneity is thought to hinder information spillover, which hampers efficiency improvement. These have a detrimental effect on economic growth. In contrast, face-to-face interactions among workers belonging to different industries are considered to act as a catalyst for innovation, leading to technological progress (Jacobs 1969, 1984). This in turn stimulates economic growth. This paper attempts to examine the influence of heterogeneity on economic growth by scrutinizing the channels through which heterogeneity affects such growth.

For this purpose, this study used panel data from 47 countries, from 1965 to 1989, to decompose the effect of ethnic heterogeneity, and to examine how it influences economic growth. Using a random-effects regression model with year dummies, I found that ethnic heterogeneity has a negative effect on growth, mainly by hampering efficiency improvement, but not capital accumulation nor technological progress. I interpret these

[15] In this paper, I assumed that the role of industrial diversity stressed by Jacobs (1969, 1984) could be captured by the role of ethnic heterogeneity. However, there seems to be a gap between industrial diversity and ethnic heterogeneity. Hence, special care should be called for when interpreting the results of Table 3.

results to imply that ethnic heterogeneity hinders cooperation and communication among individuals; however, cooperation and communication are important for technology diffusion as well. As a consequence, efficiency improvement is hampered, thereby impeding economic growth. In contrast, heterogeneity does not affect innovation and capital accumulation.

Information spillover plays an important role for developing countries; it enables them to catch up with more developed countries because it is otherwise difficult for them to create new technology (Vernon, 1966). From the findings in this paper, I derive the argument that heterogeneity is an obstacle to economic development, particularly for developing countries trying to catch up with developed countries via the acquisition of advanced technology.

Information spillover, via interactions among workers from various industries, is thought to largely occur in urban rather than suburban and rural areas (Jacobs, 1969, 1984). Geographical factors were not considered in this research when the estimations were conducted because this paper used country-level macro data. Micro-level data should be used to more closely explore the effect of heterogeneity on information spillover and therefore efficiency improvement. Furthermore, the influence of institutional factors on investment differs between private and public investment (Baliamoune-Lutz and Ndikumana, 2008). However, due to data limitations, I was unable to examine how heterogeneity influences private and public capital accumulation. These remaining issues can be addressed in future research.

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Table 1. Determinants of labor-productivity growth (random-effects estimates: 1965–1989)

	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Output)	-0.007**	-0.006	-0.007	-0.002	-0.004	-0.003
	(-2.02)-	(-1.56)-	(-1.60)-	(-0.66)-	(-0.92)-	(-0.72)-
Ethnic fractionalization	-0.044***	-0.041***	-0.043***			
	(-5.33)	(-4.52)	(-4.36)			
Ethnic polarization				-0.036***	-0.034***	-0.031***
				(-4.68)	(-3.83)	(-3.32)
Number of natural disasters	0.001***	0.001***	0.001***	0.001	0.001	0.001*
	(2.63)	(2.61)	(2.54)	(1.45)	(1.52)	(1.70)
Government size	-0.0004	-0.0004	-0.0003	-0.0006	-0.0005	-0.0005
	(-1.27)	(-1.27)	(-0.97)	(-1.68)	(-1.44)	(-1.43)
Years of schooling	0.001	0.001	0.001	0.001	0.001	0.001
	(0.91)	(0.62)	(0.57)	(0.75)	(0.88)	(1.04)
French legal origin		-0.005	-0.002		-0.001	-0.003
		(-0.72)	(-0.34)		(-0.24)	(-0.05)
British legal origin		-0.004	-0.001		-0.005	-0.001
		(-0.64)	(-0.22)		(-0.73)	(-0.24)
Latitude			0.019**			0.013
			(2.03)			(1.23)
Land size			$-0.97*10^{9}$			$-1.48*10^{9}$
			(-0.24)			(-1.17)
Hausman test	8.99	8.89	10.6	11.2	10.5	10.7
	p-value = 0.99	p-value = 0.99	p-value = 0.64	p-value = 1.00	p-value = 1.00	p-value = 1.00
Groups	47	47	47	47	47	47
Observations	1121	1121	1121	1121	1121	1121

Note: Year dummies are not reported but are included in all estimations as independent variables. Numbers in parentheses are z-statistics. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 2. Determinants of efficiency improvement (random-effects estimates: 1965–1989)

	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Output)	-0.004	-0.002	-0.003	-0.001	-0.001	-0.001
	(-1.57)-	(-0.81)-	(-0.97)-	(-0.62)-	(-0.34)-	(-0.28)-
Ethnic fractionalization	-0.023***	-0.025***	-0.027***			
	(-3.92)	(-3.70)	(-3.82)			
Ethnic polarization				-0.023***	-0.025***	-0.023***
				(-4.27)	(-4.05)	(-3.69)
Number of natural disasters	0.001***	0.001***	0.001**	0.001	0.001	0.001
	(2.59)	(2.53)	(2.47)	(1.55)	(1.40)	(1.39)
Government size	0.005*	0.004	0.005*	0.0003	0.0003	0.0003
	(1.84)	(1.50)	(1.94)	(1.39)	(1.20)	(1.33)
Years of schooling	0.0002	-0.0001	-0.0003	0.0001	0.0001	0.0001
	(0.26)	(-0.15)	(-0.30)	(0.20)	(0.17)	(0.18)
French legal origin		-0.001	-0.002		0.003	0.004
		(-0.04)	(-0.30)		(0.64)	(0.83)
British legal origin		0.003	0.005		0.004	0.006
		(0.65)	(0.40)		(0.91)	(1.16)
Latitude			0.015**			0.010
			(2.21)			(1.44)
Land size			$0.05*10^{9}$			$-0.46*10^{9}$
			(0.06)			(-0.53)
Hausman test	28.8	28.2	31.5	24.6	24.6	26.4
	p-value = 0.41	p-value = 0.44	p-value = 0.29	p-value = 0.64	p-value = 0.64	p-value = 0.55
Groups	47	47	47	47	47	47
Observations	1121	1121	1121	1121	1121	1121

Note: Year dummies are not reported but are included in all estimations as independent variables. Numbers in parentheses are z-statistics. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 3. Determinants of capital accumulation (random-effects estimates: 1965–1989)

	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Output)	0.003	0.002	0.004*	0.004**	0.003	0.004*
	(1.39)-	(1.16)-	(1.71)-	(2.00)-	(1.46)-	(1.86)-
Ethnic fractionalization	-0.012**	-0.009	-0.002			
	(-2.04)	(-1.41)	(-0.32)			
Ethnic polarization				-0.008	-0.005	-0.001
				(-1.47)	(-0.83)	(-0.21)
Number of natural disasters	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003
	(1.37)	(1.36)	(1.60)	(1.18)	(1.22)	(1.22)
Government size	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***
	(-4.85)	(-4.75)	(-4.94)	(-4.86)	(-4.71)	(-4.94)
Years of schooling	-0.0001	-0.0001	0.0005	-0.0001	0.0002	0.0006
	(-0.10)	(-0.08)	(0.62)	(-0.08)	(0.02)	(0.69)
French legal origin		-0.005	-0.003		-0.005	-0.003
		(-0.97)	(-0.74)		(0.89)	(0.66)
British legal origin		-0.006	-0.003		-0.007	-0.003
		(-1.22)	(-0.63)		(-1.37)	(-0.62)
Latitude			0.002			0.002
			(0.34)			(0.29)
Land size			$2.17*10^{9}$**			$-2.26*10^{9}$**
			(2.26)			(-2.47)
Hausman test	29.2	30.8	25.7	28.1	29.9	23.8
	p-value = 0.41	p-value = 0.32	p-value = 0.58	p-value = 0.45	p-value = 0.36	p-value = 0.68
Groups	47	47	47	47	47	47
Observations	1121	1121	1121	1121	1121	1121

Note: Year dummies are not reported but are included in all estimations as independent variables. Numbers in parentheses are z-statistics. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 4. Determinants of technological progress (random-effects estimates: 1965–1989)

	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Output)	-0.0003	0.0004	0.0001	-0.0001	0.0005	0.0004
	(-0.29)	(0.32)-	(0.07)-	(-0.15)-	(0.48)-	(0.38)-
Ethnic fractionalization	-0.001	-0.001	-0.002			
	(-0.48)	(-0.49)	(-0.80)			
Ethnic polarization				-0.003	0.0001	-0.0001
				(-0.16)	(0.06)	(-0.04)
Number of natural disasters	0.0003*	0.0003*	0.0003	0.0003	0.0003	0.0002
	(1.65)	(1.66)	(1.46)	(1.58)	(1.60)	(1.40)
Government size	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(-0.90)	(-1.11)	(-0.92)	(-0.93)	(-1.13)	(-1.01)
Years of schooling	0.0002	0.0002	-0.0004	0.0002	0.0001	-0.0001
	(0.69)	(0.06)	(-0.11)	(0.69)	(0.05)	(-0.05)
French legal origin		-0.001	-0.001		-0.001	-0.001
		(-0.41)	(-0.37)		(-0.56)	(-0.56)
British legal origin		0.001	0.001		0.0003	0.0001
		(0.39)	(0.25)		(0.18)	(0.08)
Latitude			0.001			0.001
			(0.27)			(0.21)
Land size			$0.27*10^9$			$0.14*10^9$
			(0.73)			(0.41)
Hausman test	5.97	5.30	-46.9	6.57	5.70	7.23
	p-value = 1.00	p-value = 1.00		p-value = 1.00	p-value = 1.00	p-value = 1.00
Groups	47	47	47	47	47	47
Observations	1121	1121	1121	1121	1121	1121

Note: Year dummies are not reported but are included in all estimations as independent variables. Numbers in parentheses are z-statistics. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. In column (3), the model fitted on these data failed to meet the asymptotic assumptions of the Hausman test and so a p-value could not be obtained.