The Level of Development and the Determinants of Productivity Growth: A Cross-Country Analysis

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ABSTRACT

We examine the effects of technology on productivity growth by disaggregating total output into sectoral components, exploring the roles of investment and technology on productivity growth for countries in different income groups. We find that for low-income countries, investment is the most important determinant of productivity growth. While investment plays an important role in determining productivity growth in middle-income countries, additional effects resulting from technological change also emerge. Investment ceases to have a significant effect on productivity growth in high-income countries.

KEYWORDS: productivity growth, investment, technical change, sectoral analysis

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I. Introduction

The growth accounting literature generally attributes output growth to three sources: increases in the factors of production (labor and capital), increasing returns to scale, and technical progress (see Lim 1996). In order to identify those sources, empirical work generally uses a Cobb-Douglas production function. The coefficients of labor and capital show the relative effects of the two factors of production, the sum of the coefficients reveal the returns to scale, and the effect of technological change emerges in the residual.

The existing evidence suggests that the contributions of those sources differ for developed and developing countries (Lim 1996 and Young 1996). The most important source of growth in developed countries is technological progress. The contribution of the factors of production, particularly capital, is less significant. Furthermore, the aggregate production function indicates constant returns to scale (Abramovitz 1956, Lim, 1996, Solow 1957). In most developing countries, however, capital accumulation is the most important factor explaining growth, followed by labor, with technical progress having an even smaller effect (Lim, 1996, Maddison 1970, Robinson 1971, Young 1996).

Our empirical investigation relies on the observation that different sectors of the economy probably possess different technologies, where some technologies possess higher productivity and faster productivity growth. The process of "industrialization" illustrates the idea.[i] If the manufacturing sector has, for example, higher productivity and faster productivity growth than the agricultural sector, then a shift of economic activity from the agricultural to the manufacturing sector implies faster economic growth for the aggregate economy, even if everything else is unchanged. Such changes in economic growth resulting from structural change are typically overlooked by the existing empirical growth accounting exercises (e.g., Barro 1991,

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[i] The development literature has a long tradition with the ideas of the "big-push" (e.g., Rosenstein-Rodan 1943) and the "take-off" (e.g., Rostow 1962) as important keys to a successful development process. The typical life-cycle of development begins with a largely agrarian economy that moves from an agriculture to manufacturing and then from manufacturing to services. Chenery, Robinson, and Syrquin (1986) and Dennison (1967) investigate these issues empirically.

Barro and Sala-i-Martin 1995, Islam 1995, Levine and Renelt 1992, Mankiw, Romer, and Weil 1992, and Young 1996).

Our alternative method examines the effects of technology on productivity growth by disaggregating total output into sectoral components. Maddison (1987) discusses the roles of sectoral composition and structural change on productivity growth. He argues that two basic forces influence the relationship between structural change and productivity growth as per-capita income increases. First, changes in product demand in response to changes in per-capita income affect economic growth. As income grows, manufactured and service goods replace primary good demand. Second, different levels of technological development across sectors affect economic growth, implying different levels of sectoral productivities. If productivity levels differ in various sectors, and if the share of different sectors in total production changes with increasing income, then overall productivity responds to these structural changes.

Cho (1994), one of few studies, examines the effects of structural change on productivity growth. Our study differs from Cho's in several respects. Cho considers the effect of industrialization on productivity growth; we examine the effects of differences in the levels and rates of growth in technologies in the agricultural, industrial, and service sectors on overall productivity growth. Cho estimates a cross-section of countries using averaged data over time, we use pooled cross-section, time-series data and we divide our sample into groups of countries based on the level of development -- low-, middle-, and high-income countries. Finally, Cho uses labor shares to measure industrialization; we use output shares.

We explore the roles of investment and technology on productivity growth for countries in different income groups. We find that for low-income countries, investment proves to be the most significant determinant of productivity growth. While investment plays an important role in determining productivity growth in middle-income countries, additional effects resulting from technological change also emerge. The levels of technology in the industrial (manufacturing) and service sectors exceed that in the agricultural sector. Thus, structural change resulting from income per-capita growth (i.e., increases in the share of the industrial and service sectors and decreases in the agricultural sector share) also increases productivity growth. Investment does not affect productivity growth in high-income countries. The level of technology in the industrial (manufacturing) sector leads the service sector, followed by the agricultural sector. But, in high-income countries, as the service-sector share expands and the industrial-sector share shrinks, overall productivity declines.[ii]

II. Model

The typical growth accounting method regresses the growth rate of real per capita GDP onto certain explanatory variables – investment to GDP, population growth, and so on – without an explicit theoretical model to justify the estimating equation. Levine and Renelt (1992) discover that few explanatory variables have a "robust" link to real per capita GDP growth; most effects are "fragile." Our estimating equation emerges from some simple production theory relationships.

We hypothesize an economy with three sectors – agriculture, manufacturing, and services. Each sector possesses its own Cobb-Douglas technology. Our goal is to derive an estimating equation that has the basic characteristics of the typical growth accounting regression, but that incorporates sectoral effects.

To begin, assume that total output (Y) is a geometric index of sectoral components as follows:

$$Y = Y_a^{\gamma_a} Y_m^{\gamma_m} Y_s^{\gamma_s} \tag{1}$$

where Y_i ($i = a, m,$ and s) measures the outputs produced in the agricultural, industrial (manufacturing), and service sectors, respectively.[iii] Also assume that each sector's output emerges from a Cobb-Douglas production technology given as follows:

[ii] The higher overall productivity in middle-income countries coupled with relatively lower productivity in high-income countries offers an alternative explanation for the convergence hypothesis (Cho 1994).

[iii] Note that $dlnY = \gamma_a\, dlnY_a + \gamma_m\, dlnY_m + \gamma_s\, dlnY_s$, or the rate of growth of output is the weighted sum of the rates of growth in each sector. Thus, the weights (γ_i's) should sum to one. As such and without any loss of generality, we define γ_i to be the output share (i.e., Y_i/Y).

$$Y_i = A_i e^{g_i t} K_i^{\alpha_i} L_i^{\beta_i}, \qquad i = a, m, s. \tag{2}$$

where A_i and g_i measure the level of, and growth rate in, technology in the *i-th* sector, respectively.

Now, assume that the aggregate production function also corresponds to a Cobb-Douglas technology as follows:

$$Y = A e^{gt} K_i^{\alpha} L_i^{\beta}, \tag{3}$$

Substituting equations (2) into eqauation (1), combining terms, and comparing to equation (3) produces the following additional implied relationships:

$$A = A_a^{\gamma_a} A_m^{\gamma_m} A_s^{\gamma_s}; \tag{4}$$

$$e^{gt} = e^{(\gamma_a g_a + \gamma_m g_m + \gamma_s g_s)t}; \tag{5}$$

$$K^{\alpha} = K_a^{\gamma_a \alpha_a} K_m^{\gamma_m \alpha_m} K_s^{\gamma_s \alpha_s}; \text{ and} \tag{6}$$

$$L^{\beta} = L_a^{\gamma_a \beta_a} L_m^{\gamma_m \beta_m} L_s^{\gamma_s \beta_s}. \tag{7}$$

Clearly, K and L are geometric indexes of (K_a, K_m, K_s) and (L_a, L_m, L_s), respectively. Moreover, if $\alpha_a = \alpha_m = \alpha_s = \alpha$ and $\beta_a = \beta_m = \beta_s = \beta$, then the indexes for K and L have the same form as the output index in equation (1).

Taking the logarithmic derivative of equation (3) yields the following:

$$dlnY = dlnA + (g + tdg) + \alpha\, dlnK + \beta dlnL, \tag{8}$$

since $dt = 1$. Also, the logarithmic derivative of equations (4) and (5) leads to the following:

$$dlnA = \Sigma d\gamma_i\, [lnA_i] \text{ and} \tag{9}$$

$$d(gt) = \Sigma g_i\, [\gamma_i + t\, d\gamma_i]. \tag{10}$$

Substituting equation (9) and (10) into equation (8) yields the following:

$$dlnY = \Sigma d\gamma_i\, [lnA_i] + \Sigma g_i\, [\gamma_i + t\, d\gamma_i] + \alpha\, dlnK + \beta dlnL. \tag{11}$$

We assume that the levels and the rates of growth of technology (A_i and g_i) within each sector and the aggregate factor shares (α, β) are constants over time, but that (A_i and g_i) differ between sectors at a point in time. Thus, the growth rate of total output depends on three effects -- the growth rates of the aggregate factors of production (i.e., K and L), the growth rate of sectoral technology (i.e., g_i), and the level of sectoral technology (lnA_i).

We already noted that the γ_is sum to one, since they are defined as output shares (i.e., Y_i/Y). Thus,

$$\Sigma\gamma_i = 1, \qquad \Sigma d\gamma_i = 0. \tag{12}$$

Only two of γ_i and of $d\gamma_i$ are independent. For example, suppose that we exclude the manufacturing sector where $\gamma_m = 1 - \gamma_a - \gamma_s$ and $d\gamma_m = - d\gamma_a - d\gamma_s$. The following relationships that are components of equation (11) hold

$$\Sigma d\gamma_i\, [lnA_i] = d\gamma_a\, [lnA_a - lnA_m] + d\gamma_s\, [lnA_s - lnA_m], \text{ and} \tag{13}$$

$$\Sigma g_i\, [\gamma_i + td\gamma_i\,] = g_m + [\gamma_a + td\gamma_a][g_a - g_m] + [\gamma_s + td\gamma_s][g_s - g_m]. \tag{14}$$

Thus, the rate of growth of output equals:

$$dlnY = g_m + d\gamma_a\, [lnA_a - lnA_m] + d\gamma_s\, [lnA_s - lnA_m] + [\gamma_a + td\gamma_a][g_a - g_m]$$
$$+ [\gamma_s + td\gamma_s][g_s - g_m] + \alpha\, dlnK + \beta dlnL. \tag{15}$$

Equation (15) forms the basis of our empirical model. We proxy the rate of growth of the capital stock by the investment share of gross domestic product (GDP) and the rate of growth of the labor force by the population growth rate.[iv] Subtracting the population growth rate from both sides of equation (15) converts the dependent variable into the rate of growth of real GDP per capita. For N countries with observations over T periods, we get the following empirical model:

$$y_{ct} = \alpha + \Sigma\, \beta_i\, d\gamma_{i,ct} + \Sigma\, \beta_j\, [\gamma_{j,ct} + td\gamma_{j.ct}] + \Theta\, I_{ct} + \Phi\, n_{ct} + u_{ct} \tag{16}$$
$$c = 1,\ldots,N;\ t = 1,\ldots,T;\ i,j = a,\ m,\ or\ m,\ s,\ or\ s,\ a,$$

where y_{ct} is the growth rate of real GDP per capita, I_{ct} is the investment share of GDP, n_{ct} is the population growth rate, and $\gamma_{j,ct}$ and $d\gamma_{j.ct}$ are the share and the change in share of sector j's output for country c in period t.

The typical equation estimated in the growth accounting literature exhibits some of the characteristics of equation (16). That is, the growth rate of real per capita GDP is regressed onto

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[iv] The first requires a constant capital-output ratio while the second requires a constant labor force participation rate.

the investment share of GDP, the population growth rate, the initial level of real per capita GDP, and so on (e.g., Levine and Renelt 1992 and Barro 1991). Our modeling strategy introduces variables to capture differences in the structure of economies across countries. Moreover, having derived the estimating equation from an index of aggregate output and sectoral production functions, we provide some theoretical rationale for using the investment share of GDP and the population growth rate as independent variables, albeit only proxies for more fundamental variables. Our modeling strategy does not lead naturally to the inclusion of the initial level of real per capita GDP as an independent variable.[v]

The standard method in empirical growth studies estimates equation (16) with ordinary least squares (OLS), which assumes that the omitted variables are independent of the regressors and are independently, identically distributed. The use of panel data, however, provides an approach to address this problem.

Suppose that country-specific or time-specific variables that are correlated with the included regressors are omitted. Then the fixed-effect model produces unbiased and consistent estimates of the coefficients. Without the adjustment, OLS produces biased and inconsistent estimates.[vi]

The fixed-effect model assumes that the differences across countries reflect parametric shifts in the regression function. Random-effect models treat the country-specific (e_c) and time specific (e_t) effects as random variables. Thus, the error term (u_{ct}) is assumed to have three random components, e_c, e_t, and e_t and a feasible GLS procedure is used to estimate the model. The random-effect model, however, also produces biased estimates if the omitted country-specific variables correlate with the included regressors.

We use different test statistics to compare the alternative specifications. An F-test judges the performance of the fixed-effect model against the OLS model (Greene 1990, p.484). A

[v] The initial level of real per capita GDP plays an important role in the tests for absolute and relative convergence (e.g., Barro and Sala-i-Martin 1995 and Mankiw, Romer, and Weil 1992)

[vi] Another method of excluding unobserved country specific variables estimates the first-differenced regression (see Hsiao, 1986, and Westbrook and Tybout, 1993).

Lagrange-Multiplier test due to Bruesch and Pagan (1980) assesses the random-effect model against the OLS model (Greene 1990, p. 491-92). Finally, a Wald criterion due to Hausman (1978) appraises the fixed-effect model against the random-effect model (Greene 1990, p.495).

III. Data Base and Estimation Results

We assemble data on 93 countries from Summers and Heston (1991) and the World Bank (1992). Data limitations restrict our sample to the 1976 to 1984 time period. The Appendix lists the countries by income groups. The identification of countries into high-, middle-, and low-income country groups uses the classification scheme reported in the *World Development Report,* World Bank (1983). Data on investment share of GDP (in percentages), real GDP per capita (USD, 1985 international prices, Laspeyres index), and population come from Summer and Heston (1991) and data on sectoral production (value added, constant prices) come from World Bank (1992). Sectoral shares (in decimals) were derived by dividing sectoral output by total output. Growth rates of real GDP per capita and population were approximated (in percentages) by taking the logarithmic differences and the change in sectoral shares (in decimals) were derived by taking differences of levels of shares.[vii]

We estimate the model for the three income groups -- low-, middle-, and high-income countries -- using OLS, fixed-effects, and random-effects estimation techniques. The OLS and random-effects estimates provide nearly identical findings. While the fixed-effects estimates frequently produce the same findings, occasionally the results differ from the OLS and random-effects findings. Based on the test statistics that compares the various estimating approaches, the preferred estimations employ OLS estimates for low- and high-income countries and fixed-

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[vii] The *agriculture* sector includes Agriculture, Forestry, Fishing, and Livestock; the *industrial* sector includes Construction, Mining and Quarrying, Manufacture, Gas, Electricity, and Water; and the *service* sector includes Distributive Trade, Transport, Finance, Business, and other Services, Public Administration and Defence. The residual is in the service sector. The IFS identifies these sectors by using 1-digit level of the United Nations International Standard Industrial Classification of all economic activities (ISIC).

effects estimates for the middle-income countries. We now discuss the findings for the three groups of countries.

Low-Income Countries: Table 1 shows that the different tests indicate that the OLS model dominates both the fixed- and random-effects models. The investment share of GDP affects productivity growth rates positively, while the population growth rate has a negative effect on productivity growth. Population growth is not only negatively related to productivity growth, but it also is neagtively realted to the growth rate of real GDP, since the coefficient of population growth exceeds one in absolute value (i.e., -1.8892). The level of technology (i.e., lnA_i) in the industrial sector significantly exceeds that in both the agricultural and service sectors. That is, a shift of production into the industrial sector from either the agricultural or service sector improves the rate of productivity growth. The growth rates in technology are similar in different sectors, since we do not have any significant effect on productivity growth as a result of sectoral shifts.

Middle-Income Countries: Table 2 shows that the fixed-effects model dominates the OLS and random-effects models. While the investment share of GDP still affects productivity growth rates significantly, the population growth rate no longer does. Furthermore, the level of technology in the industrial sector is significantly larger than that in the agricultural sector. So, when the industrial sector grows (or the agricultural sector shrinks), it affects the productivity growth positively. The growth in technology in the agricultural sector, however, is greater than that in the industrial sector. Given that the agricultural sector shrinks for middle-income countries, this dampens productivity growth.

We also find that the level of technology in the service sector is greater than that in the agricultural sector (not directly reported in the Tables). If the service sector share increases and that of the agricultural sector declines, then higher productivity growth emerges. Similarly, the growth rate of technology in the agricultural sector is greater than that in the service sector, and this dampens productivity growth when the agricultural sector shrinks. Note, however, that the coefficient of the level of technology is significantly larger than that of the growth in technology, implying that the overall effect of changes in sectoral shares is determined by the levels of technology.

High-Income Countries: Table 3 shows that the OLS model dominates the fixed- and random-effects models. Now the investment share no longer significantly affects productivity growth, while the population growth rate once again has a negative effect on productivity growth. Now, however, an increase in population growth does not lower the growth rate of real GDP, since the coefficient of population growth is less than one in absolute value (i.e., -0,3724). The industrial sector's level of technology once again exceeds that in the agricultural and service sectors. The effect of a shrinking agricultural sector share on productivity growth is positive. But, a smaller share of the industrial sector and an expanding service sector affects productivity growth negatively. Once again, no significant difference exists between the growth rates in technology in the different sectors, since we so not have any significant effect on productivity growth as a result of sectoral shifts.

IV. Conclusion

Our results generally match those found in the growth accounting literature. That is, investment is the most important determinant factor explaining productivity growth in low-income countries. The growth in technology has little effect on productivity growth in these countries. It is the case, however, that sectoral shifts can cause productivity growth as the level of technology in the industrial sector exceeds that in the agricultural and service sectors. In high-income countries, however, investment does not significantly affect productivity growth, and technology plays a more important role. Specifically, a higher level of technology in the industrial sector affects productivity growth. In addition, we find that for middle-income countries, both investment and technology play important roles in determining productivity growth, implying higher productivity.

The population growth rate affects productivity growth negatively both in low- and high-income countries, but does not significantly affect productivity growth in middle-income countries. The difference in those results between the low- and high-income countries is that population growth reduces both productivity growth and growth in real GDP in low-income countries, while in high-income countries, population growth does not reduce the growth of real GDP. That is, real GDP grows with population, but at a slower rate, at least for our sample of high-income countries.

Our results support convergence in technology for middle-income countries when sectors with lower levels of technology have higher growth rates in technology. Specifically, the agricultural sector technological level lags both the industrial and service sectors' levels. The growth in technology in the agricultural sector, however, exceeds the growth rates in these sectors. This is not true in high-income countries, where the level of technology in the industrial sector is higher than that in the agricultural and service sectors. The growth rates of technology in these latter sectors, however, are not significantly different from that in the former sector.

Our analysis also gives an explanation for the slow down of productivity growth in high-income countries. Expansion of the low-productivity service sector and the decrease in the share of the high-productivity industrial (manufacturing) sector pulls down overall productivity growth. For middle-income countries, overall productivity growth is higher as the high-productivity industrial sector expands and the low-productivity agricultural sector shrinks.

Finally, our analysis suggests different policy implications for countries with different levels of income to increase productivity growth. For low-income countries, productivity levels can be increased with more investment and a slower population growth rate. In middle-income countries, expanding the investment share and the high-productivity industrial sector increases productivity growth. In high-income countries, productivity growth can increase if the industrial sector share expands, or the level of technology in the expanding service sector is raised.

Appendix

The sample of countries used in this study is broken down into high-, middle-, and low-income countries based on the classification in the *World Development Report,* World Bank (1983) as follows:

Low-Income Countries: 31 Countries Bangladesh, Benin, Burkina Fasu, Burundi, Central African Republic, Chad, China, Ethiopia, Gambia, Ghana, Guinea-Bissau, Haiti, Honduras, India, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Niger, Nigeria, Pakistan, Senegal, Sierra Leone, Somalia, Sri Lanka, Sudan, Tanzania, Togo, and Zaire.

Middle-Income Countries: 45 Countries Algeria, Argentina, Barbados, Bolivia, Botswana, Brazil, Cameroon, Colombia, Congo, Costa Rica, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Greece, Guyana, Hungary, Indonesia, Iran, Jamaica, Republic of Korea, Malaysia, Mauritius, Mexico, Morocco, Nicaragua, Panama, Paraguay, Philippines, Singapore, South Africa, Suriname, Swaziland, Syria, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela, Yugoslavia, Zambia, and Zimbabwe.

High-Income Countries: 17 Countries Australia, Austria, Belgium, Canada, Denmark, Finland, West Germany, Iceland, Italy, Japan, Kuwait, Luxembourg, Norway, Saudi Arabia, Sweden, United Arab Emirates, and United States.

Table 1: Growth Regressions for Low-Income Countries (Excluding the Industrial Sector)

	OLS	Fixed	Random
Constant	-0.0160	--	-0.0131
	(-0.38)		(-0.31)
$d\gamma_a$	-0.6091‡	-0.1432	-0.5839‡
	(-1.75)	(-0.32)	(-1.66)
$d\gamma_s$	-0.6160‡‡	-0.0966	-0.5952‡‡
	(-1.58)	(-0.19)	(-1.52)
$\gamma_a + td\gamma_a$	0.0567	-0.0098	0.0542
	(1.17)	(-0.01)	(1.10)
$\gamma_s + td\gamma_s$	0.0655	-0.0178	0.0623
	(1.18)	(-0.22)	(1.10)
I	0.0012**	0.0020‡‡	0.0012**
	(2.04)	(1.50)	(1.98)
n	-1.8892*	-2.8933**	-1.9112*
	(-3.05)	(-2.56)	(-3.00)
F-Test	--	1.10	--
		(30,242)	
LM-Test	--	--	0.001
			(1)
W-Test	--	--	7.89
			(6)
SEE	0.0683	0.0679	0.072

NOTE: The dependent variable is the rate of growth of per capita real gross domestic product (GDP). Numbers in the parentheses under coefficient estimates are t-statistics. The degrees of freedom for the F-tests are given in the parentheses; they test the fixed-effect model against the null hypothesis of the ordinary least squares model. The Lagrange-multiplier (LM) tests are chi-squared distributions with degrees of freedom given in the parentheses; they test the random-effect against the ordinary least squares model, which is the null hypothesis. Finally, the Wald (W) tests are chi-squared distributions with degrees of freedom given in the parentheses; they test the fixed-effect against the random-effect model, which is the null hypothesis. Greene (1990, Chap. 16) provides the various test statistics and their interpretation. SEE is the standard error of the regression.

* means significant at the 1-percent level
** means significant at the 5-percent level
‡ means significant at the 10-percent level
‡‡ means significant at the 20-percent level

Table 2: Growth Regressions for Middle-Income Countries (Excluding the Industrial Sector)

	OLS	Fixed	Random
Constant	-0.0909*	--	-0.1101*
	(-3.27)		(-3.27)
$d\gamma_a$	-2.4219*	-2.2933*	-2.3570*
	(-7.41)	(-4.89)	(-6.54)
$d\gamma_s$	-1.1126*	-0.2762	-0.9534**
	(-3.54)	(-0.58)	(-2.74)
$\gamma_a + td\gamma_a$	0.0770‡	0.1596**	0.1076**
	(1.86)	(2.22)	(2.16)
$\gamma_s + td\gamma_s$	0.0746‡	-0.0605	0.0564
	(1.93)	(-0.81)	(1.18)
I	0.0024*	0.0069*	0.0033*
	(5.81)	(7.95)	(6.43)
n	0.0428	0.7588	0.2360
	(0.13)	(0.98)	(0.55)
F-Test	--	2.32*	--
		(44,354)	
LM-Test	--	--	2.00
			(1)
W-Test	--	--	41.36*
			(6)
SEE	0.0638	0.0596	0.0645

NOTE: See Table 1.

* means significant at the 1-percent level
** means significant at the 5-percent level
‡ means significant at the 10-percent level
‡‡ means significant at the 20-percent level

Table 3: Growth Regressions for High-Income Countries (Excluding the Industrial Sector)

	OLS	Fixed	Random
Constant	0.0360	--	0.0379
	(1.06)		(1.08)
$d\gamma_a$	-3.2357**	-2.8548‡‡	-3.2363**
	(-2.91)	(-1.37)	(-2.89)
$d\gamma_s$	-1.5025*	-0.7806‡‡	-1.4935*
	(-4.20)	(-1.38)	(-4.13)
$\gamma_a + td\gamma_a$	0.1505	0.1501	0.1516
	(1.28)	(0.47)	(1.27)
$\gamma_s + td\gamma_s$	-0.0138	-0.1090‡‡	-0.0147
	(-0.28)	(-1.34)	(-0.29)
I	-0.0043	-0.0089	-0.0045
	(-0.64)	(-0.68)	(-0.65)
n	-0.3724‡	0.1394	-0.3708‡
	(-1.72)	(0.39)	(-1.70)
F-Test	--	1.06	--
		(16,130)	
LM-Test	--	--	1.69
			(1)
W-Test	--	--	10.04
			(6)
SEE	0.0423	0.0422	0.045

NOTE: See Table 1.

* means significant at the 1-percent level
** means significant at the 5-percent level
‡ means significant at the 10-percent level
‡‡ means significant at the 20-percent level

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