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The Elusive Effects of Trade on Growth:
Export Diversity and Economic Take-Off*

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Abstract

The hallmark of the voluminous growth determinants literature is the absence of a clear cut effect of trade on growth. Numerous alternative candidate regressors have been motivated by alternative theories and tested by a multitude of empirical studies, but not one trade regressor has been robustly related to growth. In this paper we leverage Melitz' (2003) insights regarding sectoral export dynamic and Feenstra and Kee (2008) approach to productivity and sectoral export diversity to propose a structured approach to trade and growth determinants. Instead of relying on aggregate trade measures as previous studies, we examine the diversity of sectoral exports and the development of broad-based comparative advantage as a potential growth determinant. Controlling for model uncertainty and endogeneity, we find that export diversity serves as a crucial growth determinant for low income countries, an effect that weakens with the level of development.

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I. Introduction

The elusive effects of trade are a fundamental puzzle in the growth determinants literature. Numerous theories link trade to economic growth, but exhaustive analyses of growth determinants have not produced robust trade effects.[1] Endogeneity bias compounds the issue since feedback effects from growth to trade are commonly ignored in studies that examine a wide range of growth determinants.[2] Complicating matters further is the multitude of trade channels and their positive *or* negative effects on growth that different theories suggest. When competing theories propose alternative candidate regressors and/or opposing effects, the associated model uncertainty may artificially inflate t-statistics and narrow confidence intervals (see Raftery, 1995 and Raftery and Zheng, 2003).

In this paper, we extend the empirical trade-and-growth literature in two dimensions. First we provide a structured approach to identifying trade effects on growth. We follow Hausmann et al. (2007) who advocate that growth is determined by the composition of trade, not simply by export volumes. While previous growth determinant approaches use aggregate trade measures, we examine trade-driven growth through sectoral export diversification. We do not rely on aggregate tariff levels or aggregate (primary) trade volumes, but instead examine variations in the breadth of countries' comparative advantages across sectors as a potential growth determinant. Second, we address model uncertainty and endogeneity simultaneously to produce consistent test statistics and reduce endogeneity/omitted variable bias.

Levine and Renelt (1992) first included trade measures in their seminal study of growth determinants. "Primary export shares", "import and export volumes" and/or "years open"[3] have since become standard candidate growth determinants in this literature. Their effects are well known not to be robust, with the exception of isolated specifications (usually for "years open"). Levine and Renelt (1992) also included Leamer's (1988) "openness measure," and two measures of "foreign exchange rate distortions" in their Extreme Bound Analysis of growth determinants

[1] Rodriguez and Rodrik (2001) provide a skeptics' guide to the related literature of reduced-form trade-and-growth empirics which includes trade measures but only a fraction of potentially relevant growth determinants. The authors side with Edward's (1993) previous trade-and-growth survey assessment that these studies "have been plagued by empirical and conceptual shortcomings. The theoretical frameworks used have been increasingly simplistic, failing to address important questions such as the exact mechanism through which export expansion affects GDP growth."

[2] The exceptions are Barro (2003) and Durlauf et al. (2008).

[3] The proportion of years in which an economy was "open to international trade."

but find that no trade measure is robustly linked to growth. Sala-i-Martin (1997) subsequently used Levine and Renelt's trade measures and added "primary export shares of GDP," Sachs and Warner's (1995) "years open" measure, as well as the "trade share" (imports plus exports over GDP). After lowering Renelt and Levine's Extreme Bound effect thresholds, he found "trade share" and "years open" to be robust.

Since the Extreme Bound thresholds are entirely arbitrary, Sala-i-Martin's analysis has since been replicated in a multitude of studies that use Bayesian Model Averaging (BMA), where effect thresholds are theory-specified. Using the original (and/or updated) Sala-i-Martin data, in cross sections or panels, with different parameter and model priors, not a single BMA paper identifies any one of the above trade measures as having a decisive effect on growth.[4] In the most recent and extensive analysis of trade, growth, and model uncertainty (without controlling for endogeneity), Eris and Ulasan (2013) examine openness, real openness, years open, tariff rates, non-tariff barriers, and the black market premium. They concur with the previous literature by finding "no evidence that trade openness is directly and robustly correlated with economic growth in the long run."

In this paper, we move away from aggregate trade measures and focus on sectoral diversity. To measure export diversity, we use the extensive margin measure introduced by Hummels and Klenow (2005), which is based on earlier work by Feenstra (1994).[5] The Hummels-Klenow measure has been employed extensively in the study of trade diversity and income patterns - although its relationship to economic growth has not been explored to date. The descriptive literature examining trade diversity and income patters finds conflicting results. For advanced countries, income was found to be correlated with increasing or constant export diversification (Proudman and Redding, 2000, and Funke and Ruhwedel, 2001). Studies utilizing global panels find that exports first diversify and then re-concentrate with income (Cadot et al., 2011, and Papageorgiou and Spatafora, 2012), or that diversity is rising throughout, but with decreasing intensity (see Figure 1 and also Brasili et al., 2000, De Benedictis et al., 2009, Parteka, 2010, and Besedes and Prusa, 2011). The only one salient and uncontroversial feature of

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[4] See Fernández at al. (2001), Brock and Durlauf (2001), Sala-i-Martin et al. (2004), Durlauf et al. (2008), Ciccone and Jarocinski (2010), Eicher et al. (2011). Note that BMA results have better predictive performance and a lower Mean Square Errors than any single regression model (Raftery and Zheng, 2003).

[5] Our empirical results are robust to using other export diversity measures commonly used in the literature, such as Herfindahl, Gini and Theil indices. Detailed results are provided below in the robustness section.

this literature is then that diversification *levels* differ distinctly by development stages. That is, the relationship between diversity and income is positive for low income countries while the correlation for high income and diversity is somewhat uncertain.[6]

The structure of this paper builds on Durlauf et al.'s (2008) seminal BMA panel growth study. We extend the time dimension of the Durlauf et al. panel and introduce trade diversity as a potential growth determinant. In addition, we utilize a methodology that fully accounts for model uncertainty and endogeneity, since Durlauf et al. examined model uncertainty in the second stage only. Our findings confirm Durlauf et al's earlier results that aggregate trade is not a robust growth determinant in a panel of countries.

Once we allow for nonlinear effects of export diversity, however, we find that it is a crucial determinant of economic growth for low income countries. The effect features not only a high inclusion probability, but is also economically important: a one standard deviation increase in export diversity is shown to increase the average annual growth rate by one percentage point for low income countries. Aside from trade diversity, the growth determinants suggested by our approach are those central to all previous studies: initial GDP, population growth and investment reflecting neoclassical models, governance quality and government expenditures reflecting new growth theories as well as some support for recent religion and growth theories with an effect of the fraction Jewish.

The remainder of the paper is organized as follows. Section II sketches the various links between trade, diversity and growth suggested in the literature and highlights the importance of addressing model uncertainty in this context. Section II also discusses our preferred measure of export diversity and our empirical specification. Section III provides an overview of the IVBMA methodology, Section IV describes the structure of the panel of countries used in our empirical analysis and also introduces alternative export diversity measures considered in the literature. Section V presents a discussion of the empirical results and Section VI concludes.

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[6] The descriptive literature also developed stylized facts that relate trade diversity to aggregate trade growth. Hummels and Klenow (2005) show that larger (in terms of GDP) and richer countries (in terms of GDP per capita) have greater trade volumes and more diversified exports. Brenton and Newfarmer (2007) document that increased trade diversity accounts for 20 percent of trade growth in developing nations, while Kehoe and Ruhl (2013) show that it explains 10 percent of trade growth in advanced countries. Below we take this literature one step further and examine the effects of diversity on economic growth.

II. Trade, Diversity and Growth Determinants

To appreciate the dichotomy between the absence of trade effects in growth regressions and the number of theories that relate trade to growth, we briefly summarize the trade and growth effects and their associated candidate regressors that have been suggested by trade theories. Theories that link trade to growth rely either on transitions dynamics (e.g., the HOS, Ricardo, or two-sector open economy Solow models), or on dynamics that alter the growth rate in perpetuity. Models that rely on transition dynamics focus on static comparative advantage and aggregate trade volumes. Empirical estimates of these models pick up the expansion of export volumes due to trade-induced resource reallocation from uncompetitive to competitive sectors (see Bernhofen, 2011).

Endogenous growth models that focus on international trade imply dynamic sectoral reallocations and trade effects via learning by doing across sectors (Young, 1991), intra- and intersectoral knowledge spillovers (Grossman and Helpman, 1991), higher quality products and product cycle dynamics (Aghion and Howitt, 1992), or increases in varieties (Rivera-Batiz and Romer, 1992). These theories all suggest growth accelerations through export expansions at the extensive margin, since more sectors generate additional learning, spillovers, or incentives to invent better qualities or more varieties.

There is, however, no theoretical presumption in favor of unambiguously positive trade effects on growth. Unless trade takes place between identical countries, endogenous growth theories imply that counties experience differential effects of trade on growth. Laggard countries may well experience growth reductions when trade shifts production towards less dynamic sectors in terms of learning, spillover or R&D intensive goods, see Grossman and Helpman (1991), Feenstra (1996), Matsuyama (1992), Rivera-Batiz and Romer (1992), and Young (1991). Given that fast growth rates in developing countries are often attributed to the adoption of technologies that originated elsewhere, imitation is potentially a more relevant source of growth for low income countries (see e.g., Edwards, 1992). Depending on the degree of imitation and intellectual property rights protection, growth in such economies might be enhanced via increased product market competition or slowed by reduced innovation incentives (see Aghion et al., 2001).

Recent monopolistically competitive trade models that feature heterogeneous firms allow for stochastic differences in technologies across countries and their empirical implementations usually focus on export dynamics within sectors (see Eaton and Kortum, 2002, Melitz, 2003, Bernard et al., 2007, and Chaney, 2008). Feenstra and Kee (2008) point out, however, that even in heterogeneous firm trade models increases in the share of exporting firms (or exported varieties) imply increased average productivity and growth, since only the most productive firms export. It is exactly these dynamics that we hope to capture in our empirical analysis. While global firm data is not available, we can capture the dynamic evolution of exports by considering countries' extensive margin of trade.

Dynamic and static trade models thus provide diverse trade and growth channels that might differ in importance depending on a country's level of development. The importance of trade for growth is then best captured by examining sectoral export diversity, since it allows for a disaggregation of trade flows to account for dynamic trade effects. To quantify the effect of sectoral export expansion on growth, we use the extensive margin measure suggested by Hummels and Klenow (2005) which has the advantage of being firmly rooted in trade theory.[7] The Hummels-Klenow measure appropriately integrates new products into price indices (see Feenstra, 1994) which is crucial in dynamic sectoral studies. Specifically the extensive margin measure for country *j*'s exports to country *n* in year *t*, EM_{jnt}, is given by:

$$EM_{jnt} = \frac{\sum_{i \in I_{jnt}} X_{knit}}{\sum_{i \in I_{kt}} X_{knit}} \qquad (1)$$

where i denotes a Comtrade sector, and I_{jnt} and I_{kt} are the sets of sectors in which *j* and the rest-of-the-world, *k*, have positive exports to *n* in year *t*, respectively. X_{knit} is the value of exports in sector *i* from all countries other than *j* to country *n* in year *t*. EM_{jnt} then measures the diversification of *j*'s export basket to country *n* in year *t* by calculating the share of the rest-of-the-world's exports to *n* that is contributed by the set of sectors that is also exported by *j* to *n*. The importance of each sector *i* in computing the diversity of *j*'s exports to *n* then corresponds to its share in *n*'s imports from the rest-of-the-world. To obtain a single export diversity measure for each country, we aggregate the individual EM_{jnt} measures over all markets other than *j*, N_{-jt}:

[7] Alternative measures exists (e.g., Gini, Theil and Herfindahl indices) and we shall examine their implication in our robustness analysis.

$$EM_{jt} = \prod_{n \in N_{-jt}} EM_{jt}^{a_{jnt}} . \qquad (2)$$

Following Hummels and Klenow (2005), a_{jnt} weighs the individual diversity measures by the logarithmic mean of country *n*'s share in country *j*'s and the rest-of-the-world exports in year *t*.[8]

Identifying the effect of export diversity on economic growth is, however, complicated by endogeneity considerations. A country's growth rate may be a key determinant of its ability to invest into R&D, which in turn drives the number of new product varieties that can be exported. To address endogeneity, we instrument our export diversity measure in the spirit of Frankel and Romer (1999) with a number of exogenous geographical features: the log of a country's land area, a dummy taking the value one for landlocked countries, and the log of a country's population.

All additional covariates and instruments used in our empirical analysis below were obtained from Durlauf et al. (2008) and the associated data update in Henderson et al. (2011). Durlauf et al. base the selection of their variables on Barro (2003), which was previously one of the most comprehensive approaches to growth determinants in a panel of countries. Durlauf et al. include proxies for seven different growth theories, including regressors suggested by I) neoclassical growth theory (initial per capita income, population growth, investment, and education). We follow Durlauf et al. and instrument for these four variables with one-period lagged values. Also included are II) proxies for demographic change (life expectancy, fertility), and III) theories that link macroeconomic policies to growth (government consumption, openness, and average changes in the CPI). As in Durlauf et al., the latter three variables are instrumented with their respective lagged values. We also consider IV) regressors that link geography to growth (land area within 100km of ice-free coast, percent tropical land area) and V) theories linking institutions to growth (risk of expropriation, constraints on the executive, and a governance index). In addition, we include dummy variables for the English and French origin of a country's legal system and use lagged values of the expropriation risk as instrument for the current value of the same variable. VI) Theories relating to religion and growth are proxied using the share of all major religions in a country's population (Eastern, Hindu, Jewish, Muslim, Orthodox, Protestant, and other religions). As Durlauf et al., we use the respective religious

[8] Formally, let λ be country *n*'s share in country *j*'s overall exports at time *t*, and Λ be the rest-of-the-world's export share to *n*, then $a_{jnt} = \{(\lambda - \Lambda)/(\ln \lambda - \ln \Lambda)\} / \sum_{n \in N_{-jt}} \{(\lambda - \Lambda)/(\ln \lambda - \ln \Lambda)\}$.

shares in 1900 as instruments. Finally, we also include regressors capturing VII) theories that predict a detrimental effect of ethnic tensions on growth (using linguistic fractionalization and ethnic tension indices). Exact definitions and sources of each variable are provided in the appendix.

III. Model Uncertainty and Endogeneity

The diversity of growth theories and their associated candidate regressors has given rise to a sizable literature that seeks to identify robust growth determinants. Early approaches used Leamer's (1978) Extreme Bound Analysis (Levine and Renelt, 1992, and Sala-i-Martin, 1997), which suffers from arbitrary robustness thresholds ("Extreme Bounds"). Subsequent approaches employ Bayesian Model Averaging, which was developed specifically to address model uncertainty empirically (Fernández at al., 2001, Brock and Durlauf, 2001, Sala-i-Martin et al., 2004, Ciccone and Jarocinski, 2010, Eicher et al., 2011). None of the above approaches tackle endogeneity, with the exception of Durlauf et al. (2008) who derive fitted values in a single first stage and address endogeneity in the second stage only. Subsequently, Eicher et al. (2009) developed a comprehensive Instrumental Variable (IV) extension of BMA that allows for model selection in both stages, which we apply below.[9]

We provide a brief sketch of the mechanics of IVBMA that follows the details in Eicher et al. (2009). IVBMA functions as a BMA procedure at the first and second stages where final model weights take into account uncertainty in both stages. Traditionally, endogeneity is addressed by applying 2SLS and certifying over-identification and instrument restrictions (e.g., Wooldridge, 2001) in the canonical setup

$$y = \beta' \begin{pmatrix} w \\ x \end{pmatrix} + \eta , \tag{3}$$

$$w = \theta_z' z + \theta_x' x + \varepsilon , \tag{4}$$

[9] Similar approaches have been suggested by Moral-Benito (2012) and Chen et al. (2009), who extend BMA to Generalized Method of Moments. Koop et al. (2012) develop a Bayesian IV methodology that does not rely on Eicher et al.'s (2009) approximations to integrated likelihoods and Karl and Lenkoski (2012) introduce conditional Bayes factors to resolve mixing difficulties associated with Koop's et al. (2012) search algorithm. To implement IVBMA, we use Lenkoski's IVBMA R-package below.

where *y* is the dependent variable, *x* is a set of covariates, *w* is the set of endogenous variables, and *z* is the set of instruments. The *x* and θ_x are of dimension p_x, and *z* and θ_z have dimension p_z. To simplify the exposition we assume that *w* is univariate. Assuming that

$$\begin{pmatrix}\eta\\ \varepsilon\end{pmatrix} \sim N\left(\begin{pmatrix}0\\0\end{pmatrix},\begin{pmatrix}\sigma_\eta^2 & \sigma_{\eta\varepsilon}^2\\ \sigma_{\eta\varepsilon}^2 & \sigma_\varepsilon^2\end{pmatrix}\right), \qquad (5)$$

the classical endogenous variable situation arises when $\sigma_{\eta\varepsilon}^2 \neq 0$, causing *w* to violate the regression assumption of independence of the error term, η. The determination of *w* then leads to inconsistent estimates of the entire coefficient vector, β. 2SLS solves the consistency problem, but relies on the existence of a set of instrumental variables (IV), *z*, which are independent of *y*, given *w* and the vector of covariates, *x*. The IV-based estimates, $\beta_{IV} = \left(\overline{w}'\overline{w}\right)^{-1}\overline{w}'y$, obtained using the fitted values from the first stage, $\overline{w}$, are consistent if the conditional independence assumptions are valid.

IVBMA combines the IV and BMA methodologies. It processes the data much like a two stage least square estimator while also addressing model uncertainty in both stages. The first stage is a straight BMA application to identify effective instruments. Let Δ be a quantity of interest and let the set of potential models in the first stage, $\tilde{M}$, be comprised of $\tilde{M}_i \in \tilde{M}$ individual models. The posterior distribution of Δ given the data, *D*, is given by the weighted average of the predictive distribution under each model, using as weights the models' corresponding posterior probabilities:

$$pr(\Delta \mid D) = \sum_{\tilde{M}_i \in \tilde{M}} pr\left(\Delta \mid \tilde{M}_i, D\right) pr\left(\tilde{M}_i \mid D\right), \qquad (6)$$

where $pr\left(\Delta \mid \tilde{M}_i, D\right)$ is the predictive distribution and $pr\left(\tilde{M}_i \mid D\right)$ is the posterior model probability of model $\tilde{M}_i$. The posterior model probability, $\tilde{\pi}_i$, for each model in the first stage is given by

$$\tilde{\pi}_i = pr\left(\tilde{M}_i \mid D\right) \propto pr\left(D \mid \tilde{M}_i\right) pr\left(\tilde{M}_i\right), \qquad (7)$$

where

$$pr\left(D \mid \tilde{M}_i\right) = \int pr\left(D \mid \theta_i, \tilde{M}_i\right) pr\left(\theta_i \mid \tilde{M}_i\right) d\theta_i \qquad (8)$$

is the integrated likelihood of model $\tilde{M}_i$ with model parameters θ_i. The prior densities for parameters and models are given by $pr\left(\theta_i \mid \tilde{M}_i\right)$ and $pr\left(\tilde{M}_i\right)$, respectively. The posterior mean in stage 1 is then

$$\hat{\theta}_{BMA} = \sum_{\tilde{M}_i \in \tilde{M}} \hat{\theta}_i \tilde{\pi}_i , \qquad (9)$$

which is given by the sum of the posterior means of all models, weighted by their respective posterior model probabilities. Similarly, the posterior variance can be calculated as

$$\hat{\sigma}_{BMA}[\theta] = \sum_{\tilde{M}_i \in \tilde{M}} \tilde{\pi}_i \, \hat{\sigma}_i + \sum_{\tilde{M}_i \in \tilde{M}} \tilde{\pi}_i \left(\hat{\theta}_i - \hat{\theta}_{BMA}\right)^2 . \qquad (10)$$

The variance has a clear interpretation that highlights how model uncertainty is accounted for by standard errors of the BMA methodology. The first term in (10) is the weighted variance for each model, $\hat{\sigma}_i = Var\left(\hat{\theta}_i \mid \tilde{M}_i, D\right)$, summed over all relevant models, and the second term indicates how stable the estimates are across models. The more the estimates differ across models, the greater is the posterior variance.

The posterior distribution for a parameter is a mixture of a regular posterior distribution and a point mass at zero, which represents the probability that the parameter equals zero. The sum of the posterior probabilities of the models that contain the variable is called the inclusion probability and can then be taken as a measure of the importance of a variable

$$\mu_{BMA}[\theta] = pr\left(\hat{\theta} \neq 0 \mid D\right) = \sum_{\tilde{M}_i \in \tilde{M}_A} \tilde{\pi}_i . \qquad (11)$$

where $\tilde{M}_A$ is the set of models in the first stage in which parameter θ is not constrained to zero.

IVBMA is then a nested approach that first determines the posterior model probabilities in the first stage according to the BMA methodology, and then uses the predicted values from each model, $\overline{w}_i$, to derive second stage model posterior model probabilities, $\pi_j\left[\overline{w}_i\right]$, and estimates, $\hat{\beta}_j\left[\overline{w}_i\right]$. The set of models in the second stage is denoted by M, which consists of all second stage models $M_j \in M$.

The posterior means for the second stage can then be derived to be

$$\begin{aligned}\tilde{\hat{\beta}}_{IVBMA} &= \sum_{\tilde{M}_i \in \tilde{M}} \sum_{M_j \in M} \tilde{\pi}_i \pi_j [\overline{w}_i] \hat{\beta}_j [\overline{w}_i] \\ &= \sum_{\tilde{M}_i \in \tilde{M}} \tilde{\pi}_i \tilde{\hat{\beta}}_{i,BMA}\end{aligned} \tag{12}$$

which implies that the IVBMA estimate is the sum of the averaged posterior IV means obtained using the fitted values from each first stage model, $\tilde{M}_i$, weighted by the respective quality of each individual first stage specification.

The posterior variance reflects how stable the estimates are across models, and how estimates differ across models in both the first and second stage, just as in the canonical BMA setup in (10), captured by $\tilde{\hat{\sigma}}_{BMA}[\beta]$. However, IVBMA also takes into account the model weights derived in the first stage so that the posterior variance is again weighted by the quality of its instrumenting models:

$$\tilde{\hat{\sigma}}_{IVBMA}[\beta] = \sum_{\tilde{M}_i \in \tilde{M}} \tilde{\pi}_i \tilde{\hat{\sigma}}_{i,BMA}[\beta]. \tag{13}$$

Therefore, results generated by underperforming instrument models are deemphasized, while those based on strong instrument models receive relatively high posterior weights. A similar interpretation holds for the IVBMA inclusion probabilities:

$$\mu_{IVBMA}[\beta] = pr\left(\hat{\beta} \neq 0 \mid D\right) = \sum_{\tilde{M}_i \in \tilde{M}, M \in M_A} \tilde{\pi}_i \mu_{i,BMA}[\beta] \tag{14}$$

Where M_A indicates the subset of second stage models for which the coefficient β is not constrained to zero. Standard rules of thumb for interpreting μ_{IVBMA} have been provided by Kass and Raftery (1995) and Eicher et al. (2009). They establish the following effect thresholds: < 50% evidence against the effect, 50-75% weak evidence for the effect, 75-95% positive evidence, 95-99% strong evidence, and > 99% decisive evidence.

IV. Data

The dataset is an unbalanced panel of 84 countries from 1965 to 2009. Using 5-year periods, the dataset comprises 589 country-period observations. To extend the datasets of Durlauf et al.

(2008) and Henderson et al. (2011), we used government expenditure as share of GDP instead of government expenditures net of education and military expenditures. In addition, the Durlauf et al. "Cheque" data on legal procedures required to collect a bounced check (from World Bank Doing-Business Indicators) is only available for a limited set of countries. Djankov et al. (2003) and LaPorta et al. (2008) document the strong empirical relationship between legal origin and current legal procedures and standards, hence we substitute LegalOrigins (French and English) for Cheque in our regressions.

Since our focus is on the relationship between diversity and growth, we exclude from our analysis resource-rich economies that generate more than 20 percent of their GDP from resource rents (as reported by the World Development Indicators). Resource-rich countries represent sizable outliers with unusually low export diversity relative to their income levels. These countries have developed significant volumes of natural resource exports, which is not a relevant development path for the vast majority of countries in our sample. Removing resource-rich countries allows us to focus on understanding whether the development of diversified export structures and broad-based comparative advantages are advantageous for growth. While the combination of the described changes overall allow for a larger dataset, they do not affect our findings; qualitatively similar results can be derived with fewer countries and years, and when allowing for the inclusion of resource-rich economies.

The dependent variable in our analysis is the average growth rate of GDP per capita during each 5-year period. Growth rates were calculated using data on per capita incomes from the Penn World Tables versions 6.2 (until 2004) and 7.1 (2005-2009). We also include period and regional dummies (Sub-Saharan Africa, East Asia, Latin America and the Caribbean) to control for spatial and time effects on growth. To construct the Hummels and Klenow (2005) extensive margin measure of export diversification, we use trade data from Feenstra et al. (2005, 4-digit SITC for 1962-1989) and from the UN Comtrade database (6-digit HS for 1990-2009). For both classifications sectoral exports were compiled using mirror import data.

To check the robustness of our empirical results, we also provide estimates based on alternative export diversity indicators that have previously been used in the trade diversity literature (see Cadot et al., 2011, for a survey of these measures): Herfindahl, Gini, Total Theil, Between Theil and Within Theil indices. Each of these indices captures slightly different dimensions of export diversification. The Herfindahl index is a measure of the concentration of export shares. Both the Gini and Total Theil indices, on the other hand, gauge export diversification based on the inequality between export shares of individual sectors. The Total Theil index is composed of the Between Theil and the Within Theil indices. The Between Theil index measures export diversification based on the evolution of the extensive margin, while the Within Theil index captures export diversification at the intensive margin. In particular, the latter measures how equally exports are distributed across active export lines independent of the actual of number of active export sectors. While all alternative measures are quite similar in nature to the Hummels-Klenow diversity measure, the Within Theil index adds one distinctly different diversity dimension by focusing on how evenly sectoral export volumes evolve over time. To ensure comparability, all alternative export diversity measures are normalized to lie between zero and one. As shown in the robustness section, our results are not dependent on the choice of the diversity measure.

Finally we also construct an entirely new diversity measure, based on the Hummels-Klenow approach to control for potentially serious measurement errors in the COMTRADE data. It is well known that the UN trade database features arbitrary and potentially misleading sector classifications in the HS and SITC nomenclatures, as they were not designed to provide meaningful sectoral trade statistics, but primarily to monitor tariff collection (see Cadot et al., 2011). The measurement error arises when sector classifications contain either excessively irrelevant or insufficiently differentiated sectors.[10]

For example, for our use of the data it is crucial to understand whether a country is expanding its export sectors from leather sandals to leather loafers, or from leather sandals to computers. To address this issue, we cluster the 4-digit SITC and 6-digit HS sectors by the similarity of their production processes. Using the 2002 US benchmark Input-Output table from the US Bureau of Economic Analysis, we employ complete-linkage clustering to aggregate individual sectors into broad clusters based on the similarity of their input usage (using a Euclidian distance measure). The sensitivity of the algorithm can be adjusted from a Euclidian distance of 0 (replicating the original SITC/HS sectors) to 1 (grouping all sectors into one single

[10] For example "Woman Suits" HS6201 and Woman Suits knitted" HS6204 contain 47 HS six-digit sectors while all "Machinery Parts Without Electrical Connectors" are grouped into a single HS 8485 four-digit sector that contains only two six-digit subsectors ("Ships' Propellers" HS 878510 and "All Other Machinery Parts Not Containing Electrical Features" HS 848590).

sector). We then use the generated product clusters to calculate an alternative Hummels-Klenow measure, which accounts for the similarity of the export sectors' production processes.

V. Export Diversity, Stages of Development and Growth

The approach of our paper dictates the order in which we present the results. We first introduce *i)* sectoral export diversity as a potential growth determinant. Then we examine *ii)* the importance of endogeneity in trade/growth regressions. Finally we address *iii)* model uncertainty and endogeneity simultaneously. To highlight the importance of model uncertainty, we first compare OLS and 2SLS results and then introduce IVBMA and trade diversity in stages to isolate their individual effects. We conclude with a discussion of the robustness of our results. In the robustness section, we allow for alternative export diversity measures and motivate additional controls that have previously been linked to trade and diversity.

V.1 OLS Baseline Results

Our OLS results provide a direct baseline comparison with previous growth determinant studies. Column 1 in Table 1 reports OLS results without export diversity, producing roughly comparable results to the OLS regressions in Barro (2003). As expected, InitialGDP, Investment and PopulationGrowth are significant, as suggested by the neoclassical model, along with institutional factors such as GovernanceQuality, GovExpenditures, and ExecutiveConstraint. As in Barro (2003), religious measures (Jewish, Protestant) are significant while one trade measure, FilteredOpenness (the filtered ratio of imports plus exports over GDP), is significant at the 10% level. Barro (2003) and Durlauf et al. (2008) found that the weak OLS trade effect disappeared once they controlled for endogeneity.

Column 2 adds export diversity to the standard growth determinants, but it is not significant in the global sample. The result is not surprising given that the slope of the partial correlation between growth and export diversity is close to zero in Figure 2. On the other hand, we are able to confirm that the effect of diversity on growth is declining with income, as shown in column 3 of Table 1.[11] The OLS regression traces out the relationship in Figure 1, where

[11] The income dummies included in column 3 are derived from the World Bank's definition of high, upper medium, lower medium, and low income levels. Diversity effects by country-income levels are calculated as the sum of the main export diversity coefficient and the respective country-income interaction with the diversity term. The standard errors of the composite coefficients effects are calculated using the Delta method.

diversity is positively related to growth, but it is diminishing with income. The economic effect of diversity on low income countries is sizable, implying that a one standard deviation increase in export diversity raises average annual growth in low income countries by just about 1 percentage point.[12]

V.2 2SLS: Controlling for Endogeneity

As outlined in Section II, there is ample evidence for feedback effects from growth to trade. Column 4 in Table 1 acknowledges not only trade endogeneity, but also the potential endogeneity of 18 other growth determinants in our dataset whose respective instruments are described in Section II.[13] Given the large number of endogenous regressors, we report the Angrist-Pischke test statistics that indicate whether a particular endogenous regressor is identified. The Angrist-Pischke first-stage chi-squared and F statistics are tests of underidentification and weak identification, respectively.[14] Underidentification and weak identification are rejected at the 5 percent level for all endogenous variables. In the full 2SLS model, the Sargan-Hansen J statistic rejects, however, instrument validity, indicating that a more parsimonious 2SLS specification may be preferred as we will show below.

In terms of significance, the 2SLS results in column 4 coincide by and large with the OLS growth determinants in column 3. Aside from Investment, only the marginally significant ExecutiveConstraint and EasternReligionFraction in the OLS regression lose significance in the 2SLS approach. The loss of significance for Investment is worrisome, but not surprising. While Investment is seen as a universal growth determinant in theory, previous panel studies (e.g., Durlauf et al., 2008, and Barro, 2003) also find that the significance of Investment decreases substantially after controlling for endogeneity. Note that investment becomes insignificant only after controlling for endogeneity, but before we addressing model uncertainty. Export diversity remains significant for low (and upper medium) income countries.

[12] The coefficient of 0.062 and the 0.16 standard deviation of export diversity for low income countries implies that a one standard deviation increase in diversity should increase growth by 100x0.062x0.16 = 0.992%.

[13] Following Durlauf et al (2008), the endogenous regressors are InitialGDP, ExecutiveConstraint, FilteredOpenness, GovExpenditures, Education, Investment, PopulationGrowth, Inflation, EasternReligionFraction, OrthodoxFraction, HinduFraction, MuslimFraction, OtherRelFraction, JewishFraction, ProtestantFraction, Diversity, and Diversity with three income interactions. Our instruments follow directly from Barro (2003) and Durauf et al. (2008).

[14] In the case of a single endogenous regressor, the AP statistic is identical to the Cragg-Donald (if errors are i.i.d.) or the Kleibergen-Paap (if errors are not i.i.d.) underidentification statistics, respectively.

V.3 Model Uncertainty, Endogeneity and Export Diversity

Since the set of candidate regressors in growth regressions is always an amalgam of variables suggested by a range of growth theories, it is important to control not only for endogeneity but also for the associated model uncertainty. Here it is important to note that single regressions do not account for the uncertainty surrounding the validity of the particular model in question. And while an extensive literature on model uncertainty in growth regressions exist to date, only Durlauf et al. (2008) control simultaneously for endogeneity. In addition, all empirical studies that previously included trade regressors as growth determinants focused exclusively on aggregate quantities, such as imports, exports or "openness" (the share of imports and exports in GDP). Below we examine whether the addition of sectoral trade diversity leads to an effect on growth, even after we control for endogeneity and model uncertainty.

Column 5 in Table 2 presents IVBMA results without diversity, while columns 6 and 7 add the linear and nonlinear diversity specification. In addition to posterior inclusion probabilities (PIP), we also report conditional means and standard deviations for our coefficient in order to facilitate comparisons with our OLS and 2SLS estimates above. The posterior inclusion probability of a regressor provides a probability statement regarding the importance of a regressor, which directly addresses the researchers' prime concern: it identifies the probability that a coefficient has a non-zero effect on the dependent variable.

The first set of estimates in column 5 indicates that IVBMA results are much more parsimonious than the 2SLS and OLS specifications. JewishFraction, LegalOriginsUK, HinduFraction, OrthodoxFraction, ExecutiveConstraint, EasternReligionFraction, FilteredOpenness, Fertility and LandNearCoastPct are no longer associated with an effect on growth. Instead the traditional growth determinants exhibit the highest effect thresholds: InitialGDP, GovernanceQuality, Investment, PopulationGrowth, GovExpenditures in addition to ProtestantFraction, LegalOriginsFrench, SubSaharanAfrica and Inflation. Adding Diversity in column 6 does still not lead to an effect in the global sample, but once we control for nonlinearities in column 7 we find again that export diversity has a decisive impact on growth for low income countries. A one standard deviation increase in export diversity increases growth by about 1.1 percentage points for low income countries. The IVBMA-Sargan test outlined in Eicher et al. (2009) indicates instrument validity in all IVBMA specifications in Table 2.

At this stage, it is important to contrast the IVBMA and 2SLS results to highlight the importance of controlling simultaneously for both endogeneity and model uncertainty. Of the 14 suggested growth determinants by 2SLS (Table 1, column 4) only 8 find support once we control for model uncertainty (Table 2, column 7). In addition, the IVBMA approach assigns an effect to two additional regressors that were not found to be effective in the 2SLS approach: Investment and the LowIncomeDummy. The set of growth determinants identified by IVBMA is parsimonious but expected. With InitialGDP, GovernanceQuality, Investment, PopulationGrowth, and GovExpenditures, the results show that the data provide support for both the neoclassical growth model as well as new growth theories that rely on productive government expenditures and the quality of institutions. Most importantly we have documented a crucial effect of trade, through trade diversity that drives growth in low income countries.

V.4 Robustness: Alternative Diversity Measures and Additional Controls

In this section, we examine whether our results are sensitive to the definition of our export diversity measure. A number of alternative indices have been suggested in the literature and we examine their relevance below. Although all measures identify different dimensions of sectoral export diversity, we will show that our IVBMA growth determinants and the effect of trade diversity on growth remains remarkably stable. We also examine whether our results could be caused by factors which have been identified as drivers of export diversification, for example economic integration agreements, output volatility, primary export shares, the real exchange rate and a country's terms-of-trade. We will again illustrate that our results in the previous section remain robust.

V.4.1 Alternative Diversity Measures

Table 3 reports IVBMA results with alternative trade diversity measures. The results in column 8 are based on the clustered diversity measure (with a Euclidian distance sensitivity threshold of 0.1) which groups together the original sectors by the similarity of their input structures based on the hierarchical complete-linkage clustering algorithm.[15] We choose the particular threshold to generate a parsimonious set of sectors. Thresholds below 0.1 replicate the sectors of the UN nomenclatures and thresholds above 0.1 quickly lead to excessive aggregation

[15] The clustered diversity measure groups our original 4,894 6-digit HS sectors (752 4-digit SITC sectors) into 481 (296) clusters with similar production structures.

into only a handful sectors. The clustered results are just about identical to those in column 7 in Table 2, only the formerly weakly effective UKLegalOrigins loses its effect. This finding indicates that the arbitrary nomenclature of the UN sectors does not drive our results.

Columns 9-13 in Table 3 present alternative measures of export diversity that we discussed in the data section above: Herfindahl, Gini, Total Theil, Between-Theil and Within-Theil indices. The table indicates that the baseline IVBMA results are remarkably stable and hardly change if we use alternative diversity indices. In addition, the results for the Between-Theil and the Within-Theil indicate that growth in low income countries is stimulated through both i) increases in diversity at the extensive margin as well as through ii) a more equal distribution of exports among existing export sectors.

V.4.2 Additional Control Variables

Table 4 introduces additional control variables that are potentially linked to export diversification. The regressors are not standard in growth regressions, but their omission in this context could lead to an overstatement of the diversity effect on growth. The new covariates are introduced in three stages. Column 14 adds output volatility (GDPVolatility), primary export shares (Primary), WTO membership (WTO), and membership in Preferential Trading Agreements (PTA). These variables can all be directly related to trade diversity. For instance, diversity insures against volatility and WTO/PTA membership might bring out an expansion in export volumes and sectors. In addition, we add as exchange rate measures in column 15 and 16 countries' real effective exchange rate (REER), real exchange rate volatility (FXVolatility), terms-of-trade (TOT) and TOT volatility (TOTVolatility). All additional covariates are treated as exogenous and the results again support our previous findings. The additional control variables do not change the effect of trade diversity and neither of the new variables is identified as key growth determinant. The one exception is FXVolatility, which is not traditionally included in growth regressions. In our regressions, it is estimated to have an impact on growth but without affecting the diversity-growth relationship.

VI. Concluding Remarks

In this paper, we reexamine the effect of trade on growth. Previous empirical studies of growth determinants have not found a robust relationship between trade and growth, and in this study we extend the literature to introduce disaggregated measures of trade, specifically export diversity. Using Hummels and Klenow's (2005) extensive trade margin, we find decisive evidence that export diversification is a substantial driver of growth in low income countries, but that the effect weakens and eventually vanishes for rich countries. Our findings are robust to the two major caveats encountered in growth regressions: endogeneity and model uncertainty. Our results are also robust to the inclusion of at least five alternative export diversification measures.

Overall, our findings suggest that the benefits from trade diversity are largest at the early stages of development. When the development process advances further, export diversification seems to be rather a by-product of prosperity than its cause. Export diversity could be the driver of a country's early development through several channels. More diversified economies offer an insurance against idiosyncratic sectoral shocks, especially early in the development process, when countries export only few products. Alternatively, countries with greater export diversification at early development stages may be more likely to move into the production of new products to spur growth. Hausmann and Hidalgo (2011) and Kali et al. (2013) offer a detailed discussion of this point from an economic network's perspective.

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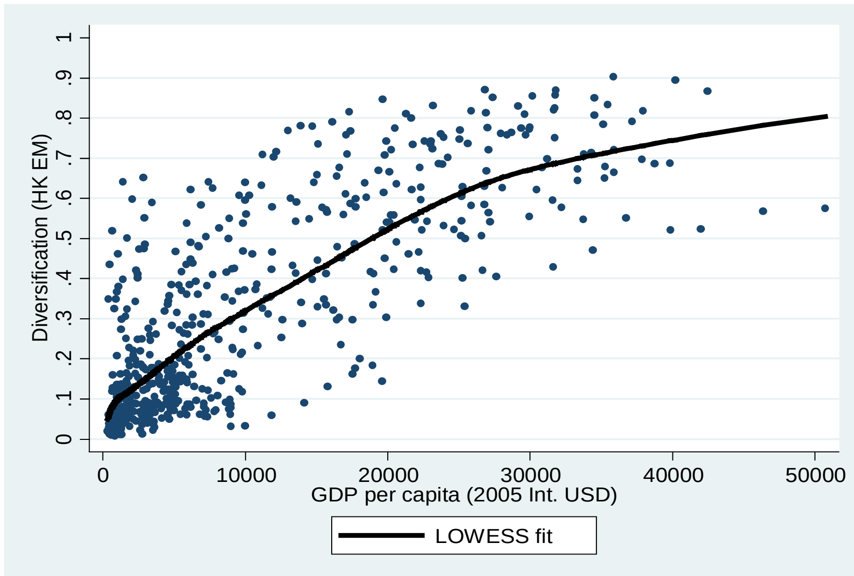
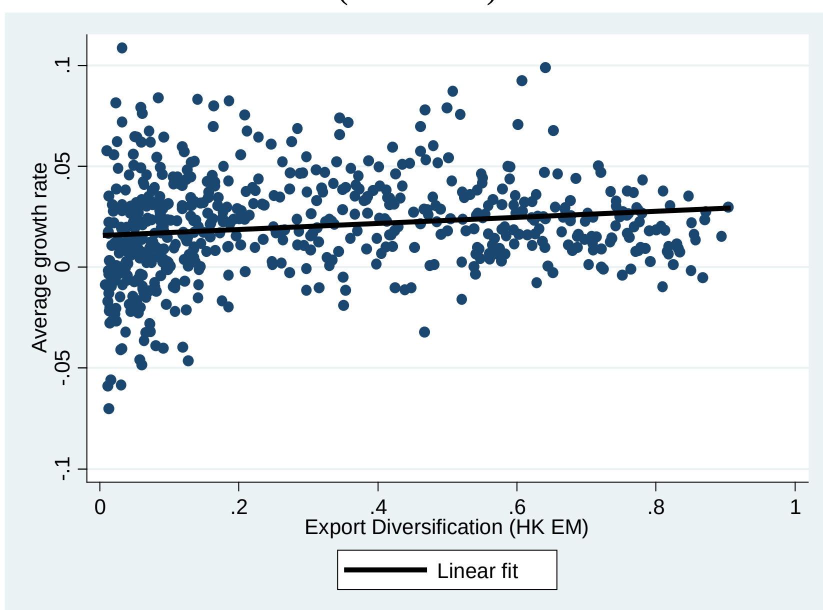
Figure 1:
Export Diversity and Per Capita Income (1965-2009)



Fitted values obtained using locally weighted scatter plot smoothing (LOWESS) of the Hummels-Klenow extensive margin diversity measure on real GDP per capita (2005 international Dollars, PWT 7.1)

Figure 2:
Average growth and Export Diversity (extensive margin)
(1965-2009)



Fitted values obtained using linear regression of the average growth rate on a constant and the Hummels-Klenow export diversity measure

Table 1

OLS and 2SLS Estimates										
	1		**2**		**3**		**4**			
	Extended DKT		Extended DKT		Extended DKT		Extended DKT			
	ols		ols		ols		2sls		AP pvalues	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	X^2	F
InitialGDP	**-0.011*** **	0.003	**-0.012*** **	0.003	**-0.015*** **	0.004	**-0.020*** **	0.005	0.000	0.000
GovernanceQuality	**0.005***	0.003	**0.006***	0.003	**0.010*** **	0.003	**0.013*** **	0.003		
Investment	**0.010*** **	0.003	**0.010*** **	0.003	**0.011*** **	0.003	0.006	0.004	0.000	0.000
GovExpenditures	**-0.107*** **	0.026	**-0.108*** **	0.026	**-0.112*** **	0.026	**-0.133*** **	0.039	0.000	0.000
PopulationGrowth	**-0.042*** **	0.012	**-0.042*** **	0.012	**-0.044*** **	0.012	**-0.058** **	0.023	0.000	0.001
JewishFraction	**0.039*** **	0.009	**0.040*** **	0.009	**0.035*** **	0.009	**0.062*** **	0.016	0.000	0.000
LegalOriginsUK	0.005	0.003	0.004	0.003	**0.007** **	0.003	**0.008***	0.005		
LegalOriginsFrench	-0.002	0.003	-0.002	0.004	-0.002	0.004	-0.001	0.005		
ProtestantFraction	**-0.007***	0.004	**-0.008***	0.004	**-0.008** **	0.004	**-0.010***	0.006	0.000	0.000
OrthodoxFraction	0.008	0.005	**0.010***	0.006	0.006	0.006	0.008	0.006	0.000	0.000
Inflation	**-0.000*** **	0.000	**-0.000*** **	0.000	**-0.000*** **	0.000	**-0.000***	0.000	0.017	0.030
Fertility	**-0.003***	0.002	**-0.003***	0.001	-0.002	0.002	-0.003	0.002		
LatinAmerica	-0.001	0.005	0.001	0.005	-0.002	0.005	-0.005	0.007		
HinduFraction	-0.001	0.012	-0.003	0.013	**-0.024***	0.014	**-0.028***	0.017	0.000	0.000
LinguisticFractionalization	-0.008	0.005	-0.007	0.005	-0.002	0.006	-0.007	0.007		
EthnicFractionalization	-0.005	0.006	-0.006	0.006	-0.008	0.006	-0.004	0.007		
OtherRelFraction	-0.007	0.008	-0.007	0.008	-0.011	0.008	-0.017	0.015	0.000	0.000
ExecutiveConstraint	**-0.006***	0.004	**-0.006***	0.004	**-0.007***	0.004	-0.003	0.005	0.000	0.000
FilteredOpenness	**0.007***	0.004	**0.007***	0.004	0.003	0.004	0.004	0.005	0.000	0.000
ExpropriationRisk	0.001	0.010	-0.001	0.011	-0.007	0.011	-0.005	0.011		
SubSaharanAfrica	-0.003	0.005	-0.003	0.005	-0.000	0.006	0.000	0.008		
LifeExpectancy	0.011	0.013	0.012	0.013	0.008	0.014	0.002	0.014		
EastAsia	0.005	0.004	0.004	0.005	-0.006	0.005	0.001	0.008		
EasternReligionFraction	0.005	0.006	0.005	0.006	**0.012***	0.006	0.001	0.009	0.000	0.000
LandTropicsPct	0.003	0.004	0.003	0.004	0.005	0.005	0.003	0.005		
MuslimFraction	0.000	0.004	0.001	0.004	-0.002	0.005	-0.006	0.007	0.000	0.000
Education	-0.001	0.001	-0.000	0.001	-0.001	0.001	-0.001	0.001	0.000	0.000
LandNearCoastPct	**-0.007***	0.004	**-0.007***	0.004	-0.006	0.004	**-0.009** **	0.004		
Diversity			0.007	0.008	-0.002	0.009	-0.003	0.011	0.000	0.000
Diversity Low Income♠					**0.062*** **	0.019	**0.062** **	0.032		
Diversity Lower Medium Inc.♠					**0.024** **	0.011	0.004	0.017		
Diversity Upper Medium Inc.♠					0.035	0.023	**0.056***	0.029		
Diversity*LowIncome					**0.064*** **	0.019	**0.065** **	0.030	0.000	0.000
Diversity*MedIncome					**0.026** **	0.012	0.007	0.018	0.000	0.000
Diversity*UpperMedIncome					**0.037***	0.022	**0.059** **	0.029	0.000	0.000
LowIncomeDummy					**-0.020** **	0.010	-0.020	0.014		
LowerMedIncomeDummy					-0.005	0.009	0.001	0.012		
UpperMedIncomeDummy					-0.011	0.010	-0.020	0.013		
R-squared	0.409		0.410		0.434		0.403			
Sargan test p-value							0.000			
Observations	589		589		589		589			

♠ Composite coefficient comprised of Diversity and Diversity*CountryIncome interaction, calculated using Delta Method

Table 2

IV BMA Estimates (extensive margin)									
	5			**6**			**7**		
	Extended DKT IVBMA			Extended DKT IVBMA			Extended DKT IVBMA		
	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD
InitialGDP	**1.000**	-0.016	0.002	**1.000**	-0.016	0.002	**1.000**	-0.022	0.002
GovernanceQuality	**0.999**	0.010	0.002	**0.996**	0.011	0.002	**0.999**	0.011	0.002
Investment	**0.993**	0.012	0.003	**0.992**	0.013	0.003	**0.997**	0.014	0.003
GovExpenditures	**0.749**	-0.075	0.028	**0.848**	-0.078	0.032	**0.994**	-0.112	0.027
PopulationGrowth	**0.872**	-0.045	0.013	**0.842**	-0.042	0.014	**0.996**	-0.062	0.013
JewishFraction	0.231	0.027	0.016	0.270	0.031	0.020	**0.979**	0.047	0.012
LegalOriginsUK	0.126	0.000	0.004	0.118	0.000	0.005	**0.541**	0.006	0.002
LegalOriginsFrench	**0.649**	-0.006	0.002	**0.712**	-0.006	0.002	0.294	-0.005	0.003
ProtestantFraction	**0.919**	-0.016	0.005	**0.908**	-0.016	0.005	0.206	-0.009	0.005
OrthodoxFraction	0.087	0.008	0.006	0.109	0.010	0.006	0.188	0.011	0.006
Inflation	**0.593**	0.000	0.000	0.331	0.000	0.000	0.191	0.000	0.000
Fertility	0.349	-0.002	0.002	0.342	-0.003	0.001	0.124	-0.001	0.001
LatinAmerica	0.065	-0.002	0.003	0.092	-0.002	0.004	0.125	-0.004	0.003
HinduFraction	0.033	-0.004	0.009	0.060	-0.006	0.009	0.099	-0.016	0.011
LinguisticFractionalization	0.061	-0.004	0.005	0.102	-0.005	0.006	0.103	-0.006	0.004
EthnicFractionalization	0.070	-0.004	0.006	0.071	-0.003	0.005	0.096	-0.004	0.005
OtherRelFraction	0.154	0.010	0.012	0.147	0.012	0.011	0.067	-0.005	0.007
ExecutiveConstraint	0.043	0.000	0.004	0.046	0.000	0.005	0.081	-0.003	0.004
FilteredOpenness	0.039	0.002	0.004	0.081	0.005	0.004	0.098	0.004	0.003
ExpropriationRisk	0.065	-0.001	0.008	0.071	0.000	0.009	0.051	0.002	0.007
SubSaharanAfrica	**0.910**	-0.011	0.004	**0.915**	-0.011	0.004	0.055	-0.002	0.004
LifeExpectancy	0.115	-0.003	0.008	0.113	-0.003	0.007	0.029	0.000	0.005
EastAsia	0.116	0.004	0.004	0.068	0.004	0.003	0.052	0.001	0.004
EasternReligionFraction	0.073	0.007	0.007	0.054	0.005	0.007	0.047	0.005	0.006
LandTropicsPct	0.071	0.001	0.003	0.045	0.001	0.003	0.043	0.002	0.003
MuslimFraction	0.056	0.003	0.004	0.059	0.003	0.004	0.044	0.002	0.003
Education	0.056	0.000	0.001	0.043	0.000	0.001	0.037	0.000	0.001
LandNearCoastPct	0.060	-0.002	0.003	0.026	-0.001	0.003	0.041	0.000	0.003
Diversity				0.123	0.008	0.007	0.093	0.006	0.007
Diversity Low Income♠							**0.999**	0.070	0.016
Diversity Lower Medium Income♠							0.142	0.005	0.008
Diversity Upper Medium Income♠							0.156	0.010	0.013
Diversity*LowIncome							**0.998**	0.069	0.016
Diversity*MedIncome							0.054	0.003	0.009
Diversity*UpperMedIncome							0.076	0.012	0.016
LowIncomeDummy							**1.000**	-0.026	0.005
LowerMedIncomeDummy							0.066	-0.001	0.005
UpperMedIncomeDummy							0.062	-0.003	0.007
Sargan test p-value	0.999			0.999			0.999		
Observations	589			589			589		

♠ Composite coefficient reported, based on the joint posterior distribution of Diversity and Diversity*CountryIncome interaction. Since the PIP is not defined for the composite, we report the percentage of the joint posterior distribution of Diversity*Country Income interaction that is non-zero.

Table 3

	IVBMA Robustness Regressions: Alternative Diversity Measures																	
	8 Clustered			9 Gini			10 HHI			11 Between Theil			12 Within Theil			13 Theil		
	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD
InitialGDP	**1.00**	-0.022	0.003	**1.00**	-0.021	0.003	**1.00**	-0.021	0.002	**1.00**	-0.023	0.002	**1.00**	-0.022	0.003	**1.00**	-0.022	0.002
GovernanceQuality	**1.00**	0.012	0.002	**1.00**	0.011	0.002	**1.00**	0.013	0.002	**1.00**	0.013	0.002	**1.00**	0.011	0.002	**1.00**	0.011	0.002
Investment	**1.00**	0.014	0.003	**1.00**	0.014	0.003	**1.00**	0.015	0.003	**1.00**	0.013	0.003	**1.00**	0.015	0.003	**1.00**	0.015	0.003
GovExpenditures	**0.97**	-0.105	0.028	**0.99**	-0.125	0.030	**0.97**	-0.102	0.030	**0.99**	-0.106	0.026	**0.99**	-0.119	0.029	**0.97**	-0.107	0.027
PopulationGrowth	**0.96**	-0.058	0.014	**0.99**	-0.061	0.014	**1.00**	-0.060	0.013	**1.00**	-0.054	0.012	**1.00**	-0.064	0.014	**0.98**	-0.060	0.013
JewishFraction	**0.93**	0.044	0.013	**0.97**	0.047	0.013	**0.89**	0.045	0.013	**0.99**	0.046	0.012	**0.98**	0.050	0.014	**0.95**	0.045	0.012
LegalOriginsUK	0.42	0.005	0.002	0.48	0.006	0.002	0.15	0.004	0.003	0.18	0.004	0.002	0.25	0.005	0.002	0.36	0.005	0.002
LegalOriginsFrench	0.29	-0.006	0.003	0.31	-0.005	0.003	0.39	-0.005	0.002	0.26	-0.004	0.002	0.34	-0.006	0.003	0.21	-0.005	0.003
ProtestantFraction	0.28	-0.011	0.005	0.26	-0.010	0.005	**0.54**	-0.013	0.006	0.19	-0.009	0.005	0.31	-0.011	0.005	0.24	-0.010	0.005
OrthodoxFraction	0.24	0.012	0.006	0.12	0.010	0.006	0.20	0.011	0.006	0.27	0.012	0.006	0.18	0.009	0.006	0.16	0.011	0.006
Inflation	0.23	0.000	0.000	0.41	0.000	0.000	0.31	0.000	0.000	0.12	0.000	0.000	0.43	0.000	0.000	**0.65**	0.000	0.000
Fertility	0.19	-0.002	0.001	0.22	-0.002	0.001	0.14	-0.001	0.001	0.09	0.000	0.001	0.26	-0.002	0.001	0.15	-0.001	0.001
LatinAmerica	0.11	-0.004	0.003	0.23	-0.006	0.003	0.08	-0.003	0.003	0.17	-0.005	0.003	0.17	-0.006	0.004	0.04	-0.003	0.003
HinduFraction	0.09	-0.013	0.011	0.05	0.007	0.011	0.07	-0.003	0.011	0.07	-0.009	0.010	0.03	0.007	0.010	0.03	-0.003	0.010
LinguisticFractionalization	0.13	-0.006	0.004	0.11	-0.006	0.005	0.10	-0.005	0.004	0.10	-0.006	0.004	0.11	-0.006	0.005	0.11	-0.005	0.004
EthnicFractionalization	0.09	-0.005	0.005	0.07	-0.005	0.005	0.06	-0.003	0.005	0.10	-0.005	0.005	0.07	-0.005	0.005	0.07	-0.003	0.005
OtherRelFraction	0.09	-0.005	0.009	0.13	-0.009	0.009	0.08	-0.004	0.008	0.08	-0.005	0.007	0.09	-0.009	0.008	0.07	-0.005	0.008
ExecutiveConstraint	0.06	-0.003	0.004	0.06	-0.002	0.004	0.06	-0.001	0.004	0.07	-0.004	0.004	0.08	-0.001	0.004	0.06	-0.002	0.004
FilteredOpenness	0.08	0.005	0.003	0.09	0.005	0.004	0.12	0.005	0.004	0.04	0.002	0.004	0.13	0.005	0.004	0.07	0.003	0.003
ExpropriationRisk	0.05	0.002	0.008	0.06	0.005	0.007	0.08	0.004	0.007	0.06	0.001	0.007	0.07	0.005	0.008	0.05	0.003	0.007
SubSaharanAfrica	0.09	-0.004	0.005	**0.57**	-0.009	0.003	0.13	-0.005	0.004	0.05	-0.002	0.004	0.31	-0.007	0.004	0.18	-0.006	0.004
LifeExpectancy	0.07	-0.002	0.005	0.04	-0.001	0.006	0.07	-0.001	0.006	0.07	-0.001	0.007	0.10	-0.002	0.005	0.06	-0.003	0.006
EastAsia	0.04	0.000	0.004	0.11	0.005	0.004	0.08	0.004	0.003	0.06	0.003	0.004	0.11	0.004	0.003	0.07	0.004	0.003
EasternReligionFraction	0.08	0.006	0.006	0.12	0.009	0.006	0.07	0.005	0.006	0.12	0.009	0.006	0.08	0.006	0.007	0.06	0.005	0.006
LandTropicsPct	0.06	0.002	0.003	0.04	0.001	0.003	0.06	-0.001	0.003	0.05	0.003	0.003	0.03	-0.001	0.003	0.03	0.001	0.003
MuslimFraction	0.05	0.001	0.004	0.05	0.001	0.004	0.04	0.000	0.003	0.06	0.000	0.004	0.06	0.000	0.004	0.05	0.001	0.004
Education	0.06	0.000	0.001	0.06	0.000	0.001	0.08	0.000	0.001	0.03	0.000	0.001	0.05	-0.001	0.001	0.04	0.000	0.001
LandNearCoastPct	0.05	0.001	0.003	0.05	-0.002	0.003	0.06	-0.003	0.003	0.06	0.002	0.003	0.03	-0.002	0.003	0.04	-0.001	0.003
Diversity	0.19	0.010	0.007	0.10	-0.027	0.030	0.22	0.002	0.040	0.31	-0.050	0.038	0.14	0.017	0.020	0.08	-0.011	0.013
Diversity Low Income♠	**0.99**	0.048	0.012	**0.86**	-0.049	0.039	**0.94**	-0.045	0.014	**1.00**	-0.102	0.019	**0.87**	-0.040	0.024	**0.99**	-0.042	0.017
Diversity Lower Medium Inc♠	0.23	0.009	0.007	0.23	-0.020	0.031	0.31	0.013	0.029	0.40	-0.032	0.021	0.26	0.018	0.024	0.17	-0.008	0.012
Diversity Upper Medium Inc.♠	0.24	0.010	0.009	0.16	-0.012	0.037	0.24	-0.004	0.068	0.35	-0.053	0.044	0.25	0.043	0.056	0.12	-0.008	0.016
Diversity*LowIncome	**0.98**	0.047	0.012	**0.83**	-0.047	0.039	**0.88**	-0.049	0.018	**0.93**	-0.094	0.022	**0.85**	-0.044	0.024	**0.99**	-0.041	0.017
Diversity*MedIncome	0.04	0.005	0.007	0.14	-0.012	0.026	0.16	0.022	0.041	0.19	0.015	0.051	0.13	0.017	0.028	0.09	-0.005	0.011
Diversity*UpperMedIncome	0.05	0.010	0.013	0.08	0.011	0.033	0.04	-0.036	0.143	0.06	-0.057	0.064	0.11	0.074	0.070	0.04	-0.001	0.021
LowIncomeDummy	**1.00**	-0.027	0.005	**0.68**	0.035	0.042	0.21	-0.009	0.006	0.11	0.002	0.007	0.34	0.007	0.018	**0.51**	0.018	0.011
LowerMedIncomeDummy	0.11	0.000	0.005	0.13	0.015	0.025	0.09	0.004	0.004	0.08	-0.001	0.004	0.10	-0.004	0.012	0.06	0.000	0.006
UpperMedIncomeDummy	0.07	-0.001	0.008	0.08	-0.008	0.030	0.04	0.002	0.005	0.06	0.002	0.004	0.10	-0.022	0.022	0.04	0.001	0.007
Sargan test p-value		0.999			0.999			0.999			0.999			0.999			0.999	
Observations		589			589			589			589			589			589	

♠ Composite coefficient reported, based on the joint posterior distribution of Diversity and Diversity*Country Income interaction. Since the PIP is not defined for the joint, we report the percentage of the joint posterior distribution of Diversity and Diversity*Country Income interaction which is non-zero.

Table 4

IV BMA Estimates (extensive margin)									
	Extended DKT IVBMA 14			Extended DKT IVBMA 15			Extended DKT IVBMA 16		
	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD
InitialGDP	**1.000**	-0.929	0.108	**1.000**	-0.020	0.003	**1.000**	-0.020	0.003
PopulationGrowth	**0.955**	-0.370	0.091	**0.963**	-0.054	0.015	**0.972**	-0.072	0.019
Investment	**0.990**	0.289	0.062	**0.985**	0.012	0.003	**0.955**	0.013	0.004
GovExpenditures	**0.891**	-0.226	0.062	**0.895**	-0.093	0.028	**0.861**	-0.103	0.033
GovernanceQuality	**0.999**	0.411	0.088	**0.998**	0.010	0.002	**0.763**	0.008	0.003
LegalOriginsFrench	0.399	-0.108	0.054	0.475	-0.006	0.003	**0.753**	-0.010	0.004
JewishFraction	**0.862**	0.185	0.051	**0.859**	0.043	0.012	**0.663**	0.047	0.016
ProtestantFraction	0.345	-0.114	0.055	0.368	-0.011	0.005	0.437	-0.017	0.008
HinduFraction	0.106	-0.066	0.046	0.149	-0.019	0.011	0.352	-0.027	0.012
LegalOriginsUK	0.339	0.098	0.049	0.417	0.005	0.003	0.342	0.009	0.004
EasternReligionFraction	0.087	0.041	0.050	0.160	0.011	0.006	0.232	0.014	0.009
Fertility	0.252	-0.175	0.118	0.286	-0.002	0.002	0.201	-0.003	0.002
OrthodoxFraction	0.193	0.072	0.035	0.150	0.010	0.006	0.197	0.015	0.009
LinguisticFractionalization	0.132	-0.071	0.054	0.188	-0.007	0.004	0.159	-0.009	0.005
LandTropicsPct	0.037	0.041	0.046	0.100	0.003	0.003	0.134	0.005	0.004
LifeExpectancy	0.062	-0.048	0.117	0.091	-0.003	0.006	0.132	-0.003	0.006
SubSaharanAfrica	0.072	-0.046	0.061	0.092	-0.004	0.004	0.130	-0.004	0.006
EthnicFractionalization	0.083	-0.046	0.051	0.111	-0.006	0.005	0.114	-0.006	0.006
Inflation	0.329	-0.119	0.060	0.126	0.000	0.000	0.092	0.000	0.000
LatinAmerica	0.131	-0.084	0.064	0.061	-0.001	0.004	0.091	-0.004	0.005
ExecutiveConstraint	0.076	-0.032	0.061	0.115	-0.005	0.004	0.090	-0.005	0.006
Education	0.050	0.011	0.058	0.057	0.000	0.001	0.075	-0.001	0.001
ExpropriationRisk	0.051	0.002	0.066	0.086	-0.002	0.008	0.072	0.000	0.009
OtherRelFraction	0.085	-0.043	0.058	0.082	-0.001	0.008	0.070	0.004	0.011
MuslimFraction	0.056	-0.008	0.068	0.025	0.000	0.004	0.067	0.004	0.004
FilteredOpenness	0.069	0.044	0.043	0.070	0.003	0.004	0.066	-0.001	0.004
EastAsia	0.067	0.011	0.047	0.062	0.004	0.004	0.065	0.000	0.007
WTO	0.038	0.039	0.039	0.044	0.002	0.003	0.050	-0.001	0.003
LandNearCoastPct	0.034	0.018	0.044	0.059	0.002	0.003	0.044	0.003	0.004
PTA	0.052	-0.031	0.045	0.042	0.000	0.000	0.110	0.000	0.000
Primary	0.067	0.024	0.052	0.084	0.006	0.004	0.080	0.005	0.006
GDPVolatility	0.058	-0.032	0.038	0.039	0.002	0.037	0.056	0.010	0.045
REER				0.067	0.002	0.002	0.053	0.002	0.004
FXVolatility				**0.987**	-0.004	0.001	**0.756**	-0.003	0.001
TOT							0.047	0.002	0.003
TOTVolatility							0.068	-0.001	0.001
Diversity	0.083	0.053	0.077	0.103	0.005	0.007	0.154	0.012	0.010
Diversity Low Income♠	**0.998**	0.069	0.017	**1.000**	0.073	0.017	**0.989**	0.068	0.023
Diversity Lower Medium Income♠	0.111	0.005	0.008	0.133	0.004	0.008	0.218	0.007	0.013
Diversity Upper Medium Income♠	0.170	0.009	0.012	0.158	0.006	0.010	0.240	0.014	0.011
Diversity*LowIncome	**0.998**	0.246	0.061	**1.000**	0.073	0.017	**0.969**	0.067	0.022
Diversity*MedIncome	0.031	0.016	0.052	0.034	0.003	0.008	0.079	-0.003	0.013
Diversity*UpperMedIncome	0.097	0.053	0.065	0.058	0.009	0.013	0.097	0.015	0.012
LowIncomeDummy	**0.999**	-0.409	0.077	**0.997**	-0.023	0.005	**0.988**	-0.025	0.006
LowerMedIncomeDummy	0.081	-0.022	0.088	0.077	0.001	0.004	0.153	-0.005	0.006
UpperMedIncomeDummy	0.048	-0.043	0.088	0.025	-0.001	0.007	0.067	0.004	0.006
Sargan test p-value	0.999			0.999			0.999		
Observations	589			584			407		

♠ Composite coefficient reported, based on the joint posterior distribution of Diversity and Diversity*CountryIncome interaction. Since the PIP is not defined for the composite, we report the percentage of the joint posterior distribution of Diversity*Country Income interaction that is non-zero.

Data Appendix

Variable Name	Mean	StDev	Min	Max	Definition	Source
Between Theil	0.103	0.100	0.000	0.550	Average Between Theil measure of export diversifications, calcluated using 4-digit SITC data (for 1960-1989) and 6-digit HS data (1990-2009).	Authors' own calculations, trade data: Feenstra et al. (2005), Comtrade
EastAsia	0.105	0.307	0.000	1.000	Dummy variable for East Asia.	World Bank
EasternReligionFraction	0.055	0.187	0.000	0.967	Eastern Religion share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion and corresponding share in 1900.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
Education	-3.769	1.864	-11.555	-0.488	Logarithm of the average percentage of a country's working age population that attended secondary school times the completion rate of secondary school for all periods.	Barro and Lee dataset
EM_j	0.305	0.258	0.008	0.904	Average Hummels-Klenow extensive margin measure of a country's exports, calcluated using 4-digit SITC data (for 1960-1989) and 6-digit HS data (1990-2009).	Authors' own calculations, trade data: Feenstra et al. (2005), Comtrade
EthnicFractionalization	0.400	0.261	0.002	0.930	Measures the degree of tension within a country attributable to racial, nationality, or language divisions.	Alesina (2003)
ExecutiveConstraint	0.633	0.352	0.000	1.000	A measure of the extent of institutionalized constraints on the decision making powers of chief executives. This variable ranges from one to seven where higher values equal a greater extent of institutionalized constraints on the power of chief executives. This variable is calculated as per period average. The variable was transformed first using (x-1)/6.	Henderson, Papageorgiou, Parmeter (EJ 2011) and Polity IV Project
ExpropriationRisk	0.718	0.206	0.160	1.000	Risk of "outright confiscation and forced nationalization" of property. Rescaled, from 0 to 1, with a higher score indicating less risk of expropriation.	Henderson, Papageorgiou, Parmeter (EJ 2011) and Durlauf, Kourtellos, Tan (EJ 2008).
Fertility	3.575	2.104	0.073	8.072	Logarithm of the total fertility rate in inital years of 5-year periods.	Henderson, Papageorgiou, Parmeter (EJ 2011) and World Bank.
FilteredOpenness	-0.035	0.303	-0.505	1.497	Average ratio exports plus imports to GDP, filtered for the relation of this ratio to the logs of population and area.	Openness, GDP, population and area data from PWT 7.1 and World Bank.
g	0.020	0.025	-0.070	0.109	Average per capita GDP growth rate.	Henderson, Papageorgiou, Parmeter (EJ 2011 - PWT 6.2), PWT 7.1.
Gini	0.942	0.058	0.699	0.999	Average Gini measure of export diversification, calcluated using 4-digit SITC data (for 1960-1989) and 6-digit HS data (1990-2009).	Authors' own calculations, trade data: Feenstra et al. (2005), Comtrade
GovernanceQuality	0.338	0.912	-1.870	1.930	Average Composite Governance index. It is calculated as the average of six variables: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption.	World Bank
GovExpend	0.149	0.054	0.041	0.387	Average ratio of government consumption to GDP.	World Bank.
HHI	0.125	0.154	0.002	0.859	Average Herfindahl measure of export diversification, calcluated using 4-digit SITC data (for 1960-1989) and 6-digit HS data (1990-2009).	Authors' own calculations, trade data: Feenstra et al. (2005), Comtrade

Variable Name	Mean	StDev	Min	Max	Definition	Source
HinduFraction	0.019	0.100	0.000	0.820	Hindu share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
Inflation	13.067	23.325	-3.079	270.651	The average consumer price inflation rate.	Henderson, Papageorgiou, Parmeter (EJ 2011) and World Bank.
InitialGDP	8.539	1.090	6.177	10.806	Logarithm of initial per capita GDP in each period.	Henderson, Papageorgiou, Parmeter (EJ 2011 - PWT 6.2), PWT 7.1.
Investment	2.746	0.538	1.097	4.515	Average ratio of investment to GDP.	Henderson, Papageorgiou, Parmeter (EJ 2011), PWT 7.1.
JewishFraction	0.015	0.103	0.000	0.896	Jewish share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LandNearCoastPct	0.504	0.347	0.000	1.000	Percentage of a country's land area within 100km of an ice-free coast.	Henderson, Papageorgiou, Parmeter (EJ 2011).
LandTropicsPct	0.308	0.395	0.000	1.000	Percentage of land area classified as tropical and subtropical via the in Koeppen-Geiger system.	Henderson, Papageorgiou, Parmeter (EJ 2011).
LatinAmerica	0.233	0.423	0.000	1.000	Dummy variable for Latin America and the Caribbean.	World Banl
LegalOriginsFrench	0.472	0.500	0.000	1.000	Dummy variable that takes value if 1 if a country legal system is based on French legal code.	Durlauf, Kourtellos, Tan (EJ 2008).
LegalOriginsUK	0.345	0.476	0.000	1.000	Dummy variable that takes value if 1 if a country legal system is based on British legal code.	Durlauf, Kourtellos, Tan (EJ 2008).
LifeExpectancy	0.205	0.497	0.012	2.253	Reciprocals of life expectancy at age 1 in inital years of 5-year periods.	Henderson, Papageorgiou, Parmeter (EJ 2011) and World Bank.
LinguisticFractionalization	0.354	0.304	0.000	0.923	Measure of linguistic fractionalization based on data describing shares of languages spoken as "mother tongues".	Henderson, Papageorgiou, Parmeter (EJ 2011) and Alesina (2003).
LowerMedIncomeDummy	0.399	0.490	0.000	1.000	Dummy variable taking value one for lower medium income dummies, using 1988 World Bank definition.	World Bank
LowIncomeDummy	0.219	0.414	0.000	1.000	Dummy variable taking value one for low income dummies, using 1988 World Bank definition.	World Bank
MuslimFraction	0.191	0.330	0.000	0.995	Muslim share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
PTA	10.131	10.687	0.000	56.000	Number of economic integration agreements at the beginning of each period.	NSF-Kellogg Institute EIA data base.
OrthodoxFraction	0.037	0.157	0.000	0.972	Orthodox share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
OtherRelFraction	0.109	0.182	-0.560	0.904	Other Religion share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
GDPVolatility	0.033	0.025	0.003	0.244	Standard deviation of per capita GDP growth rates during each period.	Authors' own calculations, growth rate data: Henderson, Papageorgiou, Parmeter (EJ 2011 - PWT 6.2), PWT 7.1.
PopulationGrowth	-2.718	0.164	-3.201	-2.204	Logarithm of average population growth rate plus 0.05.	Henderson, Papageorgiou, Parmeter (EJ 2011), PWT 7.1.
Primary	0.536	0.298	0.023	0.992	Average share of primary export in total export. Primary export are defined as categories 0,1,2,3,4 and 68 in SITC (Rev.1) classification.	Authors' own calculations, trade data: Comtrade
ProtestantFraction	0.153	0.259	-0.007	1.460	Protestant share in 1970, 1980, 1990 and 2000 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000

Variable Name	Mean	StDev	Min	Max	Definition	Source
REER	4.698	0.455	3.306	9.567	Average real effective exchange rate.	Bruegel real effective exchange rate database
FXVolatility	1.877	1.053	-0.722	10.074	Standard deviation of real effective exchange rate during each period.	Authors' own calculations, real exchange rate data: Bruegel real effective exchange rate database
SubSaharanAfrica	0.190	0.393	0.000	1.000	Dummy variable for Sub-Saharan Africa.	World Bank
TOT	0.084	0.356	-1.387	3.015	Terms-of-trade, calculated as the average ratio of export and import price indices.	Authors' own calculations, import and export price index data: World Bank, IMF
Total Theil	0.488	0.182	0.151	0.938	Average Total Theil measure of export diversification, calcluated using 4-digit SITC data (for 1960-1989) and 6-digit HS data (1990-2009).	Authors' own calculations, trade data: Feenstra et al. (2005), Comtrade
TOTVolatility	-2.831	1.025	-5.821	1.837	Standard deviation of terms of trade during each period.	Authors' own calculations, import and export price index data: World Bank, IMF
UpperMedIncomeDummy	0.104	0.305	0.000	1.000	Dummy variable taking value one for upper medium income dummies, using 1988 World Bank definition.	World Bank
Within Theil	0.387	0.123	0.143	0.739	Average Within Theil measure of export diversification, calcluated using 4-digit SITC data (for 1960-1989) and 6-digit HS data (1990-2009).	Authors' own calculations, trade data: Feenstra et al. (2005), Comtrade
WTO	0.153	0.360	0.000	1.000	Dummy taking value one if country is WTO member at the beginning of a period.	WTO homepage
Instruments						
EasternReligionFraction1900	0.059	0.205	0.000	0.990	Eastern Religion share in 1900 as fraction of the population who expressed adherence to some religion and corresponding share in 1900.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
HinduFraction1900	0.024	0.110	0.000	0.816	Hindu share in 1900 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
JewishFraction1900	0.006	0.016	0.000	0.090	Jewish share in 1900 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagEducation	-4.113	2.029	-12.183	-1.024	One period lag of logarithm of the average percentage of a country's working age population that attended secondary school times the completion rate of secondary school for all periods.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagExecutiveConstraint	0.620	0.370	0.000	1.000	One period lag of constraints on executive measure.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagFilteredOpenness	-0.080	0.288	-0.569	1.364	One period lag of filtered openness ratio.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagGovExpend	0.146	0.055	0.041	0.406	One period lag of average ratio of government consumption to GDP.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagInflation	14.265	23.749	-3.079	270.651	One period lag of average consumer price inflation rate.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagInitial GDP	8.432	1.053	5.805	10.445	One period lag od logarithm of initial per capita GDP in each period.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagInvestment	2.677	0.555	0.750	4.515	One period lag of average ratio of investment to GDP.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
LagPopulationGrowth	-2.706	0.165	-3.255	-2.204	One period lag of logarithm of average population growth rate plus 0.05.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000

Variable Name	Mean	StDev	Min	Max	Definition	Source
lLand	12.635	1.578	9.131	16.048	Logarithm of land area.	CEPII
lPop	9.666	1.376	6.473	13.978	Logarithm of average population size.	PWT 7.1
MuslimFraction1900	0.163	0.301	0.000	0.964	Muslim share in 1900 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
OrthodoxFraction1900	0.041	0.163	0.000	0.982	Orthodox share in 1900 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
OtherRelFraction1900	0.206	0.326	0.000	0.997	Other Religion share in 1900 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000
ProtestantFraction1900	0.150	0.301	0.000	0.999	Protestant share in 1900 as fraction of the population who expressed adherence to some religion.	Durlauf, Kourtellos, Tan (EJ 2008) for 1900, 1970, 1980, 1990 and McCleary for 2000