Appendix

A.1 Agricultural goods and countries

A.1.1 Classification of goods: A, M and E

Table A.1 lists the products considered in this work as A1, A2, A3 and E respectively. The categorization is based in the SITCRev2 classification. The set of Mi comprises all products not included in Ai or E $\forall i = 1, 2, 3$. Using this classification yields 308, 351, 401 and 158 different products in categories A1, A2, A3 and E, respectively out of a total of 1239 four-digit goods in SITCRev2. In the SITCRev1 five-digit classification, the same figures are 375 (A1), 461 (A2), 669 (A3) and 206 (E) over a total of 1659. In the HS0 six-digit classification, these figures are 833 (A1), 1183 (A2), 1983 (A3), 1032 (E) and 5038 (total).

A.1.2 Characterization of A-countries

The characterization of A-countries is complemented by evaluating which variables are correlated with countries that end the analysis period as large exporters of agricultural products. Table A.2 presents results of Probit regressions where the main dependent variable is an indicator for countries exporting more than $j\%$ of their exports in Ak products in the year 2000. Columns (1)-(3) present results for $k = 1$, while columns (4)-(6) do so for $k = 2$ and (7)-(9) for $k = 3$. Within each set of results, the first column sets the export threshold at 30 percent, the second at 40 percent, and the third at 50 percent. The explanatory variables are measured in 1965 and include different measures of the degree of comparative advantage in the production of agricultural products (the export intensity in Ak, size and share of arable land as a total country's territory) and other variables that could potentially be relevant for comparative advantage to change over time (degree of trade openness, per capita GDP, population density, size of government expenditure). Overall, the results show that the strongest predictor of remaining a large agricultural

Table A.1: List of Ak and E-goods ($\forall k = 1, 2, 3$) in SITCRev2 (four-digits)

SITCRev2 Code	**Description**	**A1**	**A2**	**A3**	**E**
0011-0XXX	Food and live animals chiefly for food	X	X	X	
1110-1XXX	Beverages and tobacco	X	X	X	
2111-2320	Hides, skins and furskins, raw; Oil-seeds and oleaginous fruit; Natural rubber Cork and wood; Pulp and waste paper; Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric)	X	X	X	
2331-23XX	Synthetic or reclaimed rubber, waste and scrap of unhardened rubber.				X
2440-271X	Cork and wood; Pulp and waste paper; Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric); Fertilizers, crude	X	X	X	
2731-28XX	Stone, sand and gravel; Sulphur and unroasted iron pyrites; Natural abrasives, N.E.S. (including industrial diamonds); Other crude minerals; Metalliferous ores and metal scrap				X
2911-29XX	Crude animal and vegetable materials, N.E.S.	X	X	X	
3221-3XXX	Mineral fuels, lubricants and related materials				X
4111-4XXX	Animal and vegetable oils, fats and waxes	X	X	X	
5111-51XX	Organic Chemicals		X	X	
5221-52XX	Inorganic chemicals				X
5311-55XX	Dyeing, tanning and colouring materials; Medicinal and pharmaceutical products; Essential oils and perfume materials; Toilet, polishing and cleansing preparations				
5621-56XX	Fertilizers, manufactured		X	X	
5721-5XXX	Explosives and pyrotechnic products; Artificial resins and plastic materials, and cellulose esters and ethers; Chemical materials and products N.E.S.				
6112-61XX	Leather, leather manufactures, N.E.S., and dressed furskins			X	
6210-62XX	Rubber manufactures, N.E.S.				
6330-64XX	Cork and wood manufactures (excluding furniture); Paper, paperboard and articles of paper pulp, of paper or of paperboard			X	
6511-65XX	Textile yarn, fabrics, made-up articles, N.E.S. , and related products				
6611-661X	Lime, cement and fabricated construction materials (except glass and clay materials)				X
6623-666X	Clay construction materials and refractory construction materials; Mineral manufactures N.E.S; Glass; Glassware; Pottery				
6671-672X	Pearls, precious and semi-precious stones, unworked and worked; Pig iron, spiegeleisen, sponge iron, iron or steel powders and shot, and ferro-alloys; Ingots and other primary forms of iron and steel				X
6731-67XX	Iron and steel bars, rods, angles, shapes and sections; Universal plates and sheets of iron and steel; Hoops and strip of iron or steel, hot-rolled or cold-rolled; Rails and railway track construction materials of iron or steel; Wires, tube pipes and fittings of iron or steel.				
6811-68XX	Non-ferrous metals				X
6911-7XXX	Manufactures of metal N.E.S; Machinery and transport equipment				
8121-8XXX	Miscellaneous manufactured articles				
9110-9XXX	Commodities and transactions not classified elsewhere in the SITC				

exporter is the initial intensity of such exports. The size and share of arable land do not show a significant correlation. The size and share of arable land do not show a significant correlation. Population density has a negative effect in most specifications, which can be interpreted as reflecting pressures toward industrialization. A similar conclusion can be drawn regarding the degree of trade openness: more open economies tend to decrease the intensity of their agricultural exports over this period. Finally, the initial income level and government size do not appear to play a significant role.

Table A.2: Characterizing A-countries

Dependant variable:	Dummy for exporting A$k > j$% in 2000								
$[k, j] =$	$[1, 30]$	$[1, 40]$	$[1, 50]$	$[2, 30]$	$[2, 40]$	$[2, 50]$	$[3, 30]$	$[3, 40]$	$[3, 50]$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
exports in A1 (%)	2.287***	3.212**	1.750*						
	(0.005)	(0.021)	(0.088)						
exports in A2 (%)				2.265***	3.180**	1.726*			
				(0.004)	(0.013)	(0.094)			
exports in A3 (%)							1.238*	2.614***	1.605
							(0.061)	(0.007)	(0.121)
Trade openness	-0.012*	-0.005	-0.006	-0.013*	-0.006	-0.006	-0.013**	-0.006	-0.006
	(0.079)	(0.450)	(0.537)	(0.054)	(0.403)	(0.539)	(0.045)	(0.374)	(0.555)
Pop. density	-0.009*	-0.013**	-0.007	-0.010**	-0.010*	-0.007	-0.009**	-0.013**	-0.007
	(0.079)	(0.031)	(0.208)	(0.040)	(0.089)	(0.205)	(0.023)	(0.026)	(0.188)
arable land (% of land)	0.004	0.030*	0.019	0.014	0.015	0.019	0.005	0.015	0.019
	(0.817)	(0.088)	(0.295)	(0.398)	(0.414)	(0.298)	(0.756)	(0.405)	(0.284)
arable land (total)	-0.000*	-0.000*	-0.000	-0.000*	-0.000	-0.000	-0.000*	-0.000	-0.000
	(0.099)	(0.098)	(0.455)	(0.058)	(0.336)	(0.454)	(0.082)	(0.205)	(0.448)
GDPpc (logs)	-0.249	-0.027	-0.311	-0.214	-0.058	-0.317	-0.341*	-0.174	-0.337
	(0.181)	(0.905)	(0.170)	(0.242)	(0.788)	(0.160)	(0.055)	(0.396)	(0.124)
Gov. expenditure	0.009	-0.030	0.011	0.011	-0.021	0.011	-0.016	-0.051	0.008
	(0.838)	(0.508)	(0.758)	(0.801)	(0.625)	(0.769)	(0.671)	(0.252)	(0.829)
Constant	0.773	-2.038	0.100	0.611	-1.897	0.167	2.747	0.061	0.416
	(0.695)	(0.445)	(0.966)	(0.753)	(0.443)	(0.943)	(0.133)	(0.978)	(0.855)
Obs.	83	83	83	83	83	83	83	83	83
Pseudo-R^2	0.332	0.355	0.213	0.335	0.313	0.211	0.282	0.331	0.204

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. GDPpc (in logs) extracted from PWT, the rest of the controls are from WDI2015.

A.1.3 Proximity by sector

This section presents summary statistics by sector using the technological proximity index presented in Hidalgo et al. (2007). The index is constructed using export data and defines technological proximity between goods a and b as the minimum of: (i) the probability that a given country exports good a conditional on exporting b, and (ii) the probability that it exports b conditional on exporting a. Table 4, presents the average proximity between any product and all other products within its industry. It is possible to see that for any list of A-goods the average proximity is smaller for goods in sector A than in M, interpreted here as evidence supporting a higher diversification cost in that industry ($a_A > a_M$). Table A.3 reports the technological proximity between the representative good belonging to industry $k = A, M$ and all other goods in the product space, and shows that the average proximity within A is lower than the average within M, suggesting that diversification is harder in the agricultural sector.

Table A.3: Proximity across all goods

k	Ak			Mk		
	mean	sd	Obs.	mean	sd	Obs.
1	0.143	0.047	195	0.184	0.045	489
2	0.147	0.048	222	0.184	0.044	462
3	0.158	0.051	312	0.184	0.044	372

Notes: Proximity between goods as reported by Hidalgo et al. (2007). For each good, the average proximity with all other goods is computed. The average for the sector is reported. Each row $k = 1, 2, 3$ uses industry definitions Ak and Mk, as listed in Table A.1.

A.2 Uneven diversification, robustness

Table A.4 presents similar results to those in Table 1, but using export data at four and five digits. Results at six-digits are also included as reference. The table shows that the finding $g_A < g_M$ is robust to different levels of aggregation and becomes more statistically significant when more disaggregated data are used.

Table A.4: Differences in diversification rates (export data)

	4-digits			5-digits			6-digits		
$gMk = gAk$	$k = 1$	$k = 2$	$k = 3$	$k = 1$	$k = 2$	$k = 3$	$k = 1$	$k = 2$	$k = 3$
mean(gM)	0.577	0.568	0.547	0.379	0.362	0.368	0.766	0.770	0.754
sd(gM)	5.602	5.477	4.933	1.013	0.981	0.998	1.264	1.281	1.218
mean(gA)	0.149	0.172	0.205	0.162	0.192	0.198	0.375	0.393	0.428
sd(gA)	1.658	1.721	1.995	0.516	0.551	0.559	0.806	0.759	0.812
Obs.	558	559	559	4,679	4,674	4,658	219	219	217
$Ha : gM < gA$	0.993	0.991	0.995	1.000	1.000	1.000	1.000	1.000	1.000
$Ha : gM \neq gA$	0.015	0.019	0.011	0.000	0.000	0.000	0.000	0.000	0.000
$Ha : gM > gA$	0.007	0.009	0.005	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Each column presents the result of a mean-comparison t-test, where the null hypothesis is $g_{Mk} = g_{Ak}$ for $k = 1, 2, 3$ as listed in Table A.1. The first three columns report results for diversification rates computed for 10-year periods starting at 1962, 1972, 1982 and 1990 using four-digit trade flows data from Feenstra et al. (2005). The three middle columns report results using 10-year periods starting every year of the period 1962-2004, five-digit data from COMTRADE. The last three columns uses 13-year diversification rates for a single year starting in 1995, six-digit data from BACI92. The first and third row give the mean of g_{Mi} and g_{Ai} respectively, while the second and fourth provide the respective standard deviation. The last three rows show the p-value of a t-test for different alternative hypothesis.

Table A.5 presents similar results to those in Table 1 counting varieties (i.e., product-origin pairs) instead of products. It therefore measures the change in the number of varieties available at the world level. Again, a significant difference in diversification rates is observed across broad industries. Given that this exercise provides only one observation per period and industry, results at higher disaggregation levels are not presented, as the small number of resulting observations prevents meaningful statistical tests.

Finally, Table A.6 replicates the results presented in Table 2, at different aggregation levels. Once again, differences between g_A and g_M prove robust to the level of disaggregation used.

To better illustrate what the exercise in Tables 2 and A.6 aims at showing, consider the following example. Let us assume that the classification design is such that, at its

Table A.5: Differences in diversification rates (varieties)

	4-digits		
	$gM1 = gA1$	$gM2 = gA2$	$gM3 = gA3$
mean(gM)	0.026	0.023	0.028
sd(gM)	0.560	0.558	0.564
mean(gA)	-0.158	-0.139	-0.123
sd(gA)	0.441	0.450	0.460
Obs.	44	44	44
$Ha : gM < gA$	1.000	1.000	1.000
$Ha : gM \neq gA$	0.000	0.000	0.000
$Ha : gM > gA$	0.000	0.000	0.000

Notes: Each column presents the result of a mean-comparison t-test, where the null hypothesis is $g_{Mk} = g_{Ak}$ for $k = 1, 2, 3$. The first and third row give the mean of g_{Mk} and g_{Ak} respectively, while the second and fourth provide the respective standard deviation. The last three rows show the p-value of a t-test where the alternative hypothesis are $g_{Mk} < g_{Ak}$, $g_{Mk} \neq g_{Ak}$ and $g_{Mk} > g_{Ak}$ respectively.

Table A.6: Differences in diversification rates (within two-digits)

	4-digits			5-digits			6-digits		
$gMk = gAk$	$k = 1$	$k = 2$	$k = 3$	$k = 1$	$k = 2$	$k = 3$	$k = 1$	$k = 2$	$k = 3$
mean(gM)	0.371	0.376	0.375	0.625	0.608	0.622	1.302	1.310	1.352
sd(gM)	0.936	1.051	1.045	1.553	1.521	1.593	2.651	2.653	2.611
mean(gA)	0.197	0.210	0.229	0.313	0.354	0.393	1.021	1.052	1.080
sd(gA)	0.570	0.595	0.631	0.666	0.791	0.872	1.917	1.949	2.220
Obs.	562	562	561	491	490	489	876	879	884
$Ha : gM < gA$	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$Ha : gM \neq gA$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$Ha : gM > gA$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Each column presents the result of a mean-comparison t-test, where the null hypothesis is $g_{Mk} = g_{Ak}$ for $k = 1, 2, 3$ as listed in Table A.1. The first three columns report results for diversification rates computed for 10-year periods starting at 1962, 1972, 1982 and 1990 using four-digit trade flows data from Feenstra et al. (2005). The three middle columns report results using 10-year periods starting every year of the period 1962-2004, five-digit data from COMTRADE. The last three columns uses 13-year diversification rates for a single year starting in 1995, six-digit data from BACI92. The reported diversification rate in each sector (A and M) is the simple average of diversification rates computed within every two-digit line belonging to that sector. The first and third row give the mean of g_{Mk} and g_{Ak} respectively, while the second and fourth provide the respective standard deviation. The last three rows show the p-value of a t-test for different alternative hypothesis.

lowest level of aggregation, bins are more disaggregated in M than in A. Figure A.1 illustrates such situation. The figure showcases three 2-digit codes within each industry: codes 11, 12 and 13 within agriculture and codes 63, 64 and 65 within manufactures. Notice that at four-digits, each of these sub-industries allows for more codes in M. In particular, two-digit codes 11, 12 and 13 are subdivided into only 2 bins each, while two-digit codes 63, 64 and 65 consist of four bins each.

Figure A.1: Balanced product creation and unbalanced classification design

	A												M											
2d	11				12				13				63				64				65			
4d																								
t	X		X			X			X				X		X			X			X			
t+dt	X	X	X	X		X	X	X	X				X	X	X	X		X	X	X	X			

Assume that production of a certain good at moment t is represented by an "X" in the fourth row of the diagram. At moment $t + dt$ there is product creation such that product scope is reflected by the X's in the fifth row. The real growth rates of product diversification should be $g_A = g_M = 1$ since in both industries the number of products at t equals 4 and at $t+dt$ is 8. But, given the way the classification is designed at four-digits, part of product creation within A is missed. Notice for example that two products are created within industry 11, but the codes there are broad and were already occupied at t, so counting occupied codes misses this creation entirely. If we compute the growth rates counting four-digit codes we would obtain $g_A = 1/4$ and $g_M = 1$. As is clear, this situation reflects the possibility of obtaining the result $g_A < g_M$ due entirely to how the classification is constructed.

The same setup highlights how the exercise proposed in Tables 2 and A.6 can identify this threat in the data. Consider the alternative way of computing growth rates, used in these tables: for each two-digit industry, we compute its diversification rate, and then we proceed to compute the simple average of all two-digit industries belonging to industry $i = A, M$ to obtain the growth rate of that entire industry. Following this procedure, we obtain $g_A = (0/2 + 1/1 + 0/1)/3 = 1/3$ and $g_M = (2/2 + 2/1 + 0/1)/3 = 1$. As can be seen the value of g_A computed under this procedure (1/3) is closer to the real value (1) than the one computed under the traditional procedure (1/4). This is because the alternative way of computing growth rates tends to reduce the weight of artificial zero-growth measures when they occur in a subset of two-digit industries. In terms of our example, the measured zero growth in sub-industry 11 carries lower weight in the alternative way of computing growth rates.

In the presence of a downward bias stemming purely from classification design, and affecting more g_A than g_M, we expect that the value for g_A computed following the alternative procedure (in tables 2 and A.6) should be significantly larger than the one found using the standard procedure (in tables 1 and A.4), while we expect the value of g_M not to change as much, closing the gap between g_A and g_M. Inspection of these tables does not corroborate this conjecture, especially at four and five digits. While we cannot entirely rule out the possibility of some bias stemming from classification design, the evidence above suggests that our finding that $g_A < g_M$ is not mainly driven by such bias.

A.3 Stability

A.3.1 Stability Condition

With values of E_c, v_i and n_i given by history ($\forall c = N, S$ and $i = A, M$), equation (6) gives w_i, which implies p_i is known and therefore the value of α is also known. Firms are able to compute their profits which amount to $\pi_M(t) = (1-\alpha)(E_S+1)/(\sigma n_M(t))$ and $\pi_A(t) = (\alpha(E_S+1))/(\sigma n_A(t))$. Then, the full solution of the model can be expressed in terms of known variables π_i and v_i. The non-arbitrage condition can be rewritten as:

$$g_{v,i} = r_i - \frac{\pi_i}{v_i} \tag{A.1}$$

Using (6) and (8) gives an expression for the diversification rate in each sector:

$$g_i = \frac{L_c}{a_i} - (\sigma - 1)\frac{\pi_i}{v_i} \tag{A.2}$$

where $c = S$ if $i = A$ and $c = N$ if $i = M$. The above solution allows the ratio π_i/v_i to be time variant. In fact, for the North, where $r_N = \rho$ given the choice for the numeraire, it is possible to find that:

$$g_{\left[\frac{\pi}{v}\right]_M} = -g_M - g_{v,M} = \frac{\pi_M}{v_M} - g_M - \rho$$

According to this equation, the ratio π_M/v_M can only be constant if

$$g_M = -g_{v,M} = \frac{\pi_M}{v_M} - \rho$$

A similar condition can be derived for the South:

$$g_{\left[\frac{\pi}{v}\right]_A} = \frac{g_\alpha}{1-\alpha} - g_A - g_{v,A}$$

Hence, the ratio π_A/v_A remains constant only if

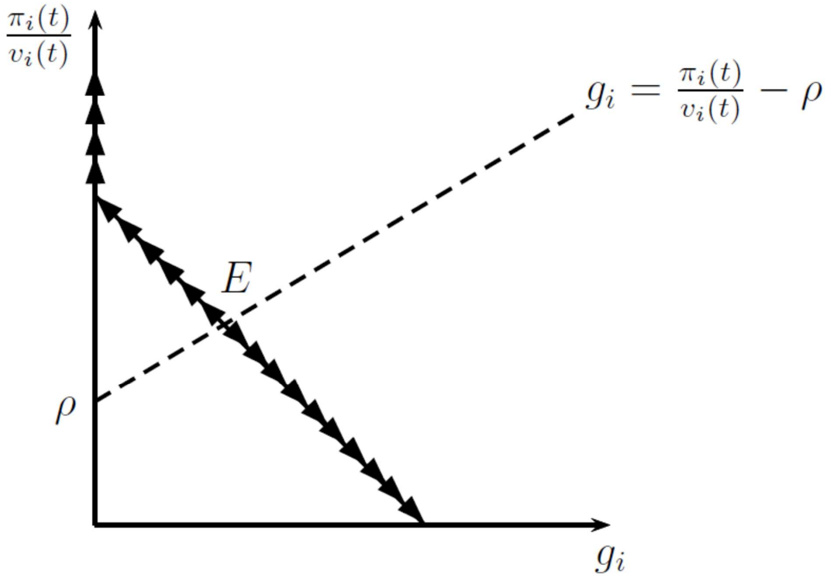
$$g_A = \frac{g_\alpha}{1-\alpha} - g_{v,A} = \frac{g_\alpha}{1-\alpha} - r_S + \frac{\pi_A}{v_A} = \frac{\pi_A}{v_A} - \rho$$

where the last equality follows by using the Euler equation for expenditure and (13). Notice the same result would follow in the case in which α is a parameter. Then the ratio π_i/v_i is constant if

$$g_i = \frac{\pi_i}{v_i} - \rho \tag{A.3}$$

The equilibrium for both economies can therefore be represented in Figure A.2. The full line represents equation (A.2), which must hold in equilibrium. The dashed line in the figure represents the locus of points for which condition (A.3) holds. Arrows show the dynamics that the system follows. Notice that for a given value of π_i/v_i, if $g_i > \pi_i/v_i - \rho$ then π_i/v_i falls until it reaches zero, an infeasible outcome, since it implies that all resources in the economy go to the development of new products (R&D), but no final goods are being produced. Conversely, if $g_i < \pi_i/v_i - \rho$ then π_i/v_i grows until $g_i = 0$. Theoretically nothing prevents diversification rates to be zero. If such situation is reached then (A.2) no longer holds and is replaced by $g_i = 0$. Then, as depicted in the figure, the ratio π_i/v_i is free to continue growing indefinitely. This possibility is disregarded as

Figure A.2: Stability in the equilibrium of the model



is not supported by the empirical evidence presented in this paper.

As a result, stability in this version of the model requires that the economy starts at the intersection of both lines and stays there, meaning the condition in (A.3) must hold.

A.3.2 Allowing S to follow an unstable trajectory

This section shows that the main results of the model also hold when S follows an unstable path. Again, the stability condition in (11) is imposed to N, so the northern economy plays the role of the stable anchor in this model. The full solution for N is exactly the same as one where α is exogenous: diversification rate in M is constant and equals that in (12), firm profits and value are reduced by exactly that rate and wages and the return rate are constant.

For the S, the fact that the stability condition is not imposed in S, implies that the ratio π_A/v_A is not constant and can follow a divergent trajectory. The value of any firm in sector A (v_A) depends positively on both r_S and π_A. While it was established that profits in A are decreasing over time, the time-path of v_A is also determined by how the return rate evolves over time, a path that is not determined in the model when the stability condition is not present. Indeed, notice that the ratio π_A/v_A can rise or fall, depending on the velocity with which firms' profit in that sector fall and the value of individual's discount factor.

The time path of the value of firms in A determines that of wages in S since, by the free-entry condition, $g_{wS} = g_A + g_{vA}$. The condition for wages in S to follow a decreasing trajectory is:

$$\begin{aligned} &\frac{\pi_A(t)}{v_A(t)}\left[1+\frac{\sigma_A}{H}\right] > Z \quad \text{if} \quad \frac{H}{1+H} > 0 \\ &\frac{\pi_A(t)}{v_A(t)}\left[1+\frac{\sigma_A}{H}\right] < Z \quad \text{if} \quad \frac{H}{1+H} < 0 \end{aligned} \tag{A.4}$$

with

$$Z = \frac{L_S}{a_A}\left[\frac{2-\sigma_A}{\sigma_A - 1} + \frac{1+H}{H}\right] - \frac{L_N}{a_M}\left[\frac{2-\sigma_M}{\sigma_M - 1}\right] - (\sigma_M - 1)\frac{\pi_M}{v_M} + \frac{\rho(1+H)}{H}.$$

Wages in S rise if the previous condition is not met. Notice that, depending on the time path followed by the ratio $\pi_A(t)/v_A(t)$, an outcome in which the condition is met at some point in time, and not in another, can arise.

With aggregate profits falling in S, decreasing wages represent a sufficient condition for falling income in that region. Notice that both variables are constant in N. The following result summarizes the findings regarding income divergence in this version of the model and replaces Result 1 in the main text:

RESULT A.1 *The model can reproduce income divergence. Relative aggregate profits unequivocally fall in S and the same is true with wages if condition (A.4) is met. Otherwise, wages in S grow. Income divergence follows only if the fall in profits is large enough to compensate for rising wages.*

Finally, a condition for terms of trade in S to be decreasing over time can be established. Notice that equation (4) establishes that the only determinant for changes in relative prices are changes in relative wages. Since wages are constant in N the price of products created there are also time invariant. The price of final production in S evolves following wages in that region, and according to the previous result, they can fall when condition (A.4) is met. It is clear that the very requirement for wage divergence is also a necessary and sufficient condition for terms of trade to deteriorate for the South. Result 2 can be replaced by:

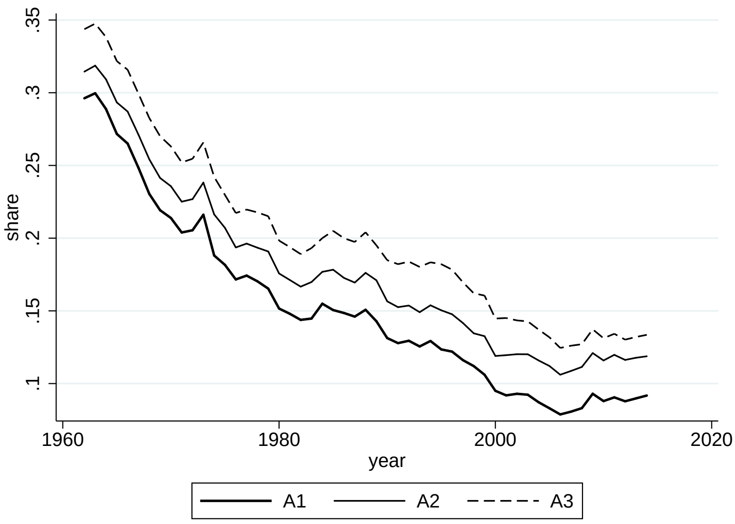
RESULT A.2 *Terms of trade can either improve or deteriorate for S. They deteriorate if wages in S fall over time, i.e., condition (A.4) is met. They improve if the opposite happens.*

Notice that a situation of terms of trade falling in S also corresponds to the case where aggregate income in S falls relative to N, since it has been already established that aggregate profits fall in S. Result A.2 shows that relative prices can improve or deteriorate for the A-sector depending on the relative speed of change in endogenous variables.

A.4 Declining share of *A*-products in world trade

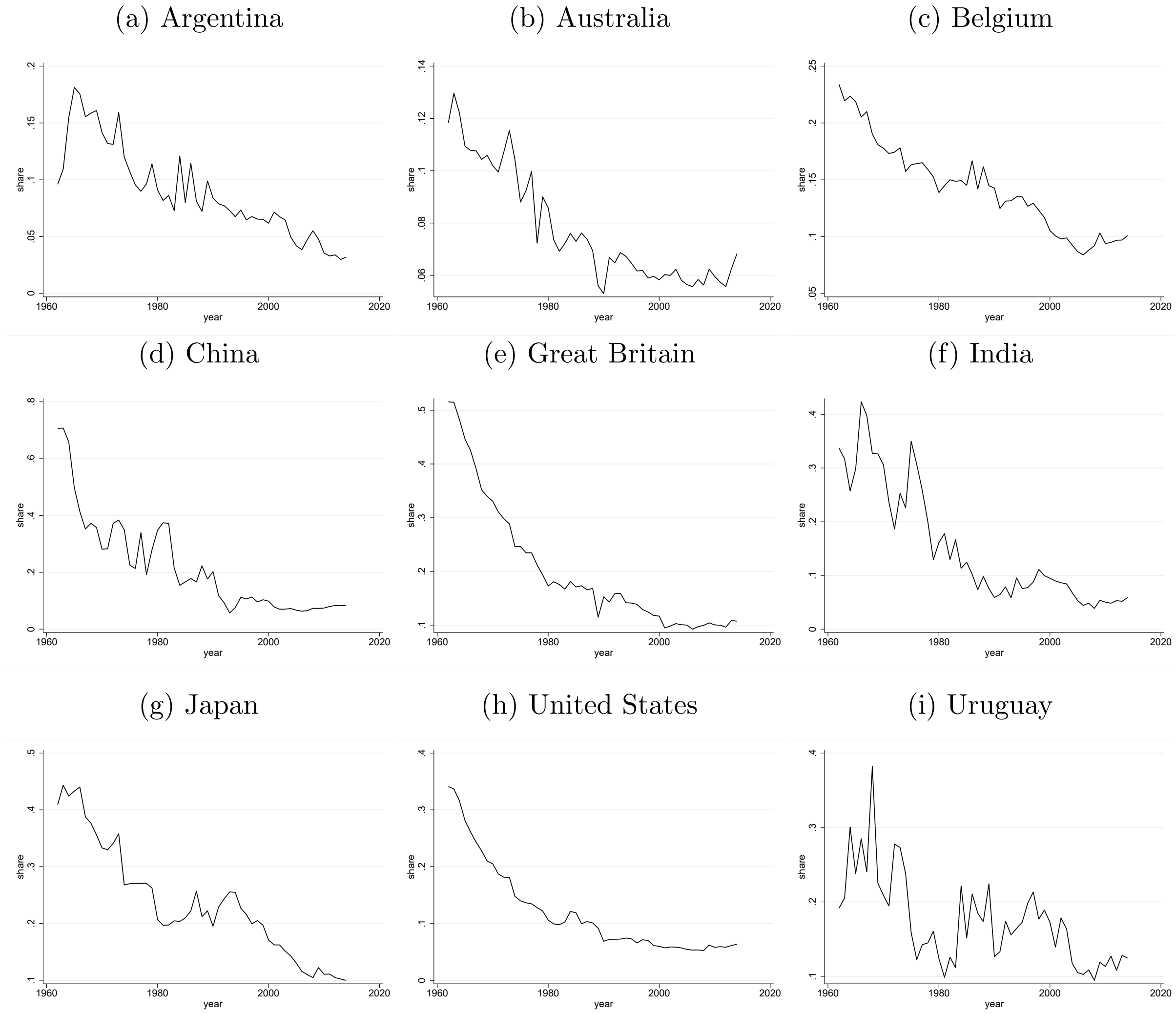
As a part of the ongoing process of globalization, international trade has been on the rise. However, these trends differ across broad industries. In particular, the importance of land-intensive products in global trade has been declining at least for the last fifty years. Figure A.3 shows the share of A-goods in worldwide exports using all three groups (A1, A2 and A3). The declining share reflects the faster growth of trade in M-products compared to A and E goods.

Figure A.3: Value share of agriculture in worldwide trade (1962-2015)



Notes: Value share of world trade in Ak-goods with $k = 1, 2, 3$ as per Table A.1. Computed using 4-digit trade flows data from Feenstra et al. (2005).

Figure A.4: Share of agriculture in imports for a sample of countries (1962-2015)



Notes: Share computed following narrower definition of agricultural goods ($A1$ in Table A.1. Computed using 4-digit trade flows data from Feenstra et al. (2005).

Figure A.4 shows a similar picture for imports of a sample of countries (including some of the largest economies in the world) reflecting how the same phenomenon can be found at the country level for economies with very different characteristics, i.e., large and small, rich and poor, industrialized and specialized in agricultural goods. Overall, it is hard to find cases where a clear negative trend absent. A very notable case is that of China. As explained above, the rising importance of China in world trade after 2000 has increased the supply of manufactures in world markets while, at the same time, has boosted the demand of primary products. The graph suggests that, since the value of A-imports tends to fall even in China, the apparent good news for primary producers over the past decade and a half may represent only a level effect, which might not persist in the future. In terms of Figure A.3, the incursion of China in world markets may explain why the sharp negative trend in the share of A-goods in total trade saw a softening after 2000, but there is nothing preventing the previous trend from resuming in the years to come.

While the above trend could be partially driven by increasing fragmentation in the production of M-products, data on value-added exports (available since 1992) show that changes in the share of value added in total exports for each sector are not large enough to reverse the trends shown above (see for example Francois et al., 2015).

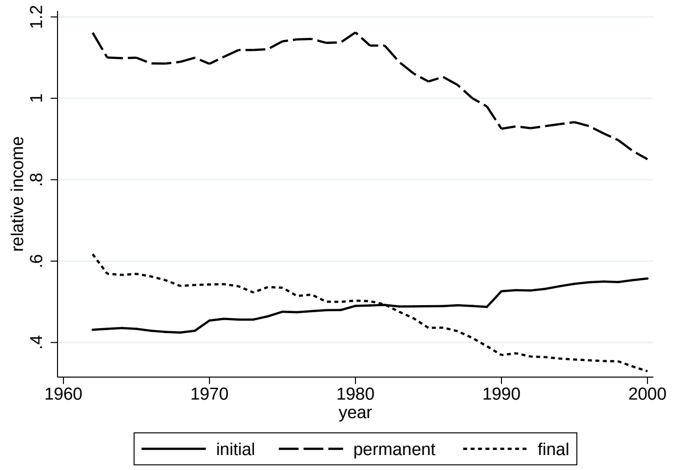
A.5 Agricultural economies are outgrown by the rest

In this section, we analyze the growth path followed by A-countries during the period 1962-2000.[33] A-countries are defined by using two sets of dummy variables: variable Ak_j identifies countries where Ak-goods account for at least $j\%$ of total exports for more than 30 years within the analyzed period, while Ak_j_end equals one when the share of Ak-goods exported by an economy is above $j\%$ at the end of the period (with $k = 1, 2, 3$ and $j = 30, 40, 50$). The list of A-countries can vary greatly depending on the criteria used: the list can range from 54 countries when $A3\_30 = 1$ to 15 when $A1\_50end = 1$. Finally, to identify countries that were major exporters of agricultural products at the beginning of the period, we set $Ak\_j\_ini = 1$ when the share of Ak-goods exported exceed $j\%$ at each country's initial year. This list can include up to 131 countries (when $A3\_30ini = 1$).

Figure A.5 shows the per capita income (in constant prices) of A-countries relative to world average. Real income of agricultural exporters is represented by the dotted and dashed lines, the former considering countries that were large exporters of agricultural products at the end of the period ($A1\_30end = 1$) and the latter including a sample of countries that exported agricultural products to a large extent for a long period of time ($A1\_30 = 1$). The full line includes countries that were agricultural exporters only at the beginning of the period ($A1\_30ini = 1$).

[33] See Section A.7 for a discussion on the time period.

Figure A.5: Evolution of per capita real income in agricultural countries relative to the rest



Notes: Agricultural countries defined according to narrower definition ($A1$ as per Table A.1). GDP per capita relative to sample average. The full line (*initial*) shows the evolution of relative per capita GDP of countries for which the proportion of A1-exports was above 30 percent at the initial year ($A1\_30ini = 1$). The dashed line (*permanent*) shows the same for countries for which exports in A1 where above the same threshold for 30 years or more ($A1\_30 = 1$). The dotted line (*final*) group those economies for which the same threshold is surpassed at the end of the period ($A1\_30end = 1$).

This figure clearly shows that exporting a large share of A-goods at some point in time does not necessarily prevent future income convergence. Notice that the bold line depicting the relative income of countries with initial specialization in A-goods exhibits an upward trend consistent with a reduction in the income gap between this set of countries and the world average. Nevertheless the figure also shows that remaining specialized in A-goods over the period is positively correlated with lower growth: there is a clear divergent trend in per capita income for exporters of A-goods across most years of the sample, particularly for those that ended the period as heavy exporters of such products. This result is robust to changing the variables used to define A-countries (similar pictures arise $\forall k = 1, 2, 3$ and $\forall j = 30, 40, 50$) and also to limiting the country sample to regions that were relatively rich at the beginning of the period.

The same result holds when controlling for other growth determinants. We perform cross-country growth regressions using the growth rate of the entire period as dependent variable and including as controls all variables identified in Sala-i Martin et al. (2004) as robust growth regressors. The controls selected in that work constitute a wide range of

Table A.7: Controls used in growth regressions

var name	Description	Data source
East-Asia	Dummy for East-Asian countries.	Own construction following https://en.wikipedia.org/wiki/East_Asia
Primary enrol. rate	Enrolment rate in primary education (avg. 1962-1972).	Own construction using SE.PRM.TENR in WDI
Investment price PPP	Investment price level (avg. 1960-1964) PPP.	pi in PWT6.3 in Heston et al. (2011)
GDPpc (logs)	Log of GDP per capita in 1960.	rgdpl PWT6.3 in Heston et al. (2011)
Tropic land	Proportion of country's land area within geographical tropics.	lnd100km in geodata.dta in Gallup et al. (2010)
Coastal pop.	Coastal (within 100 km of coastline) population per coastal area in 1960's 1965.	dens65c in geodata.dta in Gallup et al. (2010)
Malaria prevalence	Index of malaria prevalence in 1966.	Mal66a in malaria.dta in Gallup et al. (2010)
Life Expectancy	Life expectancy in 1960.	X2 in Sala-i Martin (1997)
Confucian pop.	Fraction of population Confucian in 1960.	X53 in Sala-i Martin (1997)
S-S Africa	Dummy for Sub-Saharan African countries.	X4 in Sala-i Martin (1997)
LATAM	Dummy for Latin American countries.	X5 in Sala-i Martin (1997)
Mining GDP	Fraction of GDP in mining.	X59 in Sala-i Martin (1997)
Frm Spanish colony	Dummy for former Spanish colonies.	X50 in Sala-i Martin (1997)
Years open	Number of years economy has been open between 1950 and 1994.	X23 in Sala-i Martin (1997)
Muslim pop.	Fraction of population Muslim in 1960.	X56 in Sala-i Martin (1997)
Buddhist pop.	Fraction of population Buddhist in 1960.	X51 in Sala-i Martin (1997)
Linguistic diffs.	Average of five different indices of ethnolinguistic fractionalization which is the probability of two random people in a country not speaking the same language.	muller in othervar.dta in Easterly and Levine (1997)
Gov. expenditure	Share of expenditures on government consumption to GDP in 1961.	NE.CON.GOVT.ZS in WDI
Pop. density	Population per area in 1960.	EN.POP.DNST in WDI
RER distortions	Real exchange rate distortions.	X41 in Sala-i Martin (1997)

measures of basic growth fundamentals (initial wealth, investment costs, human capital, etc.), as well as indexes of institutional quality, regional, cultural and geographical characteristics. Table A.7 lists all controls used along with the description for each variable, and provides the source were the data can be found.

The first column in Table A.8 shows how the baseline regression looks like when all 20 controls are included. The rest of the table presents results for similar specifications but replacing geographical and regional dummies by indicators signalling A-countries. For this task, we use variable $A1\_jend$ which signals countries for which the share of $A1$-goods exported is above $j\%$ (with $j = 30, 40, 50$) at the end of the period (year 2000). In columns (2)-(4) only strictly geographical variables are excluded. For columns (5)-(7), even more controls related with geographical factors and therefore closely linked with the type of specialization of an economy are excluded. Results show that the variable indicating economies that remained specialized in A during the period 1962-2000 is highly significant and negative in most specifications.

Similar results are obtained using alternative variables to signal A-countries. Tables A.9-A.13 present results for the same specifications in Table A.8 but using different indicators for A-countries. As these tables show, using different indicators for agricultural economies, still yields significantly negative coefficients for the indicator. The result that agricultural economies tend grow less than other economies with other similar characteristics is robust to that choice.

These results indicate that, even controlling for other robust growth determinants, having remained specialized in A-goods is negatively associated to growth. A-countries tend to have lower growth rates over the period analyzed than countries with otherwise similar characteristics.

Table A.14 presents an exercise to test how important the indicator of A-countries can be in growth regressions. The first column presents a regression with all 20 variables selected in Sala-i Martin et al. (2004), plus the main indicator $A1\_30end$. The following specifications (columns 2-13) remove, one by one, the variable that turns out to be the least significant in the previous regression (largest p-value). Variables that are significant

Table A.8: Cross-country growth regressions (A1-list 2000)

Dependant variable:	growth rate 1962-2000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East-Asia	-63.801						
	(44.963)						
Primary enrol. rate	0.005	0.009	0.007	0.004	0.011*	0.005	0.002
	(0.009)	(0.007)	(0.010)	(0.008)	(0.005)	(0.007)	(0.007)
Investment price PPP	0.000	-0.001	0.002	0.003	-0.002	-0.001	-0.001
	(0.003)	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
GDPpc (logs)	-0.032	-0.506	-0.338	-0.253	-0.540***	-0.645***	-0.660***
	(0.287)	(0.299)	(0.399)	(0.194)	(0.150)	(0.200)	(0.209)
Tropic land	0.211	0.176	0.246	0.463			
	(0.293)	(0.345)	(0.415)	(0.307)			
Coastal pop.	0.002	0.001	0.003	0.004	0.001	0.001	0.002
	(0.007)	(0.006)	(0.007)	(0.005)	(0.003)	(0.003)	(0.004)
Malaria prevalence	0.182	0.194	0.343	0.095			
	(0.353)	(0.368)	(0.403)	(0.293)			
Life expectancy	0.025	0.047**	0.043	0.014	0.034**	0.052**	0.053**
	(0.028)	(0.021)	(0.032)	(0.024)	(0.014)	(0.021)	(0.020)
Confucian pop.	151.065	8.653	0.334	5.654			
	(97.905)	(7.055)	(9.137)	(5.870)			
S-S Africa	-0.298						
	(0.807)						
LATAM	0.557						
	(0.527)						
Mining GDP	-2.925	-2.823	-2.446	-2.043	-2.553*	-1.483	-1.153
	(2.349)	(1.838)	(2.203)	(1.229)	(1.394)	(1.548)	(1.559)
Frm Spanish colony	-0.644***	0.215	-0.131	-0.459**			
	(0.194)	(0.262)	(0.258)	(0.163)			
Years open	0.481	0.253	0.250	0.362*	0.331	0.300	0.291
	(0.412)	(0.240)	(0.263)	(0.176)	(0.196)	(0.214)	(0.319)
Muslim pop.	0.692	0.290	0.421	0.061			
	(0.558)	(0.274)	(0.331)	(0.219)			
Buddhist pop.	73.955	0.404	0.210	0.137			
	(51.676)	(0.230)	(0.270)	(0.256)			
Linguistic diffs.	0.749	0.798***	0.462	-0.176	0.415	0.360	0.013
	(0.458)	(0.249)	(0.345)	(0.343)	(0.251)	(0.264)	(0.315)
Gov. expenditure	0.038*	0.027	-0.004	-0.010	0.012	0.007	0.025
	(0.021)	(0.026)	(0.029)	(0.026)	(0.018)	(0.020)	(0.026)
Pop. density	-0.003	-0.002	-0.003	-0.005	-0.001	-0.001	-0.002
	(0.007)	(0.006)	(0.007)	(0.005)	(0.003)	(0.003)	(0.004)
RER distortions	0.002	0.001	0.001	-0.001	0.001	0.003	-0.001
	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)
A1_30_00		-0.651**			-0.606***		
		(0.274)			(0.138)		
A1_40_00			-0.385			-0.603***	
			(0.290)			(0.184)	
A1_50_00				-0.835***			-0.784***
				(0.166)			(0.143)
Constant	-2.152	0.917	0.006	1.622	2.197**	2.304**	2.803**
	(2.399)	(2.105)	(2.547)	(1.565)	(0.837)	(0.980)	(1.306)
Obs.	33	33	33	33	33	33	33
R^2	0.905	0.861	0.822	0.889	0.817	0.784	0.791

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources.

at a 10 percent confidence level are not removed so the exercise ends when all variables have reached that significance level. As can be seen, the variable signalling A-countries is never dropped out in this exercise and it remains within the group of significant regressors

Table A.9: Cross country growth regressions (A2-list 2000)

Dependant variable:	growth rate 1962-2000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East-Asia	-63.801						
	(44.963)						
Primary enrol. rate	0.005	-0.000	0.007	0.004	-0.000	0.005	0.002
	(0.009)	(0.008)	(0.010)	(0.008)	(0.006)	(0.007)	(0.007)
Investment price PPP	0.000	-0.001	0.002	0.003	-0.004	-0.001	-0.001
	(0.003)	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
GDPpc (logs)	-0.032	-0.552	-0.338	-0.253	-0.770***	-0.645***	-0.660***
	(0.287)	(0.320)	(0.399)	(0.194)	(0.192)	(0.200)	(0.209)
Tropic land	0.211	0.242	0.246	0.463			
	(0.293)	(0.351)	(0.415)	(0.307)			
Coastal pop.	0.002	0.001	0.003	0.004	0.002	0.001	0.002
	(0.007)	(0.006)	(0.007)	(0.005)	(0.004)	(0.003)	(0.004)
Malaria prevalence	0.182	0.381	0.343	0.095			
	(0.353)	(0.342)	(0.403)	(0.293)			
Life expectancy	0.025	0.076**	0.043	0.014	0.073***	0.052**	0.053**
	(0.028)	(0.031)	(0.032)	(0.024)	(0.020)	(0.021)	(0.020)
Confucian pop.	151.065	11.171	0.334	5.654			
	(97.905)	(9.533)	(9.137)	(5.870)			
S-S Africa	-0.298						
	(0.807)						
LATAM	0.557						
	(0.527)						
Mining GDP	-2.925	-3.371*	-2.446	-2.043	-2.554*	-1.483	-1.153
	(2.349)	(1.825)	(2.203)	(1.229)	(1.430)	(1.548)	(1.559)
Frm Spanish colony	-0.644***	0.033	-0.131	-0.459**			
	(0.194)	(0.288)	(0.258)	(0.163)			
Years open	0.481	0.088	0.250	0.362*	0.195	0.300	0.291
	(0.412)	(0.313)	(0.263)	(0.176)	(0.247)	(0.214)	(0.319)
Muslim pop.	0.692	0.475	0.421	0.061			
	(0.558)	(0.272)	(0.331)	(0.219)			
Buddhist pop.	73.955	0.494	0.210	0.137			
	(51.676)	(0.287)	(0.270)	(0.256)			
Linguistic diffs.	0.749	0.780*	0.462	-0.176	0.415	0.360	0.013
	(0.458)	(0.398)	(0.345)	(0.343)	(0.332)	(0.264)	(0.315)
Gov. expenditure	0.038*	0.019	-0.004	-0.010	0.019	0.007	0.025
	(0.021)	(0.032)	(0.029)	(0.026)	(0.022)	(0.020)	(0.026)
Pop. density	-0.003	-0.002	-0.003	-0.005	-0.002	-0.001	-0.002
	(0.007)	(0.006)	(0.007)	(0.005)	(0.004)	(0.003)	(0.004)
RER distortions	0.002	-0.002	0.001	-0.001	-0.000	0.003	-0.001
	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)
A2_30_00		-0.427*			-0.443***		
		(0.220)			(0.145)		
A2_40_00			-0.385			-0.603***	
			(0.290)			(0.184)	
A2_50_00				-0.835***			-0.784***
				(0.166)			(0.143)
Constant	-2.152	0.755	0.006	1.622	3.005**	2.304**	2.803**
	(2.399)	(1.959)	(2.547)	(1.565)	(1.117)	(0.980)	(1.306)
Obs.	33	33	33	33	33	33	33
R^2	0.905	0.829	0.822	0.889	0.753	0.784	0.791

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources.

even when there is only five variables left. Moreover, the main variable is one of the few that presents significant coefficients in all specifications. Again, this result is robust to the use of alternative variables signalling A-countries. Notice that the number of

Table A.10: Cross country growth regressions (A3-list 2000)

Dependant variable:	growth rate 1962-2000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East-Asia	-63.801						
	(44.963)						
Primary enrol. rate	0.005	-0.001	0.007	0.008	-0.002	0.005	0.005
	(0.009)	(0.009)	(0.010)	(0.008)	(0.006)	(0.007)	(0.005)
Investment price PPP	0.000	-0.001	0.002	0.004	-0.004	-0.001	0.001
	(0.003)	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
GDPpc (logs)	-0.032	-0.491	-0.338	-0.369	-0.746***	-0.645***	-0.732***
	(0.287)	(0.311)	(0.399)	(0.247)	(0.197)	(0.200)	(0.190)
Tropic land	0.211	0.282	0.246	0.316			
	(0.293)	(0.348)	(0.415)	(0.301)			
Coastal pop.	0.002	0.003	0.003	0.001	0.003	0.001	-0.000
	(0.007)	(0.006)	(0.007)	(0.005)	(0.004)	(0.003)	(0.003)
Malaria prevalence	0.182	0.381	0.343	0.230			
	(0.353)	(0.346)	(0.403)	(0.298)			
Life expectancy	0.025	0.073**	0.043	0.038	0.075***	0.052**	0.061***
	(0.028)	(0.031)	(0.032)	(0.025)	(0.019)	(0.021)	(0.016)
Confucian pop.	151.065	11.291	0.334	4.468			
	(97.905)	(10.394)	(9.137)	(6.696)			
S-S Africa	-0.298						
	(0.807)						
LATAM	0.557						
	(0.527)						
Mining GDP	-2.925	-3.407*	-2.446	-3.007*	-2.533	-1.483	-1.951
	(2.349)	(1.880)	(2.203)	(1.473)	(1.478)	(1.548)	(1.339)
Frm Spanish colony	-0.644***	-0.015	-0.131	-0.268			
	(0.194)	(0.284)	(0.258)	(0.193)			
Years open	0.481	0.156	0.250	0.039	0.251	0.300	0.004
	(0.412)	(0.324)	(0.263)	(0.207)	(0.267)	(0.214)	(0.215)
Muslim pop.	0.692	0.474	0.421	0.316			
	(0.558)	(0.275)	(0.331)	(0.213)			
Buddhist pop.	73.955	0.466	0.210	0.130			
	(51.676)	(0.309)	(0.270)	(0.252)			
Linguistic diffs.	0.749	0.754*	0.462	0.154	0.428	0.360	0.094
	(0.458)	(0.385)	(0.345)	(0.326)	(0.330)	(0.264)	(0.306)
Gov. expenditure	0.038*	0.019	-0.004	-0.022	0.023	0.007	-0.002
	(0.021)	(0.035)	(0.029)	(0.027)	(0.023)	(0.020)	(0.021)
Pop. density	-0.003	-0.004	-0.003	-0.002	-0.003	-0.001	0.000
	(0.007)	(0.006)	(0.007)	(0.005)	(0.004)	(0.003)	(0.004)
RER distortions	0.002	-0.001	0.001	-0.001	0.000	0.003	-0.001
	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)
A3_30_00		-0.385*			-0.419***		
		(0.211)			(0.137)		
A3_40_00			-0.385			-0.603***	
			(0.290)			(0.184)	
A3_50_00				-0.633***			-0.779***
				(0.148)			(0.122)
Constant	-2.152	0.356	0.006	1.099	2.687**	2.304**	3.076**
	(2.399)	(1.870)	(2.547)	(1.622)	(1.179)	(0.980)	(1.197)
Obs.	33	33	33	33	33	33	33
R^2	0.905	0.823	0.822	0.883	0.746	0.784	0.829

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources.

observations increases as variables are removed. This is so because relevant information is not available for many countries. In particular, detailed information on education in the 60's or 70's is limited to a very small sample of countries. Specifications with

Table A.11: Cross country growth regressions (A1-list permanent)

Dependant variable:	growth rate 1962-2000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East-Asia	-63.801						
	(44.963)						
Primary enrol. rate	0.005	0.000	0.004	0.005	-0.004	0.004	0.002
	(0.009)	(0.008)	(0.012)	(0.011)	(0.006)	(0.008)	(0.008)
Investment price PPP	0.000	-0.001	-0.001	0.003	-0.005*	-0.003	-0.002
	(0.003)	(0.004)	(0.005)	(0.004)	(0.003)	(0.002)	(0.003)
GDPpc (logs)	-0.032	-0.414	-0.497	-0.252	-0.783***	-0.656***	-0.668***
	(0.287)	(0.318)	(0.356)	(0.261)	(0.200)	(0.204)	(0.235)
Tropic land	0.211	0.284	0.265	0.508			
	(0.293)	(0.252)	(0.351)	(0.346)			
Coastal pop.	0.002	0.002	0.001	0.003	0.000	-0.002	-0.001
	(0.007)	(0.005)	(0.007)	(0.007)	(0.004)	(0.003)	(0.004)
Malaria prevalence	0.182	0.393	0.253	0.388			
	(0.353)	(0.328)	(0.362)	(0.332)			
Life expectancy	0.025	0.062**	0.056	0.041	0.081***	0.054**	0.060**
	(0.028)	(0.029)	(0.034)	(0.031)	(0.018)	(0.024)	(0.022)
Confucian pop.	151.065	5.819	2.106	1.688			
	(97.905)	(7.170)	(8.379)	(7.075)			
S-S Africa	-0.298						
	(0.807)						
LATAM	0.557						
	(0.527)						
Mining GDP	-2.925	-3.349*	-2.663	-4.018**	-2.253*	-2.267	-3.100*
	(2.349)	(1.865)	(1.928)	(1.710)	(1.250)	(1.403)	(1.590)
Frm Spanish colony	-0.644***	-0.167	0.110	-0.098			
	(0.194)	(0.223)	(0.300)	(0.194)			
Years open	0.481	0.070	0.122	0.025	0.080	0.157	0.000
	(0.412)	(0.269)	(0.221)	(0.231)	(0.194)	(0.177)	(0.278)
Muslim pop.	0.692	0.453	0.357	0.510**			
	(0.558)	(0.267)	(0.278)	(0.228)			
Buddhist pop.	73.955	0.124	0.214	0.110			
	(51.676)	(0.232)	(0.285)	(0.293)			
Linguistic diffs.	0.749	0.217	0.528	0.376	-0.014	0.246	0.123
	(0.458)	(0.399)	(0.342)	(0.351)	(0.370)	(0.281)	(0.357)
Gov. expenditure	0.038*	-0.026	0.003	-0.015	-0.013	-0.002	-0.001
	(0.021)	(0.024)	(0.026)	(0.026)	(0.023)	(0.019)	(0.025)
Pop. density	-0.003	-0.002	-0.001	-0.004	-0.001	0.002	0.001
	(0.007)	(0.005)	(0.007)	(0.007)	(0.004)	(0.003)	(0.004)
RER distortions	0.002	0.002	0.002	-0.001	0.004	0.003	-0.001
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
A1_30_30yr		-0.487**			-0.618***		
		(0.177)			(0.153)		
A1_40_30yr			-0.575*			-0.643***	
			(0.321)			(0.165)	
A1_50_30yr				-0.459**			-0.554***
				(0.187)			(0.181)
Constant	-2.152	0.681	0.812	-0.146	3.297***	2.776**	3.086**
	(2.399)	(1.995)	(2.329)	(1.938)	(1.152)	(1.030)	(1.425)
Obs.	33	33	33	33	33	33	33
R^2	0.905	0.856	0.843	0.846	0.795	0.804	0.753

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources.

fewer controls show that the conclusion that specialization in agricultural production is related to lower growth is not driven by a small country sample. Table A.15 shows the result of a similar exercise using nominal income instead of real income since this

Table A.12: Cross country growth regressions (A2-list permanent)

Dependant variable:	growth rate 1962-2000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East-Asia	-63.801						
	(44.963)						
Primary enrol. rate	0.005	-0.001	-0.010	0.005	-0.005	-0.007	0.002
	(0.009)	(0.009)	(0.007)	(0.011)	(0.006)	(0.005)	(0.008)
Investment price PPP	0.000	-0.002	-0.003	0.003	-0.006*	-0.004	-0.002
	(0.003)	(0.005)	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)
GDPpc (logs)	-0.032	-0.493	-0.778**	-0.252	-0.848***	-0.801***	-0.668***
	(0.287)	(0.355)	(0.302)	(0.261)	(0.208)	(0.158)	(0.235)
Tropic land	0.211	0.364	0.162	0.508			
	(0.293)	(0.270)	(0.272)	(0.346)			
Coastal pop.	0.002	0.001	-0.004	0.003	0.000	-0.003	-0.001
	(0.007)	(0.005)	(0.005)	(0.007)	(0.004)	(0.003)	(0.004)
Malaria prevalence	0.182	0.303	0.267	0.388			
	(0.353)	(0.339)	(0.297)	(0.332)			
Life expectancy	0.025	0.072*	0.096***	0.041	0.091***	0.076***	0.060**
	(0.028)	(0.034)	(0.025)	(0.031)	(0.021)	(0.016)	(0.022)
Confucian pop.	151.065	10.560	7.080	1.688			
	(97.905)	(9.279)	(8.007)	(7.075)			
S-S Africa	-0.298						
	(0.807)						
LATAM	0.557						
	(0.527)						
Mining GDP	-2.925	-3.777*	-2.151	-4.018**	-2.547*	-1.864	-3.100*
	(2.349)	(1.821)	(1.864)	(1.710)	(1.237)	(1.236)	(1.590)
Frm Spanish colony	-0.644***	-0.143	0.294	-0.098			
	(0.194)	(0.236)	(0.233)	(0.194)			
Years open	0.481	0.021	0.070	0.025	0.049	0.202	0.000
	(0.412)	(0.294)	(0.187)	(0.231)	(0.201)	(0.170)	(0.278)
Muslim pop.	0.692	0.461	0.415**	0.510**			
	(0.558)	(0.272)	(0.189)	(0.228)			
Buddhist pop.	73.955	0.159	0.462*	0.110			
	(51.676)	(0.246)	(0.216)	(0.293)			
Linguistic diffs.	0.749	0.418	0.710**	0.376	0.186	0.242	0.123
	(0.458)	(0.412)	(0.297)	(0.351)	(0.387)	(0.284)	(0.357)
Gov. expenditure	0.038*	-0.016	0.009	-0.015	-0.004	-0.006	-0.001
	(0.021)	(0.026)	(0.021)	(0.026)	(0.024)	(0.019)	(0.025)
Pop. density	-0.003	-0.002	0.003	-0.004	-0.001	0.003	0.001
	(0.007)	(0.005)	(0.005)	(0.007)	(0.004)	(0.003)	(0.004)
RER distortions	0.002	0.002	0.002	-0.001	0.004	0.003	-0.001
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
A2_30_30yr		-0.483*			-0.570***		
		(0.230)			(0.168)		
A2_40_30yr			-0.810***			-0.716***	
			(0.207)			(0.148)	
A2_50_30yr				-0.459**			-0.554***
				(0.187)			(0.181)
Constant	-2.152	0.800	2.190	-0.146	3.200**	3.755***	3.086**
	(2.399)	(2.083)	(1.907)	(1.938)	(1.184)	(0.794)	(1.425)
Obs.	33	33	33	33	33	33	33
R^2	0.905	0.844	0.893	0.846	0.771	0.828	0.753

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources.

approximates better the specification in the theory presented in this paper. The same conclusion remains. Overall, these results indicate that there is robust correlation between having remained specialized in agricultural production and slow growth relative to other

Table A.13: Cross country growth regressions (A3-list permanent)

Dependant variable:	growth rate 1962-2000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East-Asia	-63.801						
	(44.963)						
Primary enrol. rate	0.005	-0.003	-0.008	0.005	-0.010	-0.010	0.002
	(0.009)	(0.010)	(0.013)	(0.011)	(0.006)	(0.006)	(0.008)
Investment price PPP	0.000	-0.002	-0.001	0.003	-0.007**	-0.005*	-0.002
	(0.003)	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
GDPpc (logs)	-0.032	-0.450	-0.563	-0.252	-0.846***	-0.799***	-0.668***
	(0.287)	(0.290)	(0.353)	(0.261)	(0.212)	(0.194)	(0.235)
Tropic land	0.211	0.336	0.189	0.508			
	(0.293)	(0.259)	(0.324)	(0.346)			
Coastal pop.	0.002	0.003	0.001	0.003	0.001	0.001	-0.001
	(0.007)	(0.005)	(0.006)	(0.007)	(0.004)	(0.004)	(0.004)
Malaria prevalence	0.182	0.317	0.464	0.388			
	(0.353)	(0.321)	(0.317)	(0.332)			
Life expectancy	0.025	0.074**	0.086**	0.041	0.101***	0.086***	0.060**
	(0.028)	(0.032)	(0.040)	(0.031)	(0.020)	(0.018)	(0.022)
Confucian pop.	151.065	2.324	6.404	1.688			
	(97.905)	(6.585)	(8.217)	(7.075)			
S-S Africa	-0.298						
	(0.807)						
LATAM	0.557						
	(0.527)						
Mining GDP	-2.925	-3.462*	-2.800	-4.018**	-2.459*	-2.244*	-3.100*
	(2.349)	(1.688)	(1.910)	(1.710)	(1.232)	(1.285)	(1.590)
Frm Spanish colony	-0.644***	-0.124	0.007	-0.098			
	(0.194)	(0.221)	(0.278)	(0.194)			
Years open	0.481	0.126	0.055	0.025	0.134	0.110	0.000
	(0.412)	(0.271)	(0.315)	(0.231)	(0.214)	(0.233)	(0.278)
Muslim pop.	0.692	0.476*	0.419	0.510**			
	(0.558)	(0.247)	(0.262)	(0.228)			
Buddhist pop.	73.955	0.043	0.416	0.110			
	(51.676)	(0.289)	(0.319)	(0.293)			
Linguistic diffs.	0.749	0.462	0.471	0.376	0.303	0.156	0.123
	(0.458)	(0.372)	(0.319)	(0.351)	(0.349)	(0.311)	(0.357)
Gov. expenditure	0.038*	-0.004	0.001	-0.015	0.011	0.003	-0.001
	(0.021)	(0.028)	(0.027)	(0.026)	(0.020)	(0.024)	(0.025)
Pop. density	-0.003	-0.004	-0.002	-0.004	-0.001	-0.001	0.001
	(0.007)	(0.005)	(0.006)	(0.007)	(0.004)	(0.004)	(0.004)
RER distortions	0.002	0.003	0.000	-0.001	0.004	0.002	-0.001
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
A3_30_30yr		-0.438**			-0.598***		
		(0.175)			(0.138)		
A3_40_30yr			-0.522*			-0.590***	
			(0.284)			(0.167)	
A3_50_30yr				-0.459**			-0.554***
				(0.187)			(0.181)
Constant	-2.152	0.199	0.981	-0.146	2.825**	3.387**	3.086**
	(2.399)	(1.578)	(2.120)	(1.938)	(1.259)	(1.223)	(1.425)
Obs.	33	33	33	33	33	33	33
R^2	0.905	0.847	0.839	0.846	0.793	0.781	0.753

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources.

countries with similar values of all other growth determinants during this period.

Table A.14: Evaluating importance of *A*-countries dummy in growth regressions

Dependant variable:	growth rate 1962-2000										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Primary enrol. rate	0.010	0.010	0.010	0.010	0.003						
	(0.182)	(0.137)	(0.141)	(0.151)	(0.700)						
Investment price PPP	0.001	0.001									
	(0.892)	(0.873)									
GDPpc (logs)	-0.366	-0.368	-0.384*	-0.422**	-0.438**	-0.325***	-0.326***	-0.288***	-0.279***	-0.278***	-0.283***
	(0.183)	(0.165)	(0.076)	(0.021)	(0.032)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tropic land	0.268	0.269	0.251	0.212	0.352*	0.231*	0.231*	0.176	0.175	0.156	
	(0.396)	(0.379)	(0.282)	(0.208)	(0.054)	(0.067)	(0.065)	(0.109)	(0.112)	(0.156)	
Coastal pop.	0.002	0.002	0.002								
	(0.697)	(0.689)	(0.674)								
Malaria prevalence	0.267	0.275	0.249	0.225	0.179	0.007					
	(0.430)	(0.320)	(0.264)	(0.287)	(0.474)	(0.974)					
Life expectancy	0.036*	0.037*	0.038**	0.039**	0.047**	0.038***	0.038***	0.037***	0.036***	0.036***	0.038***
	(0.094)	(0.051)	(0.015)	(0.015)	(0.024)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Confucian pop.	6.769	6.883	7.173	8.853	8.743*	4.918***	4.910***	2.901***	2.887***	2.701***	2.780***
	(0.361)	(0.319)	(0.281)	(0.133)	(0.063)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mining GDP	-3.083*	-3.076*	-3.084*	-3.168*	-2.219	-0.217	-0.220	0.351			
	(0.096)	(0.085)	(0.070)	(0.061)	(0.163)	(0.820)	(0.816)	(0.681)			
Years open	0.275	0.275	0.260	0.248	0.210	0.419**	0.419**	0.352**	0.340**	0.320**	0.330**
	(0.279)	(0.261)	(0.255)	(0.283)	(0.365)	(0.018)	(0.019)	(0.012)	(0.015)	(0.022)	(0.017)
Muslim pop.	0.343	0.342	0.336	0.323	0.188	0.321*	0.320*	0.302**	0.297**	0.290**	0.281**
	(0.224)	(0.210)	(0.186)	(0.188)	(0.440)	(0.058)	(0.059)	(0.027)	(0.031)	(0.034)	(0.037)
Buddhist pop.	0.284	0.290*	0.305**	0.317**	0.337**	0.429**	0.428**	0.606***	0.610***	0.571***	0.605***
	(0.210)	(0.087)	(0.046)	(0.045)	(0.020)	(0.023)	(0.024)	(0.003)	(0.003)	(0.003)	(0.001)
Linguistic diffs.	0.633**	0.635**	0.633**	0.675**	0.609*	0.020	0.020				
	(0.048)	(0.035)	(0.029)	(0.033)	(0.075)	(0.933)	(0.931)				
Gov. expenditure	0.011	0.011	0.013	0.011							
	(0.580)	(0.551)	(0.476)	(0.536)							
Pop. density	-0.003	-0.003	-0.003	-0.001	-0.001*	-0.000	-0.000*	-0.000	-0.000		
	(0.614)	(0.602)	(0.577)	(0.157)	(0.078)	(0.112)	(0.098)	(0.454)	(0.441)		
RER distortions	0.000										
	(0.944)										
A1_30_00	-0.513***	-0.511***	-0.514***	-0.539***	-0.582***	-0.222*	-0.221*	-0.207**	-0.216**	-0.219**	-0.225**
	(0.007)	(0.005)	(0.003)	(0.000)	(0.000)	(0.064)	(0.055)	(0.033)	(0.028)	(0.025)	(0.017)
Constant	0.413	0.427	0.557	0.896	1.189	0.845	0.861**	0.640*	0.646*	0.654*	0.643*
	(0.837)	(0.827)	(0.721)	(0.435)	(0.352)	(0.228)	(0.042)	(0.066)	(0.067)	(0.064)	(0.065)
Obs.	33	33	33	33	37	72	72	92	92	93	95
R^2	0.854	0.854	0.854	0.851	0.791	0.695	0.695	0.698	0.698	0.696	0.694

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. All estimations using heteroskedasticity-consistent standard errors. p-values in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources. A-countries defined as those for which the share of exports in A1-goods is larger than 30% in 2000.

Table A.15: Evaluating importance of A-countries dummy in growth regressions with nominal income

Dependant variable:	growth rate 1962-2000										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Primary enrol. rate	0.004	0.004	0.003								
	(0.730)	(0.621)	(0.657)								
Investment price PPP	-0.003	-0.005	-0.004	-0.000	-0.000	-0.000	-0.000	-0.000			
	(0.403)	(0.183)	(0.331)	(0.106)	(0.153)	(0.150)	(0.316)	(0.300)			
Nominal GDPpc (log)	-0.534**	-0.256	-0.271	-0.247*	-0.259*	-0.255*	-0.353**	-0.365***	-0.372***	-0.371***	-0.390***
	(0.038)	(0.240)	(0.231)	(0.083)	(0.077)	(0.078)	(0.014)	(0.004)	(0.002)	(0.002)	(0.001)
Tropic land	0.046	0.298	0.293	0.240	0.244	0.248	0.233	0.235	0.243*	0.224	
	(0.809)	(0.183)	(0.162)	(0.137)	(0.138)	(0.129)	(0.113)	(0.110)	(0.092)	(0.126)	
Coastal pop.	-0.009**	-0.004	-0.005	0.002*	0.002*	0.002*	0.002*	0.001*	0.002*	0.002**	0.002**
	(0.031)	(0.338)	(0.264)	(0.095)	(0.068)	(0.061)	(0.053)	(0.062)	(0.056)	(0.048)	(0.043)
Malaria prevalence	0.299	0.258	0.290	0.276	0.270	0.268	0.083				
	(0.370)	(0.396)	(0.273)	(0.228)	(0.256)	(0.256)	(0.703)				
Life expectancy	0.080**	0.049**	0.050**	0.053***	0.053***	0.053***	0.062***	0.061***	0.061***	0.057***	0.061***
	(0.023)	(0.034)	(0.026)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Confucian pop.	19.294**	14.175*	14.946*	2.154**	2.191**	2.176**	3.223***	3.253***	3.239***	3.049***	3.082***
	(0.046)	(0.078)	(0.061)	(0.036)	(0.029)	(0.028)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mining GDP	-4.405**	-3.725**	-3.690**	0.176	0.161						
	(0.020)	(0.019)	(0.016)	(0.842)	(0.857)						
Years open	0.035	0.172	0.194	0.660***	0.678***	0.675***	0.595***	0.588***	0.601***	0.614***	0.616***
	(0.847)	(0.443)	(0.371)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Muslim pop.	0.291	0.137	0.133	0.184	0.179	0.182	0.255	0.242	0.249		
	(0.275)	(0.560)	(0.576)	(0.283)	(0.284)	(0.268)	(0.117)	(0.168)	(0.147)		
Buddhist pop.	1.255***	1.163***	1.194***	0.102							
	(0.001)	(0.000)	(0.000)	(0.863)							
Linguistic diffs.	0.830***	0.588*	0.584*	-0.195	-0.195	-0.189					
	(0.004)	(0.077)	(0.079)	(0.482)	(0.477)	(0.484)					
Gov. expenditure	-0.001										
	(0.951)										
Pop. density	0.007*	0.003	0.004	-0.002*	-0.002*	-0.002*	-0.002*	-0.002*	-0.002*	-0.002**	-0.002**
	(0.054)	(0.445)	(0.366)	(0.088)	(0.063)	(0.056)	(0.050)	(0.059)	(0.053)	(0.047)	(0.047)
RER distortions	0.000	0.002									
	(0.929)	(0.635)									
A1_30_00	-0.687***	-0.790***	-0.786***	-0.321***	-0.325***	-0.326***	-0.336**	-0.330**	-0.336**	-0.382***	-0.392***
	(0.000)	(0.000)	(0.000)	(0.006)	(0.005)	(0.004)	(0.015)	(0.013)	(0.011)	(0.001)	(0.001)
Constant	-0.875	-1.301	-1.102	-1.883***	-1.825***	-1.823***	-1.576**	-1.385***	-1.373***	-1.105***	-1.092***
	(0.428)	(0.225)	(0.352)	(0.004)	(0.007)	(0.007)	(0.011)	(0.000)	(0.000)	(0.002)	(0.002)
Obs.	33	37	37	72	72	72	92	92	92	92	92
R^2	0.922	0.889	0.888	0.793	0.793	0.793	0.783	0.783	0.782	0.776	0.770

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. All estimations using heteroskedasticity-consistent standard errors. p-values in parenthesis. Controls are variables identified as robust growth regressors in Sala-i Martin et al. (2004). See Table A.7 for description of variables and data sources. A-countries defined as those for which the share of exports in A1-goods is larger than 30% in 2000.. Nominal income is the product of real GDP at current prices and current prices as reported in PWT.

A.6 Terms of trade effect

This section replicates and extends the empirical results showing the *terms of trade effect* (TTE) in Acemoglu and Ventura (2002) (hereafter, AV02), and highlights the particular situation of A-countries. AV02 starts by assuming that economies tend to converge to a steady state determined by a set of fundamentals (Z), an idea that can be represented in the following equation:

$$g_{GDP,t} = -\mu_1 GDP_{t-1} + Z_t'\mu_2 + u_t$$

where $g_{GDP,t}$ is the growth rate of output at t.

Estimating the relationship between terms of trade and growth using this approach may be biased. An economy may experience rapid growth either by accumulating more resources along its current growth path or by achieving an upward shift in its steady state. Only the first of these causes is related to falling terms of trade. To properly identify the relationship, we follow AV02 computing the following specification

$$g_{TT,t} = \epsilon_1 g_{GDP,t} + Z_t'\epsilon_2 + e_t$$

where $g_{TT,t}$ is the growth rate of terms of trade and the vector Z_t includes determinants of steady state income. This equation is estimated using Two-Stage Least Squares (2SLS) and instrumenting $g_{GDP,t}$ by its predicted value stemming from the previous equation. The excluded instrument is GDP_{t-1} since, conditional on growth and the steady state determinants, terms of trade should not be related to the initial level of income. Results for these regressions for the period 1965–1985 are reported in columns (1) and (2) of Table A.16. These use years of education, life expectancy in 1965, and a dummy variable for OPEC countries as basic determinants of steady-state income, replicating the results in AV02. Columns (3) and (4) expand the time span to cover 1965-2005. The remaining columns introduce different indicators of A-countries in the set Z.

All specifications show a negative coefficient for the growth rate, which can be inter-

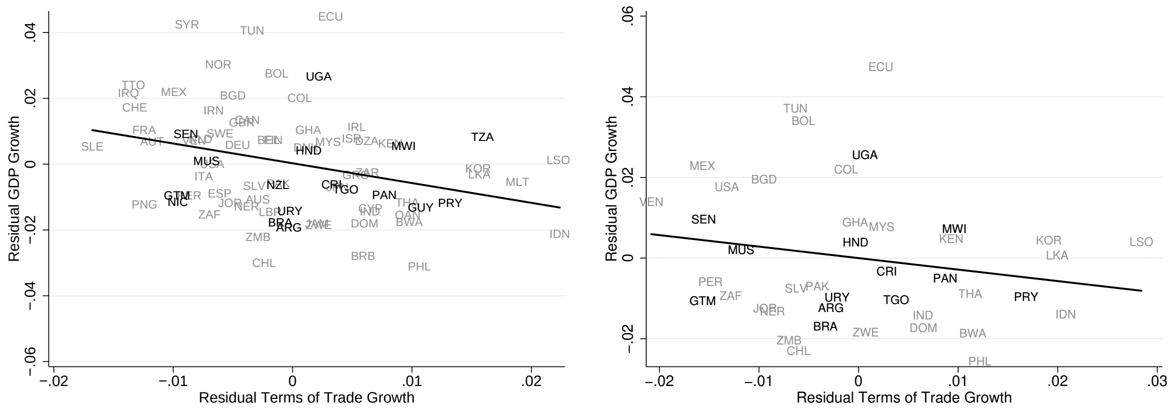
Table A.16: Terms of trade and growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Panel A: 2SLS					
gdpgr	-0.595**	-0.578**	-0.693**	-0.688**	-0.680**	-0.609**	-0.671**	-0.609**	-0.602**	-0.609**
	(0.266)	(0.261)	(0.316)	(0.319)	(0.306)	(0.272)	(0.304)	(0.272)	(0.274)	(0.272)
yr	-0.001		-0.003							
	(0.002)		(0.002)							
syr		-0.002		-0.001	-0.002	-0.000	-0.002	-0.000	-0.001	-0.000
		(0.006)		(0.007)	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
hyr		0.019		0.001	-0.005	-0.012	-0.005	-0.012	-0.009	-0.012
		(0.034)		(0.037)	(0.036)	(0.035)	(0.036)	(0.035)	(0.035)	(0.035)
pyr		-0.002		-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
		(0.003)		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
llifee	0.043*	0.046*	0.055*	0.057*	0.054*	0.051*	0.055*	0.051*	0.048*	0.051*
	(0.024)	(0.025)	(0.028)	(0.030)	(0.028)	(0.027)	(0.029)	(0.027)	(0.027)	(0.027)
opec	0.091***	0.090***	0.082***	0.082***	0.078***	0.081***	0.078***	0.081***	0.082***	0.081***
	(0.010)	(0.010)	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
A1_30end					-0.013					
					(0.009)					
A1_50end						-0.019*				
						(0.011)				
A2_30end							-0.011			
							(0.008)			
A2_50end								-0.019*		
								(0.011)		
A3_30end									-0.013**	
									(0.007)	
A3_50end										-0.019*
										(0.011)
_cons	-0.172*	-0.182*	-0.210*	-0.216*	-0.203*	-0.195*	-0.207*	-0.195*	-0.180*	-0.195*
	(0.090)	(0.092)	(0.106)	(0.111)	(0.106)	(0.101)	(0.107)	(0.101)	(0.100)	(0.101)
					Panel B: First-stage for GDP Growth					
loggdp	-0.019***	-0.020***	-0.021***	-0.021***	-0.021***	-0.023***	-0.021***	-0.023***	-0.023***	-0.023***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
R^2	0.350	0.359	0.330	0.335	0.481	0.509	0.450	0.509	0.449	0.509
					Panel C: OLS					
gdpgr	0.037	0.037	-0.045	-0.045	-0.076	-0.100	-0.073	-0.100	-0.105	-0.100
	(0.106)	(0.107)	(0.139)	(0.141)	(0.155)	(0.152)	(0.151)	(0.152)	(0.146)	(0.152)
Obs.	79	79	55	55	55	55	55	55	55	55

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. t-statistic in parenthesis. Columns (1) and (2) replicate results of Acemoglu and Ventura (2002) using data from Barro and Lee (1993) for the period (1965-1985). Columns (3) and (4) expand the time period using product figures from PWT and terms of trade from WDI and OECD. The remaining columns introduce different indicators for A countries to the group of determinants of steady state income. Each variable $Ak_j end$ takes value 1 when a country's exports of Ak exceed j% in 2000.

preted as evidence supporting the existence of a TTE. The dummy indicating A-countries takes negative values implying that, other things being equal, terms of trade tend to adjust less favourably for agricultural economies. Figure A.6 plots the part of terms of trade changes and growth changes not explained by shifts in the steady state income determinants. These determinants are the same as those used in column (1) of Table A.16. The figure in the left replicates the result of AV02 using data for 1965-1985 only, and the figure in the right presents results for the extended time period.

Figure A.6: Changes in Terms of trade and GDP growth controlling for steady state income shifts



(a) 1965-1985 (b) 1965-2005

Notes: Part of terms of trade and growth changes not explained by shifts in the steady state income determinants (i.e., years of education, life expectancy at 1965 and a dummy for OPEC countries). The panel on the left uses data for 1965-1985 only and therefore replicates results in as in Acemoglu and Ventura (2002). The panel on the right expands the time period until 2005.

In both figures, the position of A-countries is highlighted, so it is easy to notice that these group of countries tend to be below the fitted line. This implies that terms of trade adjustments tend to be lower than expected for agricultural economies.

Finally, we test whether the TTE is related to the size of the economy. Total population is introduced into Z as measure for size, to evaluate whether the relationship between changes in terms of trade and growth is influenced by this variable. Results show that size is not a significant determinant within the set Z. As a parallel exercise, we used the residual GDP and terms of trade changes, as plotted in the left panel of Figure A.6, and evaluated whether the correlation between these two variables is affected by controlling for size. Again, results give non-significant coefficients for that variable.

A.7 Reverse-TTE for agricultural economies

This section presents further evidence of the fact highlighted in Figure 5, namely that agricultural economies experience, on average, a reverse terms of trade effect. The literature on the resource curse has extensively shown that countries with large natural resource endowments tend to exhibit lower growth rates than others (see for example Sachs and Warner, 2001 or Auty, 2007). Section A.5 provides in-depth evidence in support of this trend specifically for the subset of countries that this paper targets, i.e., those specialized in non-extractive primary products (A-countries). The evidence presented there is compatible with the well-known fact that economies that converge to the group of the world's wealthiest countries, do so by undergoing processes of structural change, i.e., reallocating resources from primary sectors towards more productive activities as they grow. Nevertheless, remaining specialized in a lagging sector should not automatically lead to income divergence if a TTE were operational, i.e., if differences in output growth between sectors were compensated by relative price movements. Evidence showing that A-countries' incomes are diverging from the rest is enough to discard a one-to-one TTE, but it is not sufficient to refute the possibility of terms of trade improving for lagging economies, at least to some degree. Section A.6 presents evidence on terms of trade movements in the context proposed by Acemoglu and Ventura (2002). In this section, we explore the vast evidence presented in the rest of the literature, and document the relationship between terms of trade movements and product diversification.

Concern regarding declining terms of trade for resource-intensive economies has circulated in policy circles for a long time. Since first stated several decades ago, the Prebisch-Singer hypothesis (see Prebisch, 1950 and Singer, 1950) has been examined extensively in empirical research. Most of these works focused on the evolution of the price of primary goods relative to manufactures.[34] Declining prices of primary goods relative to manufactures only yields falling terms of trade for economies that are net exporters of the first group of goods and importers of the second. Moreover, this position needs to remain sufficiently constant over time for changes in trade composition not to offset price movements. As explained before, many agricultural economies experienced important structural changes that affected the composition of their imports and exports over the period of analysis. This is probably why many of the papers analyzing trends in relative prices are not conclusive regarding trends in terms of trade for agricultural producers

[34] See for example Grilli and Yang (1988), Ardeni and Wright (1992), Cuddington (1992), Harvey et al. (2010), Arezki et al. (2014) or Yamada and Yoon (2014).

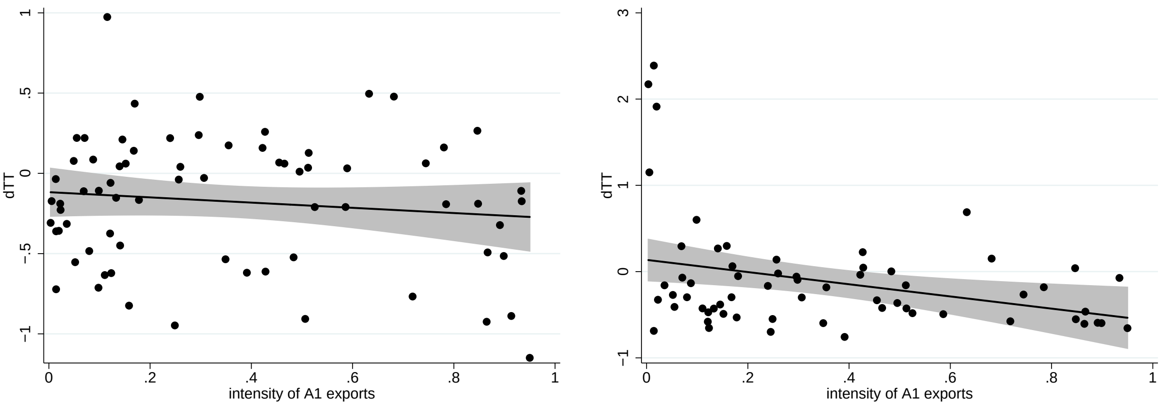
(Grilli and Yang, 1988 and Sarkar and Singer, 1991 explicitly make this point). A further condition is that relative productivity changes between sectors do not compensate for price losses–something that seems at odds with the evidence presented above.

In what follows, focus is placed on the evolution of terms of trade during the period 1962-2000, specifically for the set of economies defined as largely agricultural in this paper. Given that the goal is to explore the conditions under which an economy can experience income divergence due to its specialization, we require an environment free from external shocks. In other words, the mechanism stressed here can only become evident in a world where some region specializes in A-goods, another specializes in the rest of the activities and expenditure paths follow a natural trajectory driven by trade patterns between these two regions over the long term. As it is well known, the years following China's trade liberalization program (after 2000), provided an important shock in the relative price of primary goods to manufactured products, which would disrupt the mechanism highlighted here. This is the main reason why the analysis here stops in 2000.

Two different data sources are used: Barro and Lee (1993) report five-year changes in net barter terms of trade for 1960-1985, while for the period 1985-2000 the index available in the World Development Indicators (WDI) can be used. Figure A.7 plots the change in net barter terms of trade against the intensity of exports of $A1$-goods at the end of the period. The panel on the left considers total changes in the period 1965-2000 combining both available datasets. The panel on the right uses only the most recent data from WDI. According to both figures, it is not possible to state that terms of trade deteriorate for countries with a low share of A-exports, as the average effect, signalled by the fitted line, is not different from zero. As the intensity of A-exports increase, however, terms of trade movements clearly go below zero. The correlation between A-export intensity and negative movements in terms of trade becomes statistically significant at the 95 percent level when that share is relatively high (i.e., greater than 40 percent when considering the entire period and 25 percent when only the last 15 years are considered) for $A1$ products. A very similar picture arises using the broader classifications for A-products: $A2$ and $A3$.

We also evaluate the robustness of this relationship for alternative periods finishing in years 1995, 2005 and 2010. The change in terms of trade is still declining in the intensity of agricultural exports, but when the period after 2000 is included the slope becomes less steep. In fact, considering the period until 2010, we cannot reject the hypothesis that the change is different from zero, even for largely agricultural economies. This is the result of the aforementioned improvement in terms of trade for agricultural economies in the period 2000-2010, following China's trade integration.

Figure A.7: Evolution of net barter terms of trade and intensity of A-exports



(a) 1985-2000 (b) 1965-2000

Notes: dTT is the change in the net barter terms of trade (as reported in the WDI) of each country and $A1$ corresponds to the $A1$ list of agricultural products in the Appendix. The figure in the left presents results with data from the period 1985 and 2000 using net barter terms of trade reported in WDI. The figure in the right extends the period using data from Barro and Lee (1993) for years between 1965-1985. Export data are from Feenstra et al. (2005) in both cases. The grey area reports the 95% confidence interval for the position of the fitted line.

Finally, evidence supports the idea that movements in terms of trade are correlated with changes in the number of products internationally traded. Table A.17 regresses changes in terms of trade against the change in the number of products exported and imported. Controls include the initial number of products exported, the initial level and the change in the degree of openness, the initial level of per capita income and country fixed effects. While the mechanism highlighted here is expected to become evident in the very long run, we use 10 year changes to multiply observations. Nevertheless, results show that the change in products exported is correlated positively with changes in terms of trade as highlighted by the theory in the next section.

Overall, the evidence suggests that agricultural economies have experienced a reverse

Table A.17: Changes in terms of trade and product diversification

	Dependant variable: 10yr change in Terms of Trade				
	(1)	(2)	(3)	(4)	(5)
# of exports (10yr growth rate)	3.528**	3.718**	3.779**	3.291**	1.652**
	(1.468)	(1.483)	(1.493)	(1.512)	(0.789)
# of imports (10yr growth rate)	0.463	0.505	0.475	-0.158	0.325
	(2.312)	(2.313)	(2.317)	(2.335)	(0.973)
# of exports (initial level)	0.004	0.004	0.004	0.004	0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
# of imports (initial level)	-0.015***	-0.015***	-0.015***	-0.015***	-0.012**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
GDPpc (logs)		-0.560	-0.619	-0.532	-3.465
		(0.610)	(0.629)	(0.629)	(3.856)
Openness (initial level)			0.005	0.010	0.049
			(0.013)	(0.014)	(0.046)
Openness (10yr growth rate)				2.810*	1.456
				(1.559)	(3.042)
Constant	7.682***	11.413**	11.580**	10.668**	28.916
	(1.976)	(4.521)	(4.548)	(4.559)	(28.143)
Country-FE					Yes
Obs.	302	302	302	302	302
R^2	0.071	0.073	0.074	0.084	0.083

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Standard errors in parenthesis. Main variables computed using 4-digit trade flows data from Feenstra et al. (2005) for 1962-2000 and UNCOMTRADE for 2000-2010. Openness (measured as the value of trade over GDP) and GDPpc from PWT.

terms of trade effect since a relatively slow real income growth is not offset but rather enhanced by terms of trade movements. Moreover, terms of trade movements are correlated with product diversification.

A.8 Estimation of the model with value added data

In this section, we reproduce the last two columns of Table 5 using value-added data. This involves estimating preference parameters for a nested non-homothetic CES function as (17), where parameter ϵ drives substitution between goods and services, and parameter β does so between manufactures and agricultural goods. Results are presented in Table A.18. Column (1) reports results for the US and column (2) does so for Western European economies. The data used for the US are the same as in Herrendorf et al. (2013), that can be obtained from the NIPA tables and the BEA Input-Output tables. For the years prior to 1998, BEA does not provide annual IO tables, so linear interpolation is applied for years between those with available data.

For Western Europe, data from the World Input-Output Database (WIOD) is used, as presented by Timmer et al. (2015). As in García-Santana et al. (2021), we use the 2013 tables and assign values to sectors closely following their procedure. Relative price levels come from the Productivity Level Database (PDL), as presented by Inklaar and Timmer (2014), which provide relative price levels for different sectors using 2005 as the benchmark year. These data do not distinguish agricultural from manufacturing prices, so prices of goods are used for both these sectors as a raw approximation.

Results are reported in Table A.18. As it can be seen, using value added data further confirms that substitution between goods and services is significantly different from that between manufactured and agricultural goods, with the former being below one and the latter being larger than unity.

Table A.18: Estimation of preference parameters (value added data)

	(1) US Nested GSG	(2) WE Nested GSG
β	3.527***	2.693***
	(0.368)	(0.800)
$\bar{Q}_A$	-160.2***	-431.0***
	(3.824)	(40.460)
$\bar{Q}_S$	3330.6***	11699.4***
	(379.3)	(1238.1)
ω_A	0.058***	0.035***
	(0.004)	(0.008)
ω_G	0.152***	0.149***
	(0.003)	(0.006)
ω_M	0.942***	0.965***
	(0.004)	(0.008)
ω_S	0.848***	0.851***
	(0.003)	(0.006)
ϵ	0.000	0.591***
	(.)	(0.049)
N	64	255
AIC	-926.7	-2840.0
$RMSE_A$	0.004	0.012
$RMSE_M$	0.010	0.019
$RMSE_S$	0.011	0.021
$RMSE_{\sum_i}$	0.025	0.052

Notes: *, ** and ***, significant at a 10, 5 and 1% confidence level respectively. Robust standard errors in parenthesis. AIC is the Akaike information criterion, $RMSE_i$ is the root mean squared error for i.

A.9 Estimation of trade friction parameters

This section describes the procedure followed to obtain estimations of bilateral trade frictions between an origin z and destination country c in industry i (τ_{zcit}). For this, all trade flows are aggregated to match categories $A1$ and $M1$ as defined in Table A.1. From there, our procedure follows the proposal in Anderson et al. (2020). The first stage of the procedure consists of estimating:

$$x_{zcit} = \exp[\eta_{1i} RTA_{zct} + FE_{zit} + FE_{cit} + FE_{zci}] + \epsilon_{zcit}$$

where RTA_{zct} is a dummy variable taking value 1 if the pair zc share a trade agreement at t, and FE denote fixed effects. As proposed by Baier and Bergstrand (2007), FE_{zci} accounts for the unobservable relationship between the endogenous RTA_{zct} and ϵ_{zcit}.

Estimated values $\hat{FE}_{zci}$ are used in the second-stage where we estimate:

$$e^{\hat{FE}_{zci}} = e^{\sum_{m=2}^{5} \eta_{mi} lnDIST_{zcm-1} + \eta_6 BRDR_{zc} + \eta_7 LANG_{zc} + \eta_8 CLNY_{zc}} + \varepsilon_{zci}$$

here $lnDIST_{zcm-1}$ is the log of distance (in km) between z and c, and is decomposed into intervals to allow for non-linearities, so $m = 2, 3, 4, 5$ when distance in kilometers between the regions belongs to the interval $[0, 3000)$, $[3000, 7000)$, $[7000, 10000)$ and $[10000, \max]$, respectively. $BRDR_{zc}$ $LANG_{zc}$ and $CLNY_{zc}$ are dummy variables indicating a common border, common language and shared colonizing history.

Predicted values from this second stage provide a measure of trade costs in the absence of a RTA. Finally, the measure of trade frictions is constructed as follows:

$$\tau_{zcit} = \left[e^{\hat{\eta}_{1i} RTA_{zct} + \sum_{m=2}^{5} \hat{\eta}_{mi} lnDIST_{zcm-1} + \hat{\eta}_{6i} BRDR_{zc} + \hat{\eta}_{7i} LANG_{zc} + \hat{\eta}_{8i} CLNY_{zc}} \right]^{\frac{1}{1-\sigma_i}}$$

where we used values $\sigma_A = 3.5$ and $\sigma_M = 2.5$ as per Table 3. All estimations are performed using the PPML estimator proposed by Santos Silva and Tenreyro (2006) to control for heteroscedasticity in trade data and to allow for zero flows. All gravity variables used here were obtained from CEPII, as reported by Conte et al. (2022).

Here we document the results of following the previous procedure for yearly bilateral flows of the ten years before and including t, where t =1984, 1994, 2004 and 2014. Summary statistics of the results are reported in Table A.19.

Table A.19: Estimated measures of bilateral trade frictions τ_{zcit}

year			τ_{zcAt}					τ_{zcMt}		
	mean	median	sd	min	max	mean	median	sd	min	max
1984	2.448	2.439	0.305	1.390	2.840	3.281	3.193	1.034	1.084	4.813
1994	2.292	2.266	0.294	1.339	2.665	2.770	2.483	0.788	1.137	3.945
2004	2.580	2.602	0.496	1.135	3.154	3.125	3.026	1.205	1.016	4.977
2014	2.826	2.956	0.558	1.121	3.485	3.721	3.577	1.498	1.010	5.833

Notes: Each τ_{zcit} corresponds to an estimated measure of trade resistance between origin z and destination c (where all origins z are considered separately), in product $i = A, M$ at t. Industries are defined as $A1$ and $M1$ as per Table A.1. Estimations constructed following Anderson et al. (2020) on trade data at four-digits, for ten-year periods ending in 1984, 1994, 2004 and 2014. Maximum values reported ignore infinite values.

For the quantitative exercise in Section 6.2.2 we compute values for τ_{zcit} where $t = 1984, 2000$, using yearly flows belonging to the 10 year periods leading up to, and including t. We then compute the frictions between c and its rest of the world c' as a weighted average of all bilateral trade costs across c and its trade partners z, where weights are given by the relative importance of each particular flow. This yields a single measure of trade resistance between c and its rest of the world c', that we denote $\tau_{c'cit}$.

A.10 Additional quantitative results

Table A.20 presents a summary of the results regarding terms of trade for all countries for which WDI reports data on terms of trade and are not intensively specialized in extractive products (as per the definition in Section 2). Column 1 indicates whether the country is classified here as largely agricultural (A) or manufacturing (M) as per the narrower definitions in Section 2. Column 2 shows the change in terms of trade as reported by WDI for the period 1984-2000. Column 3 reports the slope of the line that fits the terms of trade data. Column 4 gives the slope that results for terms of trade from the full model. Column 5 presents the slope from a model with no extensive margin growth. Naturally, a gap between the observed trend and the trend predicted by the model without extensive margin growth is to be expected. Column 6 measures the percentage of that gap that is closed by allowing for product diversification in the model, and is computed as the difference between (4) and (5) as a share of the gap, with gap=$|(3)-(5)|$. The value in column 6 is positive if extensive margin growth contributes positively in closing the gap and negative if it takes the model further away from the data. The value is larger than one if the contribution more than closes the gap (the extensive margin over-contributes).

Comparing columns 3 and 4, it is possible to see that the signs coincide in almost all cases and the magnitudes are, for the most part, in the same order of magnitude. The model with no extensive margin growth (column 5) also replicates the change in terms of trade qualitatively, but in most cases the gap between its prediction and the trend in the data, i.e., the difference between columns 3 and 5, is larger than that observed in the full model (3-4). In a similar vein, almost all values in column 6 are positive, which means that allowing for product diversification in the model effectively pushes the prediction in the direction of the data.

Table A.21 compares observed changes in the expenditure share in agricultural goods, with those that obtain from different scenarios of the quantitative model. For this exercise, a version of the model without non-homotheticities in preferences is also computed so we can quantify the contribution of that channel and compare that to the contribution of extensive margin growth. The data on agricultural shares in expenditure are the same used in Section 6.2.1, and cover different time frames for each country. Results are presented for all countries for which we obtain quantitative results and data on expenditure shares in available (18 countries). Given that the focus of this exercise is on expenditure patterns there is no need to exclude extractive economies or limit our time for it. The period covered is reported in column 1. Column 2 gives the slope of the trend estimated using these data. Columns 3-5 report comparable slopes coming from the full model, the model where non-homotheticities in preferences are eliminated and the model with no extensive margin growth respectively. Column 6 reports the percentage of the gap

Table A.20: Changes in TT_c observed vs predicted (1984-2000)

	(1)	(2)	(3)	(4)	(5)	(6)
Country	Class	dTT Data	Slope Data	Slope Full	Slope No Ext.	% Gap Extensive
ARG	A	0.194	1.127	0.288	0.068	0.208
BDI	A	-0.623	-9.755	-1.272	-1.519	-0.030
BEN	A	0.015	0.724	0.821	0.454	1.359
BFA	A	0.173	1.541	0.628	0.888	-0.397
CRI	A	0.220	1.203	-0.013	-0.893	0.420
GNB	A	-0.624	-9.996	-0.092	0.429	0.050
GTM	A	-0.010	-0.467	-0.020	0.059	0.150
KEN	A	0.149	2.092	0.199	-1.656	0.495
MDG	A	-0.063	-0.728	-0.223	-0.076	0.227
MLI	A	-0.198	-1.621	-1.954	-0.372	1.267
PAN	A	0.111	1.134	0.032	0.184	-0.159
PRY	A	0.069	2.246	0.119	5.204	1.719
SEN	A	-0.382	-3.514	-3.459	-1.690	0.970
TCD	A	-0.081	-1.273	0.000	1.178	0.481
TGO	A	-0.267	-2.725	-1.571	-0.808	0.398
UGA	A	-0.662	-10.268	-0.360	0.989	0.120
URY	A	-0.058	-0.368	-0.025	-0.030	-0.014
BGD	M	-0.264	-2.367	-0.657	-0.343	0.155
BRA	M	0.608	3.341	0.012	-0.345	0.097
CHN	M	0.035	0.980	0.316	0.337	-0.033
DOM	M	-0.289	-3.674	0.319	-0.296	-0.182
JOR	M	0.154	1.314	0.388	-0.099	0.345
KOR	M	-0.165	-0.954	-0.046	0.124	0.157
LKA	M	-0.130	0.391	0.203	1.805	1.133
MAR	M	0.253	1.280	0.096	-0.002	0.076
MEX	M	-0.493	-3.641	-7.277	-0.323	2.096
MUS	M	0.230	0.576	0.207	-0.238	0.546
MYS	M	0.159	1.819	0.232	-0.094	0.170
PAK	M	-0.186	-0.847	-0.196	-0.151	0.065
SGP	M	-0.202	-1.522	-0.023	0.123	0.089
SLV	M	0.695	2.135	0.473	-0.121	0.263
THA	M	-0.210	-1.357	-1.263	1.874	0.971
TUN	M	-0.114	-1.482	-0.017	0.126	0.089
TUR	M	-0.067	-0.018	-0.021	0.695	1.005
USA	M	0.089	0.452	0.247	0.247	0.000

Notes: Results presented for all countries for which required data is available and specialization is not in extractive products. Column 1: specialization of a country as per definitions in Section 2. Column 2: change in terms of trade as reported by WDI for the period 1984-2000. Column 3: fitted trend on data. Column 4: trend in terms of trade from full model. Column 5: slope from model with no extensive margin growth. Column 6: percentage of the gap ($|(3)-(5)|$) closed by extensive margin growth.

between the data and the model ($|(2)-(4)|$) closed by preferences being non-homothetic. Similarly, column 7 measures the percentage of the gap ($|(2)-(5)|$) closed by extensive margin growth.

Comparison of columns 2 and 3 reveal the full model is able to replicate trends in expenditure shares fairly closely for almost all countries. Moreover, inspection of columns

Table A.21: Changes in α_A observed vs predicted

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Period	Slope Data	Slope Full	Slope no Non-Hom.	Slope no Extensive	% gap Non-Hom.	% gap Extensive
AUT	1995-2013	-0.0009	-0.0007	-0.0004	-0.0004	0.5762	0.5753
CAN	1981-2014	-0.0020	-0.0016	-0.0030	-0.0017	1.4801	-0.2977
COL	2005-2014	-0.0045	-0.0051	0.0551	-0.0018	1.0098	1.2186
DNK	1970-2013	-0.0033	-0.0026	-0.0021	0.0000	0.3870	0.7777
ESP	1995-2014	-0.0025	-0.0156	0.0174	-0.0371	1.6618	0.6209
FIN	1975-2014	-0.0037	-0.0921	-0.0525	-0.0602	-0.8113	-0.5638
FRA	1970-2014	-0.0017	-0.0057	0.0044	0.0032	1.6586	1.8117
GBR	1995-2014	-0.0010	0.0001	0.0013	0.0000	0.5307	-0.1042
GRC	1995-2012	-0.0001	-0.0003	0.0007	-0.0003	1.2437	0.0943
IRL	1995-2014	-0.0032	-0.0034	-0.0036	-0.0021	0.4959	1.1934
ISL	1995-2014	-0.0025	-0.0001	0.0000	0.0040	0.0510	0.6302
ISR	1995-2013	0.0002	0.0000	0.0016	0.0000	1.1463	0.0019
ITA	1995-2014	-0.0014	-0.0002	0.0000	-0.0006	0.1429	-0.4565
KOR	1970-2014	-0.0090	-0.0110	-0.0220	-0.0176	0.8457	0.7668
MEX	1993-2014	0.0000	0.0000	0.0020	0.0000	1.0207	-0.0304
NLD	1995-2013	-0.0003	-0.0011	-0.0023	-0.0037	0.6105	0.7725
NOR	1970-2014	-0.0028	-0.0022	0.0012	-0.0022	0.8426	-0.0202
PRT	1995-2013	-0.0011	0.0025	0.0012	0.0013	-0.6212	-0.5297
SWE	1993-2013	-0.0016	-0.0022	-0.0023	0.0017	0.1024	1.1810
USA	1947-2010	-0.0022	-0.0011	-0.0002	-0.0011	0.4484	-0.0294

Notes: Results presented for all countries for which required data is available. Column 1: period for which data on expenditure shares in agricultural goods (α_A) is available. Column 2: slope in α_A over that period. Column 3: trend in α_A from full model. Column 4: slope from model with homothetic preferences. Column 5: slope from model with no extensive margin growth. Column 6: percentage of the gap ($|(2) - (4)|$) closed by preferences being non-homothetic. Column 7: percentage of gap ($|(2) - (5)|$) closed by extensive margin growth.

4-7 underscore that both non-homothetic preferences and uneven extensive margin growth contribute to explain expenditure shifts, with their relative importance varying for different countries. While gaps between the model and the data are not as large as for the case of terms of trade, both mechanisms are found to contribute a quantitatively relevant part of expenditure shifts. Narrowing down on product diversification, column 7 reveals that the mechanism contributes positively to the prediction of the full model in almost all cases, and that contribution can be very important.

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