Trade Policy and Pro-Poor Growth

by Rolf Maier (olbes@gmx.de)

Abstract

This paper analyzes empirically the impact of trade policy and sector specific openness on pro-poor growth in a cross-country approach to answer the question, whether the poorest 20 and 20 to 40 percent benefit from trade openness. To capture this issue, we estimate the distribution effect of eight different openness indicators, six adjusted trade sector indicators (agricultural raw materials exports and imports, food exports and imports, manufactures exports and imports) and two tariff indicators (export duties and imports duties). In addition, we estimate the total effect, i.e. the distribution and growth effect, to analyze potential trade-offs between the impact of trade liberalization on poverty via overall economic growth and distribution.

To test the poverty effects, we collect an irregular and unbalanced panel of time-series cross-country data on the first and second quintile share in 72 countries for the period 1971 to 1999 and apply two econometric specifications, a growth equation and a system GMM equation. We estimate the poverty effects of trade policy for all countries and, separately, for developing/transitional and industrial countries due to considerable differences in economic structure. Finally, we estimate poverty effects of trade liberalization with respect to the level of the countries' development.

Combining empirical findings of the system GMM estimation for both the distribution and total effect, estimation results suggest the importance of sector specific trade policy for the poorest 20 and 20 to 40 percent. First, liberalization in agricultural raw material exports is very important for the poorest 40 percent of low income developing countries due to both the distribution and total effect. In addition, liberalizing imports in agricultural raw materals is highly positively related to the mean income of the poor without changing the distribution. Second, trade reforms in food exports affect negatively the mean income of the poorest 40 percent in low income developing countries through the growth effect. However, higher food imports are associated with positive distribution effects, but without total effects on the poorest 20 percent in low income developing countries. Third, promotion of manufactures exports lead to a positive total effect on the poorest 40 percent in developing countries via the growth effect, while trade reforms in manufactures imports are never relevant. Finally, reduced export and import duties affect positively the mean income of the poorest 40 percent in low income developing countries, an effect primarily driven by the growth effect. Findings for agriculture exports, food exports, export and import duties, however, are only relevant if we exploit information on both the cross-country and within-country variation of the income of the poor in a system GMM estimator. In addition, results of the growth equation suggest positive total effects of agriculture imports on the poorest 20 and 20 to 40 percent in development countries driven by the growth effect alone.

Thus, empirical findings suggest the following policy recommendations with respect to poverty-reducing trade reforms in low-income developing countries. While results are not always consistent between the growth equation and the system GMM estimation, liberalization of agricultural raw material exports and imports seems to be the most promising approach. On the other hand, liberalization in food markets and manufactures imports are not associated with poverty alleviation in low-income developing countries. Finally, a promotion of manufactures exports and a reduction of export and import duties seem to increase mean income of the poorest 40 percent in low-income developing countries only via the growth effect.

1. Introduction

Trade policy and its integration into international markets, a topic heavily discussed in the literature, is assumed to be one critical element to promote economic growth and alleviate poverty. Nevertheless, empirical evidence of the openness - growth link is mixed and has been severely criticized on econometric issues (Rodriguez/Rodrik 2000). The effect of trade reforms on poverty, while neglected in the past, is receiving considerable attention in recent publications (Bannister/Thugge 2001, McCulloch/Winters/Cirera 2001, Reimer 2002, Berg/Krueger 2003, Goldberg/Pavcnik 2004). Methodological approaches encompass microsimulations of specific trade policies, macro–micro synthesis, i.e. general equilibrium simulation with post-simulation of effects on representative households, and cross-country studies of openness indicators (Reimer 2002). While the cross-country approach is heavily criticized because of econometric issues, inappropriate indicators of openness (Rodriguez/Rodrik 2000) and the case-specific implications of liberalization on poverty (McCulloch/Winters/Cirera 2001), the strength of cross-section regressions lies in the statistical testing and generalization of the results and the possible coverage of dynamic aspects (Reimer 2002).

In general, the effect of trade policy on absolute poverty is assumed to be mainly driven by the impact of openness on economic growth (Bannister/Thugge 2001, Berg/Krueger 2003). Nevertheless a small part of literature analyses also the question of distributional effects of trade policy and openness on the income of the poor in a cross-country framework (Edwards 1997, Gugerty/Roemer 1997, Gallup/Radelet/Warner 1999, Lundberg/Squire 2001, Dollar/Kraay 2001a, Ghura/Leite/Tsangarides 2002, Winters/McCulloch/McKay 2002, Lopez 2003, Milanovic 2003). In combining both approaches we extend the literature in four ways.

First, we select an irregular and unbalanced panel of data on first and second quintile share in the most consistent way to capture the problem of incomparability of income inequality measures. Second, we apply two econometric specifications, a growth equation and a system GMM equation, to cover econometric issues, cross country variation and dynamic aspect of within-country change of the income of the poor. Third, we choose eight different openness indicators, six trade sector indicators (agricultural raw materials exports and imports, food exports and imports, manufactures exports and imports) and two tariff indicators (export duties and imports duties). The underlying hypothesis is that the poor may be affected differently by trade in agriculture raw materials, food and manufactures, i.e. sector specific trade policy may improve pro-poor growth. We test this hypothesis for all countries and in subsamples of developing/transitional and industrial countries to reveal important differences in the impact of trade policy on poverty in countries with different economic structures. Finally, we estimate both the distribution and total effect, i.e. the distribution and growth effect, of the trade openness indicators on the poorest 20 and 20 - 40 percent to analyze potential trade-offs between the impact of trade liberalization on poverty via overall economic growth and distribution. Thus, we analyze empirically the impact of trade policy and sector specific openness on pro-poor growth in a cross-country approach to answer the question, whether the poorest 20 and 20 - 40 percent benefit from trade liberalization.

This paper is structured as follows. In section 2 we present six possible channels of trade liberalization on poverty and empirical evidence on the distribution effect from cross - country studies. In section 3 we describe the data coverage and data sources used in the estimations, which encompasses a discussion on the measurement problem of openness indicators. While we debate our concept of pro-poor growth in section 4, we explain econometric specifications and econometric issues in section 5, followed by an interpretation of the results. Finally, we present major findings in the conclusion in section 6.

2. Trade policy and pro-poor growth

2.1 Channels of trade liberalization on poverty

Considering the theoretical and empirical literature, six channels are proposed for how trade policy may affect poverty (Winters 2000a/b, McCulloch/Winters/Cirera 2001, Bannister/Thugge 2001, Berg/Krueger 2003, Agénor 2003) .

Economic Growth

The openness – growth link is relevant because economic growth has been to found to be a key element in reducing absolute poverty (Gugerty/Roemer 1997, Gallup/Radelet/Warner 1999, Gugerty/Timmer 1999, Dollar/Kraay 2001a, Ghura/Leite/Tsangarides 2002).

Concerning economic theory, trade liberalization may foster economic growth due to a more efficient allocation of resources by efficiency effects on investment.[1] Improved access to intermediate capital goods may also increase technical efficiency by technology embodied in capital imports (Berg/Krueger 2003, Baldwin 2003). Thus trade liberalization in manufactures may impact on the poor mainly through growth and productivity effects (McCulloch/Winters/Cirera 2001). In addition, access to larger markets may promote innovation by openness to new ideas or spillover effects of technologies as proposed by endogenous growth models (Grossman/Helpman 1991). A poverty reducing effect of trade reforms, however, depends critically on complementary macroeconomic and structural policies and institutions at the domestic level (Bannister/Thugge 2003). Institutions, however, could also be positively influenced by openness and thus foster growth since trade liberalization may impose discipline on bad government policies as corruption (Ades/Di Tella 1999). From a static point of view, trade restrictions could also be argued for in presence of market distortions, externalities or

[1] As long as an economy is not in the steady-state, openness also raises the growth rate due to a more efficient allocation of resources.

imperfect competition (Helpman/Krugman 1991). One possible example would be the infant industry argument in which protection for not-yet-competitive industries is supported.

Empirical results, while indicating a positive impact of openness on growth (Sachs/Warner 1995, Frankel/Romer 1996, Dollar/Kraay 2001b, Baldwin 2003, Wacziarg/Welch 2003), are severely critisized on indicators of openness, instruments and specifications used in cross-country regressions (Rodriguez/Rodrik 2000, Rodrik 2000).[2] In addition, cross-country studies have been heavily attacked by their weak theoretical foundations, data reliability and inappropriate econometric techniques (Srinivasan, Bhagwati 2001).

Price transmission

Reduction of tariffs and trade restrictions could affect the income of the poor via its effect on the price of tradable products demanded and supplied by the poor. Considering a tariff reduction in a single good, the import price would be lowered for poor consumers and producers. On the other side, if export duties are abolished and the good is sold to a stable world market price, poor producers would gain more income from exports.[3] The price transmission, however, is heavily influenced by the competitive structure of the distribution sector, a working infrastructure and the regulation and operation of government institutions at the national, regional and local level (e.g. marketing organization). Thus the poor could also be hurt by trade liberalization, if they are protected by initial patterns of trade restrictions. In addition, the net effects on the poor may be ambiguous if many goods are liberalized simultaneously. Furthermore, adjustment effects of trade policy, i.e. switching consumption or production to other markets due to changed relative prices, may stimulate important indirect effects of trade liberalization depending also on the domain of trade.[4]

The price effects of trade liberalization in agriculture and food are likely more important than in manufactures as a high part of the poor's consumption is devoted to food expenditures (Goldberg/Pavcnik 2004). In addition, trade liberalization in agriculture may benefit all rural (and urban) poor by positive spill-overs to non-farmers.[5] Even if trade liberalization in agriculture and food is widely accepted as important for poverty reduction, however, price effects depend also on internal reforms since the agriculture sector is heavily regulated in developing and industrial countries.[6] Distorted domestic markets, however, may inhibit the possibility for the poor to

---

[2] For a survey of empirical literature on the effect of openness on growth and productivity, see Winters/McCulloch/McKay (2002).
[3] However, fluctuating world market prices in agricultural products could significantly diminish poverty reducing effects of reduced tariffs (Hoekman/Michalopoulos/Schiff/Tarr 2002).
[4] For a survey of empirical literature on the transmission of border-price shocks, market creation and destruction and the possibility of the poor to capture opportunities of price effects of trade liberalization with respect to production and consumption, see Winters/McCulloch/McKay (2002).
[5] For a survey of empirical literature on spillover effects of trade liberalization in agriculture, see Winters/McCulloch/McKay (2002).
[6] The poverty effects of trade liberalization in agriculture and food are also dependent on the economic situation of the poor, i.e. whether they are net producers or net consumers of agricultural goods.

capture liberalization-induced opportunities.[7] Furthermore, poverty effects of trade reforms in the agriculture sector are not independent from policies in other sectors and countries. First, in developing countries import manufacturing tariffs exhibit strong bias against agriculture due to increased domestic prices of manufactures relative to agriculture products. Second, tariff escalation for agriculture products in industrial countries encourages trade only in agricultural raw materials (Winters 2001a/b, McCulloch/Winters/Cirera 2001).[8] Finally, high export subsidies of commodities in industrial countries could constrain agriculture exports in developing countries (Hoekman/Michalopoulos/Schiff/Tarr 2002).

Wages and employment

Trade liberalization also works on the income of the poor via wage and employment effects.[9] Relying on the Stolper-Samuelson theorem, a rise in the relative price of exportable goods intensively produced by unskilled labour would increase wages of unskilled labour and thus reduce poverty if the poor are mainly unskilled workers (Bannister/Thugge 2001). The Stolper-Samuelson argument would be especially important with respect to agricultural liberalization in developing countries since the majority of the labour force is employed in farming and so less-skilled workers in rural areas would likely benefit the most (Winters 2001a/b, McCulloch/Winters/Cirera 2001).

On the other side, lower trade restrictions may also reduce the demand for unskilled labour because unskilled labour may not be the most intensively used factor in producing tradable goods and trade liberalization may be associated with introduction of higher-level technology requiring more skilled labour (Agénor 2003, Goldberg/Pavcnik 2004).[10] This situation could be relevant for manufacturing liberalization in developing countries when the production in manufacturing is intensive in skilled labour. [11] Finally, the predictions of the Stolper-Samuelson theorem are also criticized by its restrictive and unrealistic assumptions as perfect labour mobility and perfectly competitive goods and factor markets (Bannister/Thugge 2001, Winters 2000b).

---

[7] Important reform areas are e.g. the structure of land ownership within society, social norms and institutions at the local level, centralized agricultural marketing organizations and markets for credits and insurance to the poor (McCulloch/Winters/Cirera 2001).

[8] Tariff escalation discourages foreign processing activities since the import tariff increases with more processed agriculture goods (McCulloch/Winters/Cirera 2001).

[9] Additional proposals of liberalization-induced labour market effects on poverty are changed in compliance with minimum wages, increase of informal sector and positive or negative effects on child labour (Goldberg/Pavcnik 2004).

[10] The effect could be especially damaging for the poor, if imperfect credit markets prevent the ability of the unskilled workers to finance the accumulation of human capital (Agénor 2003).

[11] Concerning wage inequality effects of trade liberalization in developing countries, additional theoretical explanations have been proposed. First, a higher skill premium is explained by increased globalisation of production, i.e. the shift of skill-intensive intermediate goods production to developing countries raises the demand for skilled labour force. Second, openness may promote technology progress which may increase the demand for skilled employees, i.e. a skill-biased technological change. Third, trade liberalization may lead to a “quality” upgrading of firms or products which may increase demand for skilled workers relative to unskilled labour. Finally, trade liberalization could increase wage inequality by extending the informal sector if wages in the informal sector are lower. Wage inequality, however, is only one part of the distribution effect of trade liberalization on income or consumption of the poor (Cornia 2002, Goldberg/Pavcnik 2004).

While in the Stolper-Samuelson theorem total labour supply is assumed to be fixed, one could also imagine the opposite, i.e. a perfectly elastic supply of labour. In this case, increased prices of exportable goods due to trade liberalization would result in a surge in employment (not in wages), which could largely improve the situation of the poor with no alternative sources of income. In reality a mixture of both extremes may be realistic dependent on the possible segmentation of the labour market due to skills, gender and location (Winters 2001a/b, McCulloch/Winters/Cirera 2001).[12] In addition, initial patterns of protection and disappearance of whole markets due to trade reforms can significantly influence the way the poor are affected by trade liberalization (Bannister/Thugge 2001). Finally, employment and wage effects on the poor hinge also on the flexibility of the labour market, the overall reform package and the importance of the sectors being liberalized. The proportion of the manufacturing industry of a country's GDP varies considerably in developing countries (McCulloch/Winters/Cirera 2001).[13]

Taxes and government spending

Trade reforms may also cause falling revenues restraining government spending on social expenditures (health, education, social security) and public investment.[14] As trade taxes in some developing countries cover up to 50 percent of the total government revenue, reduction of trade tariffs could lead to severe budget constraints. This effect may be especially relevant for liberalization in manufactures since manufacturing tariffs cover close to 70 percent of tariff revenues for developing countries in 1995 (Hertel, Martin 1999). In general, however, the effect of trade liberalization on government revenue is far from certain depending on the reforms implemented, the initial economic situation, the effect of lower tariffs on the trade volume and the changes in the taxation system. In addition, lower government revenues do not necessarily translate into reduced social programs if trade reform is properly managed (Bannister/Thugge 2001, McCulloch/Winters/Cirera 2001).[15] Furthermore, the final poverty effect depends critically on the initial structure of the social spending programs and how the poor are affected by new taxes. Therefore, social expenditures often benefit disproportionately the upper-income households in developing countries (Dollar/Kraay 2001a, McCulloch/Winters/Cirera 2001, Baldacci/de Mello/Inchauste 2002, Agénor 2002, Davoodi/Tiongson/Asawanuchit 2003).[16]

Volatility and external shocks

In general, trade liberalization leads to a deeper integration into world markets, which could increase the volatility of the terms of trade or the output fluctuation. Theoretically, the openness

---

[12] Considering the poor in developing countries, the elasticity of labour supply in rural and urban informal sectors is typically high. Thus adjustments to trade reforms will likely affect the poor mainly by changes in employment.
[13] On a survey of the empirical literature of the trade liberalization effects on wage, employment and wage inequality, see Winters/McCulloch/McKay (2002).
[14]Curtailing government expenditures may also lead to increased poverty via cuts in real wages and layoffs of employees in the public sector (Agénor 2002).
[15] On a survey of the empirical literature covering trade liberlization effects on government revenue and poverty effects of falling tariff revenues, see Winters/McCulloch/McKay (2002).

– volatility link is argued for due to a specialization effect of trade liberalization, which may increase the proneness to sector-specific shocks. In addition, higher exposure to external shocks can also aggravate the overall level of risk (McCulloch/Winters/Cirera 2001).[17] The poor may be vulnerable to external shocks and macroeconomic volatility (Glewwe/Hall 1998, Breen/Garcia-Peñalosa 1999). First, the variability of the poor's income could be increased due to dependence on more flexible world market prices. Second, increased precautionary savings caused by higher uncertainty about future income may raise poverty due to reduced growth. In addition, credit market effects, i.e. higher incidence of credit rationing or increased risk premium and borrowing rates for private firms, may negatively affect the poor via fallen labour demand (Agénor 2002). The effect of external shocks and the dependence on world market prices, however, is crucially influenced by the institutions (e.g. distribution networks and government regulations) transmitting the shocks and prices throughout the economy to the poor. In addition, the net poverty effect depends on the possibility of the poor to cope with unanticipated shocks. So trade liberalization could also entail improved business opportunities for the poor, which may offset higher levels of risk (McCulloch/Winters/Cirera 2001).[18]

Short-term adjustment

While trade liberalization may benefit an economy in the long run, the shock of trade reform could nevertheless lead to a period of adverse adjustment effects on poverty. The poor may be affected by a changed employment situation and the speed of the adjustment process in rigid labour markets. Increased poverty due to short term effects of trade reforms may also depend on the initial level of protection in specific sectors, the way firms can react to higher competitive pressure, the size of the external shock, and the initial level of assets available for the households to smooth the consumption during transitional unemployment. In addition, possible economics of scale and learning-by-doing effects of trade openness are more relevant for countries already producing high-technology goods. Thus temporary adverse effects on growth and poverty may be possible in an adjustment period of economies exporting initially low-technology goods or (agriculture) raw materials (Winters 2001a/b, McCulloch/Winters/Cirera 2001, Winters/McCulloch/McKay 2002, Agénor 2003).

2.2 Empirical evidence

Analytically, the impact of trade openness on the income of the poor can be discerned in the growth effect and the distribution effect.[19] Concerning the distribution effect of trade policy, recent cross-country studies provide only mixed results depending also on the limited availability

---

[16] Cuts in social spending may nevertheless lead to reduced poverty if social expenditures are better targeted to the poor (Agénor 2002).
[17] Concerning the empirical evidence, however, results for both terms of trade and output volatility due to trade liberalization are not consistent (McCulloch/Winters/Cirera 2001, Winters/McCulloch/McKay 2002).
[18] For a survey of the empirical literature on the effect of trade liberalization on the vulnerability of the poor via portfolio choice of households, variability of existing income sources or prices and poverty traps, see Winters/McCulloch/McKay 2002).

of inequality and poverty data in the past years. Edwards (1997) tests the impact of average tariffs on the change of the Gini coefficient with a positive coefficient indicating increased inequality for countries with trade distortions. On the other side, trade reforms seem not to significantly affect changes in income distribution. Gugerty/Roemer (1997) use data on the poorest 20 and 40 percent from the Deininger/Squire dataset for 26 developing countries. The distribution effect of openness measured by the Sachs-Warner Index is statistically insignificant in several specifications. A similar result is reached by Gallup/Radelet/Warner (1999), which regress the growth rate of the first quintile share on openness measured by the Sachs-Warner Index and additional variables in a cross–section study with 54 countries. Lundberg/Squire (2001) examine joint determinants of growth and inequality in a model of simultaneous equations using adjusted Gini coefficients as inequality indicator. Statistical tests reveal a trade-off between growth and distribution for openness measured by the Sachs–Warner index, i.e. a 10 percent increase of the openness indicator (increasing the proportion of time in a given period in which the Sachs-Warner criteria are fulfilled) improves the growth rate by 10 percent and increases inequality by 1 percent.

Spilimbergo/Londoño/Székely (1999) collect panel data on Gini coefficients and factor endowments over the period 1965 to 1992 to regress the trade volume corrected for factor endowments and other variables on the inequality measure. While the openness index reduces inequality in capital-abundant countries, inequality is increased in skill–abundant countries. Using a panel of Gini coefficients, Barro (2000) tests the effect of a filtered trade volume measure on inequality with significant positive association. Anderson/White (2001), however, find no impact of the Sachs-Warner index on the poorest 20 and 40 percent, while growth regressions of quintile incomes on openness and additional variables result in positive coefficients of the Sachs-Warner index except in the top quintile. Dollar/Kraay (2001a) collect the most comprehensive dataset based on four sources. However, no systematic correlation between six openness indicators (trade volume, adjusted trade volume, Sachs-Warner index, collected import taxes to total import ratio, dummy for WTO membership and dummy for capital controls) and the share of income of the poorest 20 percent is found. Relying on the dataset and econometric specification of Dollar/Kraay (2001a) Ghura/Leite/Tsangarides (2002) extend the Dollar/Kraay (2001a) approach to account for model uncertainty issues using a Bayesian-type robust estimation. Again, trade openness measured as trade volume and collected import taxes to total import ratio remains statistically insignificant. Lopez (2003) uses as openness measure the volume of trade adjusted by country size (area, population), whether a country is landlocked or oil exporter. Using the unadjusted Dollar/Kraay (2001a) dataset inequality measures, averages of non-overlapping five year periods from 1960 to 2000 are constructed. Trade openness is found to increase inequality and growth resulting in a trade-off of both effects on poverty. While in the short run trade openness seems to worsen poverty, the net long-run growth elasticity of poverty with respect to trade openness is negative. In addition, Milanovic (2003) finds evidence that the effect of trade volume and foreign direct investment on the poor is

[19] See section 4.

dependent on the country's average income level, i.e. in poor countries the rich benefit from openness, but this effect is reversed in richer countries. Kraay (2003) tests the direct impact of the trade volume on the Gini index and four poverty measures (headcount, poverty gap, squared poverty gap and Watts index) on a sample of developing countries. Estimated coefficients, however, are never statistically significant. Finally, Agénor (2003) examines the effect of globalization on poverty in regressing the poverty gap on the ratio of import duties to total import, the ratio of foreign direct investment to GDP and a 'composite' index of globalization. Empirical results indicate an inverted U-shape relationship between globalization and poverty, i.e. beyond a threshold of the globalization index integration in the world market seems to help the poor.

To summarize our discussion on poverty effects of trade liberalization, empirical results suggest an ambiguous effect of openness on pro-poor growth. In addition, poverty effects of openness may depend on a possible trade-off between a growth effect and a distribution effect. Finally, the impact of trade liberalization on the poor may differ with respect to the country's level of development. Thus we conclude from this section, that we have to test these hypotheses for the 20 and 20 to 40 percent poorest.

3. Data

3.1 Indicators of trade policy and openness

In our research the question of the effect of openness on pro-poor growth is restricted to trade openness and policy in contrast to broader concepts of openness concerning increased labour or capital mobility. Notwithstanding this restriction, measuring trade openness is heavily debated in the literature. Broadly, two different approaches to trade openness are discerned: outcome-based and policy-based measures.

First, trade liberalization can be measured with respect to the trade outcome (e.g. the trade dependency ratio, i.e. the ratio of exports plus imports to GDP). Thus trade openness would measure the importance of trade on poverty looking only indirectly at the possible reasons and policies responsible for changed trade volumes. As the trade volume is also dependent on other factors (e.g. economic development, geography, factor endowments) also adjusted trade openness indicators are applied by taking residuals of a regression of the trade volume on structural characteristics. Methodological shortcomings of this procedure, however, concern the atheoretic or ad hoc nature of the adjustment process and the possible weak correlation between trade distortions and unexplained variation in the trade dependency ratio (Pritchett 1996, Spilimbergo/Londoño/Székely 1999, Berg/Krueger 2003).

Second, focusing more on trade reform openness can also be measured by trade policy under direct control of the government. Examples for the second category are tariff averages, i.e. the simple/trade-weighted average of tariff levels, or the coverage of quantitative restrictions. (Pritchett 1996, Spilimbergo/Londoño/Székely 1999, Rodriguez/Rodrik 1999, McCulloch/Winters/Cirera 2001). Policy measures, however, are criticized with respect to aggregation, quantification and implementation problems (Berg/Krueger 2003). Considering the relationship between both approaches countries may be open with respect to the trade dependency ratio, but nevertheless impose high tariff rates. So various indicators of openness are not necessarily correlated with each other and may measure different aspects of trade policy with opposite effects (Pritchett 1996, Harrison 1996, Spilimbergo/Londoño/Székely 1999). Thus it is important to specify clearly what is assumed to be measured by the openness indicator (McCulloch/Winters/Cirera 2001). In addition, it seems necessary to test different measures of trade liberalization to gain a more comprehensive insight into the effects of trade openness on pro-poor growth (Edwards 1997).

In our approach we, first, extend the recent literature on the impact of trade liberalization on poverty in testing the effect of trade liberalization in the primary and secondary sector.[20] The underlying hypothesis is that the poor may benefit differently from trade in specific sectors or commodities, i.e. targeted trade policy may be necessary to achieve higher pro-poor growth. Thus we choose six outcome measures, i.e. agricultural raw materials exports to GDP, agricultural raw material imports to GDP, food exports to GDP, food imports to GDP, manufactures exports to GDP and manufactures imports to GDP.[21] The six outcome measures were formed by three basic variables, i.e. a trade structure measure (e.g. food exports to merchandise exports) is multiplied by total merchandise exports and divided by GDP in current US dollars (table 3). Subsequently, the outcome variables, e.g. food exports to GDP, are regressed on area, population and an oil exporter dummy to control for structural determinants of trade (table 4).[22] The estimated residuals from the regressions form our six openness indicators. Thus we assume that all differences in trade sectors, which do not depend on the size of the country, population and difference between countries due to oil exports, are trade policy driven and measure policy openness. Second, we also test two more trade policy oriented measures, i.e. export duties to total exports, and import duties to total imports.[23] Due to data limitations our sample covers the period 1980 to 1999 for the trade sector openness indicators and the period 1971 to 1999 for the duties variables.

---

[20] We also thought of measuring the impact of trade in services especially for developing countries (Whalley 2003). Data of total and decomposed indicators of trade in services, however, are based mainly on balance of payments statistics and are flawed by severe inconsistencies (World Development Indicators 2001). Thus we restricted our research on trade in the primary and secondary sector.

[21] The six openness indicators capture only in a very crude way the trade with respect to poverty. More specific outcome-based measures for trade in goods produced or consumed by the poor would be more convincing. Cross–country data on exports and imports, however, are not filtered with respect to its relevance for the poor. On the other side, trade in products not directly relevant for the poor may also affect the income of the poor via the wage and employment channel and trade in different products may be relevant for the poor in different countries.

[22] We also tested other adjustment procedures including ln(Y) and $\ln(Y)^2$ in the regression. While the correlation matrix of residuals (our openness indicators) differs, the results of the estimation regressions with respect to pro-poor growth do not change considerably. In addition, including mean income in the adjustment regression is not necessarily convincing. For a discussion of different adjustment methodologies, see Pritchett (1996), Harrison (1996), Frankel/Romer (1996), Spilimbergo/Londoño/Székely (1999), Rodriguez/Rodrik (2000).

[23] We also tried other openness measures: the trade dependency ratio and an adjusted version (using area, population and an oil exporter dummy for the adjustment), and an price distortion index (Dollar 1992). In our sample, however, they turned out to be insignificant.

To have a look on the relationship between the openness measures, we present a correlation matrix of all eight indicators (table 5). While one would expect a negative correlation between the policy and outcome measures as higher duties should prevent trade flows, food exports and imports are significantly positive correlated with imports duties (and exports duties in one case). The correlations are significantly negative only in three cases (agriculture imports and exports duties, manufactures exports and exports duties, and manufactures exports and import duties). The correlations between the outcome measures, however, are mostly positive and thus in the assumed direction.

Finally, if we interpret higher adjusted trade sector openness indicators as measures for less restricted or more open trade policy, regional disaggregation reveals important differences in trade sector openness between the regions (table 7). While trade is relatively open in East Asia and the Pacific in all sectors and with respect to duties on trade, the food sector seems to be especially protected in Eastern Europe and Industrial countries. In addition, trade in agriculture and manufactures is heavily restricted in Latin America and the Caribbean. While exports for all sectors are more restricted than imports in Middle East and North Africa due to the outcome variables, the duties variables, however, indicate the opposite result. Finally, trade in manufactures imports is the most regulated in South Asia, whereas trade in the food sector seems to be the most open in Sub-Saharan Africa. Concerning export and import duties, South Asia and Sub-Saharan Africa are the regions which rely the most on revenues from trade taxes.

3.2 Data on income inequality measures and additional macroeconomic variables

Empirical tests on the impact of trade policy on pro-poor growth are limited by data availability of income inequality. In addition, incomparability of inequality data can cause severe problems in cross-section analysis (Atkinson/Brandolini 2001). Due to different concepts used in income distribution surveys across time and space cross-section analysis of pro-poor growth using first and second quintile share of income has to be applied with caution. Data on income inequality may vary in various aspects, e.g. in income concept (income, expenditure), tax treatment, reference unit (household/family/household equivalent/person) or coverage (age/area/population). Concerning the income definition, expenditure should be preferred to income for developing countries for reasons of practical measurement, especially for rural (poor) households (Deaton 1997, Atkinson 1993). In addition, data on income distribution can be based on different sources (national household surveys, income tax records, social security/labour market agency records).[24] Thus comparability of data on first and second quintile share of income has to be handled with care. While data on quintile shares of income cannot be restricted to completely comparable samples due to limited data availability, samples should only be used with observations as fully consistent as possible (Atkinson/Brandolini 2001).

[24] see for further details UNU/WIDER–UNDP World Income Inequality Database, Version 1.0, 12 September 2000, User guide; Atkinson/Brandolini (2001).

Our data on the first and second quintile share of income (and the Gini coefficient) are based on four sources: the UNU/WIDER-UNDP World Income Inequality Database, Version 1.0, 12 September 2000, the Global Poverty Monitoring described in Chen and Ravallion (1997, 2000)[25] and the World Development Indicators 2002 Table 2.8 (see table 1). The observations are chosen by a successive selection procedure with restriction criteria motivated by the problems outlined above. For the UNU/WIDER database (2000), we first restrict the sample to data based on surveys covering all area, all population, all age and fulfilling the 1 OKIN quality rating.[26] Second, as we are interested in pro-poor growth, only countries with at least two spaced observations are selected. To cover medium-to-long run growth and measurement errors due to fluctuations we draw the first available observation and every following with at least three years distance to the preceding. Only in three cases have we allowed for a two year distance within a spell for pragmatic reasons.[27] In addition, the income concept and income recipients (reference unit) have to be identical for each spell.[28]

The Global Poverty Monitoring data set is based on nationally representative surveys. All measures of household living standards are normalized by household size. The distribution and empirical Lorenz curves are household-size weighted. The income shares are estimated from primary data sources using parameterized Lorenz curves with flexible functional forms (Chen/Ravallion 1997). We have selected the sample on data of first and second quintile share of income due to the restriction criteria outlined above. In addition, actual data are drawn from the World Development Indicators 2002 Table 2.8 using the same methodology for low- and middle- income countries as used by the Global Poverty Monitoring data set.[29] This selection procedure has resulted in 371 observations in total, 231 for developing, 27 for transitional and 113 for industrial countries. Finally, data on openness indicators have to be available, reducing the total sample further to 266 observations for 72 countries (166, 15, 85 for developing, transitional and industrial countries, respectively) in the period 1971 to 1999 (table 1).

In our regressions we use, first, the same income concept and reference unit for each spell, i.e. we do not construct all possible spells between the observations in each country.[30] In addition, we select in some cases two observations per country per year, exchanging the observations between the spells (table 1). Second, in adjusting the income inequality measures to form all possible spells in each country we regress the first/second quintile share and the Gini coefficient

---

[25] The Global Poverty Monitoring is available under www.worldbank.org/research/povmon/index.htm and continually updated.
[26] *Reliable income or expenditure data referring to the entire (national) population, not affected by apparent inconsistencies* (UNU/WIDER – UNDP World income inequality database, Version 1.0, 12 September 2000, Users guide).
[27] Bulgaria 1991 – 93, Guatemala 1987 – 89, Kenya 1992 – 94
[28] One can further strengthen the selection criteria by also requiring the same type of survey for each spell to control for differences in survey design not captured by the same income definition and reference unit. Due to data availability, however, we omitted this idea.
[29] For description of estimation methods see World Development Indicators 2002 Table 2.8.
[30] The length of time between two observations with the same income concept within a country ranges from 2 to 14 years with a median of 4 years in our sample.

on dummy variables for different income definitions and regional dummies.[31] The adjusted first/second quintile share and Gini coefficient are then calculated by subtracting the estimated coefficients of the alternative income dummies from the unadjusted measures to form a sample of inequality measures corresponding to the distribution of household expenditure (table 2).[32] In general, the number of observations per country varies significantly from 2 (almost all Sub-Saharan Africa and Eastern Europe countries) to 8 (e.g. Finland).

Mean income of the poorest is measured as the share of income earned by the poorest first and second quintile times mean income, divided by 0.2. Data on mean income are based on the PPP-adjusted real income per capita (constant 1996 US dollars using the chain index) reported in the Penn World Tables Version 6.1 (Heston/Summers/Aten 2002, Heston/Summers 1991). Though the mean income from national accounts may differ from mean level of household income (expenditure) due to measurement errors, income definition or underestimation of income (consumption) in developing countries caused by nonparticipating rich, we use per capita GDP.[33]

Looking at summary statistics (adjusted) first/second quintile, (adjusted) mean income of the first/second quintile, growth rates of the first/second quintile, and growth rate of the mean income of the first/second quintile vary considerably in the different regions (table 7). Thus the growth rate of the first quintile in Eastern Europe is on average highly negative (-5.36 percent). Second, we emphasize the differences between changes in distribution and overall economic growth. We have a low positive growth rate of the first quintile share in East Asia and Pacific (0.39 percent), but a high positive growth rate for the mean income of the first quintile (+4.83 percent). Thus this positive effect stems mainly from the positive growth rate of real GDP per capita (+4.44).

Data sources and definitions of additional macroeconomic variables are presented in table 3. As we confront missing values and outliers the number of observations vary for each variable and restrict the size of the sample due to the econometric specification (table 6). In addition, not all

---

[31] We prefer to use regional dummy variables in the adjustment regressions since we have only 371 observations and eight different income definitions which are not equally distributed among regions. While category family and equivalized are only relevant for industrial countries, category income (unknown tax treatment) and net income are only present in three out of five regions in developing countries. If we omit regional dummy variables, the coefficients of these income definitions may falsely capture also regional differences in inequality. Since we only subtract the estimated coefficients of the income definitions from the unadjusted income inequality measures, regional differences in inequality are not consumed away by this adjustment procedure. To check this issue further, we also run adjustment regressions without regional dummy variables. If we compare correlations of the two adjusted first/second quintile shares and Gini coefficients with its unadjusted version, the correlation coefficients for the adjustment process with regional dummy variables are always closer to one confirming our approach.

[32] Subtracting the estimated coefficients of the alternative income dummies from the unadjusted measures means that we calculate the adjusted measures by subtracting the alternative income dummies multiplied by their coefficients from the unadjusted first/second quintile and Gini coefficients. On critic of this adjustment procedure, see Atkinson/Brandolini 2001.

[33] One pragmatic reason is that the UNU/WIDER-UNDP Database does not indicate the mean level of household income for each household survey. For a discussion of applying this procedure in pro-poor growth regressions, see Eastwood/Lipton (2001), Dollar/Kraay (2001a). For a further discussion of discrepancies between national accounts and household survey measures of living standards, see Ravallion (2001a).

additional macroeconomic variables are used in all specifications due to insignificant coefficients.

The variables overall budget surplus to GDP and government consumption to GDP are controlled for. Their use is motivated by the impact of trade reform on the poor via public sector financing. Budget deficit is expected at least to not have negative coefficients as better public finances should not decrease pro-poor growth. The impact of government consumption, however, is ambiguous as benefits of public sector do not necessarily support the poorest part of an economy more than other income groups.[34] In addition, government size can also negatively impact the income of the poor due to distortions of private decisions and its proxy for bad governance (Barro/Sala-i-Martin 1995). Unfortunately, we could not test the impact of health and education expenditures to GDP on pro-poor growth due to lacking data availability for our sample.[35] Human capital may play a crucial role for the income of the poor, thus we use the average years of secondary schooling in the total population aged 25 and over as proxy for investment in education with expected positive coefficients.[36] We also include life expectancy as a proxy for investment in health with expected positive effect.

The rate of inflation is used to cover macroeconomic uncertainty effects and to control for inflationary financial effects on pro-poor growth. Low levels of inflation are expected to stimulate or at least not hinder pro-poor growth, while high or crisis levels of inflation should impact negatively on pro-poor growth. Furthermore, we use terms-of-trade to capture external environmental effects with expected positive impact (Barro/Sala-i-Martin 1995, Ghura/Leite/Tsangarides 2002).[37] We also controll for financial development measured by M2 to GDP ratio with expected positive coefficient. A positive impact of financial sector development on the poor may be reasoned by better access to credit and improved risk sharing (Ghura/Leite/Tsangarides 2002).

Furthermore, the initial value of the adjusted Gini coefficient is added to cover the impact of initial inequality on the growth of the mean income of the poor with expected positive coefficient. Adding the initial inequality in the growth equation can be justified by testing the hypothesis of inequality convergence. A positive coefficient for the initial Gini coefficient would confirm the convergence of inequality (Ravallion 2000). Finally, civil liberties are used to test institutional effects on the poor. The index is measured on a scale from one to seven with one indicating the

---

[34]. In developing countries social expenditures often benefit more the middle class and the rich (Dollar, Kraay 2001a, Davoodi, Tiongson, Asawanuchit 2003).

[35] Davoodi/Tiongson/Asawanuchit (2003) collected data on education and health expenditures for 81 countries for the period 1960 to 2000. Even if the dataset was accessible (which is not the case), it would be inconvenient for our purposes as only less than half of the countries are present in our sample.

[36] We also experimented with three other education indicators (average years of schooling in total population aged 25 and over, average years of primary schooling in total population aged 25 and over, and percentage of "secondary school attained" in total population aged 25 and over). While results remained similar, secondary education turned out to be the most relevant indicator.

[37] Terms of trade growth reflects external shocks from world market orientation. The sign of the coefficient, however, may be indifferent as a positive terms of trade growth can improve the income of the poor representing for example an increase in the relative price of agricultural commodities (benefiting the rural poor) or a fall in the price for imported

most liberal state. Thus the coefficient should be negative, if less civil liberties result in anti - poor growth and policies.[38]

4. Pro-poor growth

Analytically, the impact of openness on the income of the poor can be distinguished in the growth and the distribution effect [39]:

$$\begin{aligned} \partial Y^{p20/40}_{it} / \partial\ Op_{jit} &= \partial \ln(Y_{it})/\partial\ Op_{jit} && + [\partial Y^{q20/40}_{it}/\partial \ln(Y_{it}) * \partial \ln(Y_{it})/\partial Op_{jit} + \partial\ Y^{q20/40}_{it} / \partial\ Op_{jit}] \\ &= \rho_j && + [(\alpha_1 - 1) * \rho_j \qquad + \qquad \gamma_j] \qquad (1) \end{aligned}$$

with

$Y^{p20/40}_{it}$:	mean income of the 20 percent/20 - 40 percent poorest defined as $\ln(Q^{20/40}_{it} * Y_{it}/0.2)$
$Y^{q20/40}_{it}$:	$Y^{p20/40}_{it} - \ln(Y_{it}) = \ln(Q^{20/40}_{it} * Y_{it}/0.2) - \ln(Y_{it}) = \ln(Q^{20/40}_{it}) + \ln(Y_{it}) - \ln 0.2 - \ln(Y_{it}) = \ln(Q^{20/40}_{it}/0.2)$
$Q^{20/40}_{it}$:	first/second quintile share of income
Y_{it}:	real per capita income
Op_{jit}:	openness indicators with j = 1, ... , 8
ρ_j:	(equiproportionate) growth effect of openness indicator on mean income ($\partial \ln(Y_{it})/\partial\ Op_{jit}$)
$(\alpha_1 - 1)$:	distribution effect of mean income ($\partial\ Y^{q20/40}_{it}/\partial \ln(Y_{it})$)
γ_j:	distribution effect of openness indicator ($\partial\ Y^{q20/40}_{it} /\partial\ Op_{jit}$)

The (equiproportionate) growth effect (the first term on the right hand side of the equation) measures the effect of the openness indicator on mean income (ρ_j). The distribution effect (second term in brackets) measures the impact of the openness indicator on the first/second quintile share in two parts, the difference between α_1 and one times the growth effect and the direct effect γ_j of the openness indicator Op_{jit} on the first and second quintile share. Thus the income of the poor could be affected directly and indirectly through growth by openness. In addition, possible trade-offs of the openness indicator affecting economic growth and the first/second quintile share in opposite directions can be analyzed.[40]

---

consumption goods (benefiting the urban poor). Otherwise, positive terms of trade growth can also decrease the income of the poor by adverse supply-side effects due to the shift in relative prices.

[38] To cover the omitted variable issue we also controlled for other additional macroeconomic variables, i.e. we used the impact of institutions measured by political rights and macroeconomic uncertainty captured by output volatility. Test statistics, however, indicate no significant impact of these covariates in our regressions.

[39] There is considerable ongoing discussion on the appropriate definition and measurement of pro-poor growth. While none of the measures proposed has so far set an international accepted standard, both the growth effect and the distribution effect have been identified as most critical for reduction in absolute poverty (Kakwani/Pernia 2000, Anderson/White 2001, Bourguignon 2001, Eastwood/Lipton 2001, Chen/Ravallion 2001, Kakwani/Son/Khandker 2003, Klasen 2003, Ravallion 2003).

[40] In the discussion of our concept of pro-poor growth we abstract from the inclusion of an interaction term to simplify the analysis.

A natural benchmark for pro-poor growth would be equipropotionate growth with α_1 = 1 and γ_j = 0, i.e. no distribution effects (equation (1): $\partial Y^{p20/40}_{it} / \partial Op_{jit} = \rho_j$). Thus pro-poor growth could be defined by a distribution effect:

$$\rho_j + [(\alpha_1 - 1) * \rho_j + \gamma_j] > \rho_j \qquad \text{i.e.} \qquad \gamma_j > 0 \qquad \text{for } \alpha_1 = 1 \tag{2}$$

One drawback of defining pro-poor growth only by equation (2) is the fact, that a situation with a negative growth effect ($\rho_j < 0$) would also be labelled as pro-poor if $\gamma_j > 0$. In this case the openness indicator would affect the growth rate negatively ($\rho_j < 0$), but this effect would be diminished by a positive effect on the first/second quintile share, if $\gamma_j > -(\alpha_1 - 1) * \rho_j$ (as ρ_j is assumed to be negative the direct distribution effect of the openness indicator γ_j must be greater than the distribution effect via growth if $\alpha_1 > 1$). To cover this issue, pro-poor growth could be defined by a total effect assuming $\partial Y^{p20/40}_{it} / \partial Op_{jit} > 0$:

$$\rho_j + [(\alpha_1 - 1) * \rho_j + \gamma_j] > 0 \qquad \text{i.e.} \qquad \gamma_j > -\rho_j \qquad \text{for } \alpha_1 = 1 \tag{3}$$

This condition would require a positive impact of a total effect, adding the growth and distribution effect. A positive impact of the openess indicator on first/second quintile share has to more than offset the negative effect of the openness indicator through growth. On the other hand, a growth situation would be also labelled pro-poor, if the positive growth effect of an openness indicator exceeds its negative distribution effect.

In our approach we choose equation (2) and equation (3) as our pro-poor growth conditions, to cover both the distribution effect and the total effect of openness indicators on the poorest 20 and 20 – 40 percent. We also profit from the fact that the coefficient α_1-1, while often different from zero, is almost always insignificant in our regressions. Thus, assuming no indirect distribution effect via the mean income (α_1= 1), pro-poor growth is defined in equation (2) by a positive distribution effect ($\gamma_j > 0$). In equation (3) pro-poor growth is achieved if the total effect of the distribution effect and growth effect is positive ($\gamma_j + \rho_j > 0$). By estimating both equations, possible trade-offs between the distribution effect and growth effect can be analyzed. If estimations for the distribution effect are positive ($\gamma_j > 0$), but the coefficients for the total effect are zero ($\gamma_j + \rho_j = 0$), we can conclude that the growth effect of the openness indicator on the income of the poor has to be negative ($\rho_j < 0$). If estimations for the distribution effect are negative ($\gamma_j < 0$) and the total effect is zero ($\gamma_j + \rho_j = 0$), the growth effect of the openness indicator on the income of the poor has to be positive ($\rho_j > 0$).

5. Econometric specifications and estimation

5.1 Econometric specifications

To measure the impact of openness indicators on pro-poor growth we choose two different econometric methodologies, a system generalized method of moments estimation for a level and first-differenced equation and a growth equation using pooled OLS, random or fixed effects estimation.[41]

5.1.1 System GMM Estimation: level and first differenced equation

To estimate the distribution effect we formulate the following ad hoc equation in levels, i.e. we regress the mean income of the 20/20 to 40 per cent poorest on the mean income, trade openness indicators, and variants of additional variables.

$$Y^{p20/40}_{it} = \alpha_0 + \alpha_1 \ln(Y_{it}) + \beta_k X_{kit} + \gamma_j Op_{jit} + \mu_i + \varepsilon_{it} \qquad (4)$$

with

$Y^{p20/40}_{it}$:	mean income of the 20 percent/20 to 40 percent poorest defined as $\ln(Q^{20/40}_{it} * Y_{it}/0.2)$
$Q^{20/40}_{it}$:	first/second quintile share of income
Y_{it}:	real per capita income
i:	cross-section units (split or not split countries)
t:	year of observation
$\mu_i + \varepsilon_{it}$:	composite error term including unobserved country effects
X_{kit}:	additional variables with k = 1, ... ,n
Op_{jit}:	trade openness indicators with j = 1, ... , 8

To present more clearly the distribution effect we subtract Y_{it} from both sides: [42]

$$Y^{q20/40}_{it} = \alpha_0 + (\alpha_1\text{-}1)\ln(Y_{it}) + \beta_k X_{kit} + \gamma_j Op_{jit} + \mu_i + \varepsilon_{it} \qquad (5)$$

with

$Y^{q20/40}_{it}$: logarithm of first/second quintile share divided by 0.2

---

[41] In the discussion of our concept of pro-poor growth we abstract from the inclusion of an interaction term to simplify the analysis.

[42] $Y^{q20/40}_{it} = Y^{p20/40}_{it} - \ln(Y_{it}) = \ln(Q^{20/40}_{it} * Y_{it}/0.2) - \ln(Y_{it}) = \ln(Q^{20/40}_{it}) + \ln(Y_{it}) - \ln 0.2 - \ln(Y_{it}) = \ln(Q^{20/40}_{it}/0.2)$

However, to include information on within-country variation and to cover econometric issues discussed in the next section we apply a system GMM estimator, i.e. we estimate the level equation (5) and its first difference (6) as a system with the restriction of having the same coefficients α_1-1, β_k and γ_j

$$Y^{q20/40}_{i,t+z} - Y^{q20/40}_{it} = (\alpha_1-1)[\ln(Y_{i,t+z}) - \ln(Y_{it})] + \beta_k[X_{ki,t+z} - X_{kit}] + \gamma_j[Op_{ji,t+z} - Op_{jit}] + [\varepsilon_{it+z} - \varepsilon_{it}] \quad (6)$$

z: distance of years between two observations of a spell with identical income definition or distance of years between observations within a country

To handle the incomparability problem of inequality data we choose two different routes. First, we split the countries requiring the same income definition within each subgroup (e.g. Côte d'Ivoire 1: 1985/88, Côte d'Ivoire 2: 1988/95) and using only the unadjusted income definition. While the number of cross-section units is now increased, the number of oberservations for the level equation is decreased as the first observation per cross-section unit is omitted due to the first-differenced procedure. The advantage of this procedure is that the first-differenced equations are now formed only by observations with the same income definition per country. On the other hand, the first/second quintile shares in the level equations are not directly comparable. Therefore, second, we do not split the countries and form first-differenced equations for all observations per country using the adjusted first/second quintile share of income. In this case we omit one of the two observations for the same year in one country (e.g. Côte d'Ivoire 1988/1) and an observation with only one year difference within a country (Netherlands 1983) (see table 1).[43] While in this case income definitions in the first-differenced and level equation are comparable, the adjustment procedure may influence the estimated coefficients (Atkinson, Brandolini 2001). One general drawback of the system GMM estimation in our context, however, is the fact that we are confronted with irregular panel data, i.e. z ranges from 2 to 14 in both approaches. In the system GMM estimation, however, z is assumed to be identical in the first-differenced equation.

The results of the system GMM estimation can be interpreted as a mixture of the level and first-differenced equation, i.e. pooled cross-section regression of the impact of the openness indicators on the level of first/second quintile at certain country-year observations (5) and the impact of the change of the openness indicators on the change of the first/second quintile share (6) between the observations within a country. Combining (5) and (6) in the system GMM estimation, the coefficients of the openness indicators (γ_j) and the additional regressors (β_k) capture the distribution effect. Thus relying on (2) a significant γ_j, $\beta_k > 0$ indicate pro-poor growth (positive distribution effect), while γ_j, $\beta_k < 0$ could be labelled as anti-poor growth on average.[44]

[43] We compare the values of the adjusted first and second quintile of both per country year observations (e.g. Venezuela 1987/1, 1987/2) with the values before (Venezuela 1981) and after (Venezuela 1993) the country year observations to decide whether we omit the first or second observation as ordered in table 1. If one of the adjusted observation varies considerably with respect to the other observations, we omit this observation.

[44] This interpretation would apply equivalently to $\alpha_1 - 1$. As $\alpha_1 - 1$, however, is almost never significant, we present only results for the system GMM estimation of equations (5) and (6) omitting $\ln(Y_{it})$.

Interpreting the system GMM approach as a level equation e.g. a one percentage points increase in the openness indicators would change the first/second quintile share by γ_j*100 percent.

Finally, to estimate the total effect we regress the mean income of the poorest 20 and 20 to 40 percent on the openness indicators and variants of additional regressors taking as level equation in the system GMM methodology variants of the following equation: [45]

$$Y^{p20/40}_{it} = \alpha_0 + (\beta_k+\rho_k)X_{kit} + (\gamma_j+ \rho_j)Op_{jit} + \mu_i + \varepsilon_{it} \qquad (7)$$

Taking into account (3) a significant $(\beta_k+\rho_k) > 0$, $(\gamma_j+ \rho_j) > 0$ indicates pro-poor growth (positive total effect), while $(\beta_k+\rho_k) < 0$, $(\gamma_j+ \rho_j) < 0$ would indicate anti-poor growth on average. Trade-offs between the distribution effect and growth effect are present, if estimations for the distribution effect (γ_j) and the total effect ($\gamma_j + \rho_j$) differ in sign.

5.1.2 Growth equation: pooled OLS, fixed effects or random effects estimation

To measure also within-country variation, to cover the problem of an irregular panel in the first-differenced equation and the incomparability issue of income inequality measures, we also use a growth equation forming the dependent variable exclusively from spells with identical definitions of inequality income measures and divide the growth rates of each spell by the distance of years to calculate (regular) annual averages. Thus we regress the annual average growth rate of the mean income of the 20 and 20 to 40 per cent poorest on the annual average growth rate of mean income and initial values for the openness indicators and additional macroeconomic variables.

$$y^{p20/40}_{it} = \alpha_0 + \alpha_1 y_{it} + \beta_k X_{kit} + \gamma_j Op_{jit} + u_{it} \qquad (8)$$

with

$y^{p20/40}_{it}$:	average annual rate of growth of the mean income of the 20/20 to 40 per cent poorest defined as $100/z*[\ln(Q^{20/40}_{i,t+z}*Y_{i,t+z}/0.2) – \ln(Q^{20/40}_{it}*Y_{it}/0.2)]$
z:	distance of years between two observations of a spell with identical income definition
y_{it}:	average annual rate of growth of the mean income defined as $100/z*[\ln(Y_{i,t+z}) – \ln(Y_{it})]$
X_{kit}:	additional variables with k = 1, ... ,n; only initial values (at beginning of spell)
Op_{jit}:	openness indicators with j = 1, ..., 8; only initial values (at beginning of spell)
u_{it}	error term of unknown form

We subtract y_{it} from both sides in (8) to derive the distribution effect more clearly:

$$y^{q20/40}_{it} = \alpha_0 + (\alpha_1\text{-}1)y_{it} + \beta_k X_{kit} + \gamma_j Op_{jit} + \varepsilon_{it} \qquad (9)$$

with

$y^{q20/40}_{it}$: average annual rate of growth of the first and second quintile share defined as $100/z^* \; [\ln(Q^{20/40}_{i,t+z}) - \ln(Q^{20/40}_{it})]$ [46]

Again $\gamma_j > 0$ or $\beta_k > 0$ indicate pro-poor growth (positive distribution effect) with respect to (2), i.e. a one percentage point increase of the openness indicators or the additional variables would increase the average annual growth rate of the first/second quintile share by γ_j and β_k percentage points, respectively.[47]

Finally, we also estimate the total effect in using variants of the following equation:[48]

$$y^{p20,\,40}_{it} = \alpha_0 + (\beta_k+\rho_k)X_{kit} + (\gamma_j+\rho_j)Op_{jit} + u_{it} \qquad (10)$$

With respect to (3) a significant $(\beta_k+\rho_k) > 0$, $(\gamma_j+\rho_j) > 0$ indicate pro-poor growth (positive total effect), while $(\beta_k+\rho_k) < 0$, $(\gamma_j+\rho_j) < 0$ would indicate anti-poor growth on the average. Again, trade-offs between the distribution effect and growth effect are indicated, if estimations for the distribution effect (γ_j) and the total effect ($\gamma_j + \rho_j$) differ significantly in the sign of the coefficients.

5.2 Econometric issues

In estimating variants of equations (5), (6), (9), several econometric issues have to be mentioned.[49] First, if we estimate the level equation (5) alone by pooled OLS, coefficients would be biased and inconsistent due to unobserved heterogeneity correlated with regressors (Dollar/Kraay 2001a, Eastwood/Lipton 2001, Chen/Ravallion 1997). Fixed-effect or first-difference estimation in a panel data framework would be standard remedies to the unobserved heterogeneity issue. However, within-country variation of income distribution may be too limited compared to the greater variability of first and second quintile shares across countries (Dollar/Kraay 2001a). Thus we apply a system GMM estimator using both information on the levels (cross country variation) and first-difference (within country variation) of income distribution data (Arellano/Bover 1995, Blundell/Bond 1998). Estimating the growth equation (9)

---

[45] In this approach we assume that α_1-1 equals zero.

[46] $y^{q20/40}_{it} = y^{p/20/40}_{it} - y_{it}$
$= 100/z^* \; ([\ln(Q^{20/40}_{i,t+z} {}^*Y_{i,t+z}/0.2) - \ln(Q^{20/40}_{it} {}^*Y_{it}/0.2)] - [\ln(Y_{i,t+z}) - \ln(Y_{it})])$
$= 100/z^* \; ([\ln(Q^{20/40}_{i,t+z}) + \ln(Y_{i,t+z}) - \ln 0.2 - \ln(Q^{20/40}_{it}) - \ln(Y_{it}) + \ln(0.2) - \ln(Y_{i,t+z}) + \ln(Y_{it})])$
$= 100/z^* \; [\ln(Q^{20/40}_{i,t+z}) - \ln(Q^{20/40}_{it})]$

[47] This interpretation would apply equivalently to $\alpha_1 - 1$. As $\alpha_1 - 1$, however, is almost ever insignificant, we present only results for the growth equation (9) omitting y_{it}.

[48] In this approach we assume that α_1 equals one.

by pooled OLS, the estimated coefficients might also be biased and inconsistent due to unobserved country-specific effects in ε_{it}. We use both a Hausmann test for fixed and random effects and a Breusch Pagan Lagrange multiplier test for random effects to cover this issue. If we can not reject the null hypothesis in both tests pooled OLS is the appropriate method. Otherwise, we present results for random effects (the Breusch Pagan test is rejected, but not the Hausmann test) or fixed effects model (the Hausmann test is rejected).

Second, even if time-invariant country-specific effects can probably be dismissed, omitted variable bias might be an issue due to variables whose values change over time. In addition, as the econometric specification is not based on a comprehensive theoretical framework, but more founded in ad hoc considerations and plausible reasoning, model uncertainty problems might arise (Ghura/Leite/Tsangarides 2002).[50] Thus excluded variables might be correlated with the regressors leading to biased estimates.

Third, measurement error in dependent and independent variables could generate biases in the estimated coefficients. While measurement error in the data on first/second quintile might be more severe due to flawed inequality data, measurement error in the dependent variable only causes only biases in case of systematic correlation with regressors (Wooldridge 2000).[51] Measurement error in explanatory variables, however, may lead to inconsistent estimates. Varying definitions and accuracy in data collection, for example, cause measurement errors especially present in data on developing countries.[52]

Fourth, in estimating level and first difference equations (5), (6) or the growth equation (9) simultaneity might be an issue.[53] In case of reverse causation estimations would be biased and inconsistent. The impact of the (growth rate of) first/second quintile income on explanatory variables (X, Op), however, is controversially discussed. While, on the one hand, endogeneity is denied due to pragmatic reasons (Dollar/Kraay 2001a), reverse causation may be argued for because of major policy and institutional changes in developing countries and political economy reasons (Lundberg/Squire 2001). We do not instrument for X and Op in the system GMM estimations due to limited data availability and plausibility.[54] Finally, only initial values for each

[49] The discussion in this section is also relevant for regressions on the total effect (equations 7 and 10).

[50] The problems of omitted variables and model uncertainty are connected by the exclusion of significant explaining regressors which might be correlated with the selected regressors. But while the omitted variable issue points to the inconsistent estimation of the selected parameters, the problem of model uncertainty focuses on the misspecification of the general model and the problem in explaining pro-poor growth by a single ad hoc model. On the problem of model uncertainty in cross country growth regressions, see Temple (1999). On the issue of model uncertainty in pro-poor growth regressions with macroeconomic policy variables, see Ghura/ Leite/ Tsangarides (2002).

[51] As $y^{p20/40}$ is formed by y, i.e. the dependent variable would be systematically related to an explanatory variable in regressions with y, a biased coefficient of y might be expected. However, remembering $y^{q20/40}$ in equation (5), this is equal to stating that the growth rate of the first/second quintile must be correlated with the growth rate of mean income. As the data on first/second quintile and mean income stem from different sources, this can not be assumed in advance (Dollar/Kraay 2001a). On the issue of biased estimates in case of identical data sources, see Chen/Ravallion (1997).

[52] On the measurement error problem in cross-section growth regressions and on the flawed data in the Penn World Table, see Temple (1999).

[53] On the problem of simultaneous examination of inequality and growth and their joint determinants, see Lundberg/Squire (2001).

[54] One could use lagged values of X and D as instruments. However, as our sample is often restricted to only two observations per country, we would have to drop all these countries from the regression.

spell are used for the regressors X and Op to avoid endogeneity due to explanatory variables in the growth equation.[55]

A significant impact of the (growth rate of the) mean income of the poor on the (growth rate of the) mean income might be possible.[56] Considering equations (5), (6), and (9), reverse causation thus means impact of the (growth rate of) first/second quintile share on the (growth rate of the) mean income.[57] Using only a level equation (5) contemporaneous reverse causation will cause inconsistent OLS estimation, while lagged reverse causation would justify OLS estimation assuming serial independence. Thus considering the growth equation (9), pooled OLS estimation is unbiased and consistent if lagged reversed causation can be assumed with serial independence (Eastwood/Lipton 2001). Concerning the system GMM estimation, reverse causation is covered in using instruments for mean income. In the level equation (5), we instrument for mean income using accumulated growth in mean income over three years prior to time t (e.g. Brazil 1967 to 1970 for 1970). In the first difference equation (7), we instrument for growth in mean income using the level of mean income at the beginning of the period, and accumulated growth in the three years prior to time t (Dollar/Kraay 2001a, Ghura/Leite/Tsangarides).[58] A Sargan test on overidentifying restrictions is used to test for validity of extra instruments (Arrelano/Bond 1991, Bond/Blundell 1998). As the coefficient for (the growth rate of the) mean income is 1 in most of the cases, however, we present only results omitting (the growth rate of the) mean income.

Assuming lagged reverse causation of $y^{q20/40}$ on y in the growth equation (9), serial correlation in the error term within countries and over time remains to be discussed. In static models, autocorrelation in the error term leads to incorrect standard errors and t-ratios but not to inconsistent estimates in OLS estimation. Serial correlation in models with lagged endogenous variables, however, would result in inconsistent estimates. Given a serially correlated error term the structure of the variance-covariance matrix for equation (9) would be block diagonal with a separate block for each country. Thus off-diagonal elements would only be non-zero within these blocks (Chen/Ravallion 1997). As different surveys are used within almost each block, the error term is assumed to be serially independent. Considering the system GMM estimator, the assumption of no serial correlation of the error term ε_{it} in the level equation (5) is essential for consistency (Bond/Blundell 1998). Thus tests for first-order and second-order serial correlation of the first-differenced residuals $\varepsilon_{it+z} - \varepsilon_{it}$ of equation (6) are reported. If disturbances ε_{it} are not serially correlated, first order serial correlation in first differenced residuals $\varepsilon_{it+z} - \varepsilon_{it}$ have to be

[55] On this solution, see Lundberg/Squire (2001). On the empirical application of this method to deal with the endogeneity issue in cross-section growth regressions, see Barro/Sala-i-Martin (1995). But even in this solution endogeneity might remain a problem, see Temple (1999).
[56] Biased estimates might also be possible due to joint causation (Timmer 1997, Eastwood/Lipton 2001).
[57] The effect of initial income inequality on subsequent growth has been often empirically examined. The evidence, however, is mixed with negative (Perotti 1996, Alesina/Rodrik 1994), positive (Forbes 2000, Li/Zou 1998) and indifferent effect of initial income inequality on future growth (Deininger/Squire 1998b). In addition, a negative effect only for countries with mean income below $ 2000 (in constant 1985 purchasing power) is found (Barro 2000).
[58] Example: given the first difference equation Brazil 1960 – 1970 we use the mean income of 1960 and the accumulated growth of mean income between 1957 and 1960 as instruments for the first difference of mean income 1960 - 1970.

significant negative (m1), and second order serial correlation in the first differenced residuals insignificant (m2) (Arrelano/Bond 1991, Bond/Blundell 1998).

5.3 Estimation strategy and results

To measure the impact of trade policy on pro- poor growth, we estimate separately the impact of the eight openness indicators on the first and second quintile share for all, developing and industrial countries applying the system GMM estimator and the growth equation. We test this set of equations in specifications with regional dummy variables and with additional macroeconomic variables. To analyze potential trade-offs between this distribution effect and the growth effect we additionally test the total effect of the eight openness indicators on the mean income of the 20 and 20 to 40 percent poorest adding macroeconomic variables. Due to our fundamentally empirical approach, we execute different robustness checks to confirm the results, i.e. we test results only without outliers, with and without mean income, and adjusted and not adjusted inequality income measures in the system GMM estimations.[59] Finally, we test also for the effect of an interaction term with mean income for all eight openness indicators in all and developing countries.

To present a general overview of our results, we indicate matrices of significant coefficients of openness indicators in table 16 to 22.[60] In the rows we indicate the different specifications applied. The eight columns denote the eight different openness indicators we test in each specification. In table 22 we present results for the distribution and total effect of the openness indicators with interaction term. In row 1 we see findings regressing the first quintile on regional dummies and the eight openness indicators using the unadjusted approach in the system GMM estimation. Coefficients for agriculture exports and food imports seem to be highly statistically significant (table 22).

5.3.1 Openness indicators and pro-poor growth: distribution effect

Relying on this overview we emphasize that openness indicators have no distribution effect on the growth rate of the poorest 20 and 20 to 40 percent in all, developing or industrial countries (table 16, 17). In the system GMM estimation we find weak positive effect of manufactures exports on the first quintile for all, and less robust for developing countries (table 18, 19).

First, we regress the first and second quintile on the eight openness indicators and regional dummy variables to control for cultural, historical and economical differences of income inequality in the seven regions (Cornia 2002). In the system GMM approach estimations confirm

[59] We indentify outliers from graphical analysis and descriptive statistics without a strict rule (table 6). Due to a varying number of observations of the samples used in regressions for developing, and industrial countries, and in the growth equation and system GMM estimation, the number of outliers differ in these regressions for dependent and independent variables.

the hypothesis of important inequality difference between regions as almost all coefficients for regional dummy variables differ to a high significance level from the region omitted, i.e. industrial countries in all countries and Eastern Europe and Central Asia in developing countries (table 8). This result is in line with the regional difference of the mean of the (adjusted) first and second quintile (table 7). Concerning openness indicators, only manufactures exports and import duties are weakly significantly positive (table 8 equatons 1, 2, and 5).[61] Failed tests on first order serial correlations, however, do not confirm the findings and emphasize the weakness of the results.[62]

Considering the empirical literature (Romer/Romer 1998, Easterly/Fisher 2001, Eastwood/Lipton 2001, Ghura/Leite/Tsangarides 2002), macroeconomic variables are found to be relevant with respect to pro-poor growth. Thus we additionally control for budget deficit to GDP, financial development (money and quasi money to GDP), secondary education (average years of secondary schooling in total population aged 25 and over), inflation and initial Gini coefficient in the growth equation.[63] The eight openness indicators, however, remain insignificant in the growth equation approach. In the system GMM estimation, we substitute budget deficit by government consumption due to its proven relevance in this estimation methodology (Ghura/Leite/Tsangarides 2002). While the Gini coefficient is found to be highly significant in a similar approach (Ghura/Leite/Tsangarides 2002), regressing the first quintile share on the Gini coefficient in a level/first-difference equation seems to us tautological as a change in inequality in the first and second quintile share is only explained by change in overall inequality, i.e. no new informations on the determinants of inequality are added in this specification. Thus we omit the Gini coefficient in the system GMM estimations.

Considering the openness indicators, manufactures exports affect positively the first quintile share for all countries and the first and second quintile share for industrial countries (table 9 equations 1 to 6). Furthermore, agriculture exports and food exports impact negatively on the first quintile share in industrial countries, a result not confirmed in either the adjusted or unadjusted approach (table 9, equations 7 to 12). In addition, secondary education is amazingly negative (-0.12) to a one percent significance level on the first quintile share for industrial countries (table 9, equations 7 and 9). Specification tests on first-order serial correlation, however, are not passed in all regressions presented.

---

[60] Results for industrial countries in the growth equation are not presented since coefficients are either insignificant or the size of the sample is under 30 observations.
[61] Coefficients, heteroscedasticity adjusted asymptotic standard errors and tests on first-order and second-order serial correlation are based on the one-step estimator. While the one-step estimator is asymptotically inefficient relative to the two-step estimator, asymptotic inference based on the one-step estimator is supposed to be more reliable indicated by simulations (Blundell/Bond 1998, see also Bond/Hoeffler/Temple 2001).
[62] In addition, table 8 equation 4 is only significant in the adjusted income approach, while table 8 equation 5 is only significant in the unadjusted approach.
[63] Adding initial inequality in the growth equation can be motivated by testing the hypothesis of inequality convergence even if usually the same inequality measure, i.e. Gini coefficient or first quintile share, is used on both sides of the equation (Ravallion 2000). A positive coefficient for the initial Gini coefficient would confirm the convergence of inequality.

Putting the eight openness indicators separately as exogenous regressors on the right hand side in both the growth equation and system GMM estimation, empirical findings suggest only weak evidence on a distributional effect of trade policy on the poorest 20 and 20 - 40 percent. Thus we provisionally conclude that either there is only small distributional effect of trade on the poor or our model is not correctly specified and thus does not correctly describe the real economic situation.

5.3.2 Openness indicators, interaction term and pro-poor growth: distribution effect

To capture the issue posed in the last section, we next introduce an interaction term for all eight openness indicators using the mean income. Including openness indicators alone may be criticized by the fact that the effect of trade on the first and second quintile depends also on the level of the country's development. Relying on the Stolper-Samuelson effect, a theoretical explanation could be based on the reasoning that increased openness could tend to benefit low-skilled workers in poorer countries due to a boost for low-skill-intensive industries, while low-skilled workers in richer countries could lose income due to increased foreign competition and cheaper imported low-skill-intensive products. Thus more openness could increase inequality in countries relatively highly endowed in human and physical capital, while inequality may decrease in countries relatively highly endowed in unskilled labour. As we have no information on the skill composition in the first and second quintile share, we use the income level of the country as interaction term with our openness indicators to capture in a very crude way the countries' relative abundance in skilled labour (Barro 2000, Ravallion 2001b, Dollar/Kraay 2001a, Milanovic 2003).

Thus one may expect the following effects with respect to our openness indicators. First, the positive coefficients of liberalization in agriculture and food should decrease with respect to an increase in the income level of the country if the majority of the labour force is employed in the agriculture and food sector in low-income countries. Second, trade reforms in manufactures imports should lead to positive effects on the unskilled labour, decreasing with rising income levels. However, distribution effects may also be negative in low-income developing countries, if liberalization in manufactures is associated with a skilled-biased technological change (Goldberg/Pavcnik 2004). Finally, the effect of export and import duties should increase with rising income level. We test these hypotheses also for developing countries alone since the level of income and the economic structure of developing countries may differ significantly with respect to abundancy in labour and capital in our sample (table 7).

We first estimate the effect of the openness indicators on the first and second quintile share adding regional dummy variables. Considering the growth equation, the effect of agriculture exports on the annual average rate of growth of the second quintile share for all and developing countries surges with respect to an increasing initial mean income (table 10 equations 1 and

2).[64] Looking at the result for developing countries, agriculture exports affect negatively the growth rate of the second quintile share for mean income below 4150, but impact positively in countries with an income level higher than 4150 (table 10 equation 2).[65] Thus the negative effect of agriculture exports on annual average rate of growth of the poorest 20 to 40 percent worsens with lower economic development. This result, however, is in contrast to the explanation proposed above. In addition, as the median in this sample is 3890 for the mean income, within-country distribution is aggravated in more than 50 percent of the countries by agriculture exports. Finally, also manufactures imports affect significantly the growth rate of the first quintile share in developing countries, i.e. manufactures imports are negative for very low income countries, but this effect decreases with rising economic development and becomes positive above a value of 3720 for the mean income (table 10 equation 3).

If we add regional dummy variables to the openness indicators with interaction term in the system GMM estimation, only agriculture exports are significant for the first and second quintile in all countries using the adjusted approach (table 11 equations 2, 4). In addition, agriculture exports and food imports are significant in developing countries (table 11 equations 5 to 12). A positive effect on very low income countries decreases with rising economic development and turns negative at some level of mean income. Agriculture exports are positive for the first quintile share in developing countries below a value around 5100 for the mean income, which means that higher agriculture exports increase the first quintile in more than 90 percent of the developing countries in our sample (table 11 equation 5). Food imports impact positively on the first quintile share in developing countries below a value of 4100 for the mean income, i.e. higher food imports decrease the first quintile in more than 50 percent of the developing countries in our sample (table 11 equation 9). However, regressions on the effect of openness indicators almost never pass specification tests on first-order serial correlation.

One important result is that empirical findings suggest no distribution effect of agriculture imports, food exports, manufactures exports, and import and exports duties in both the growth equation and system GMM estimation if we add an interaction term in specifications without macroceonomic variables (table 16, 17 21, 22). A second important result is an opposite effect of agriculture exports if we compare the findings in the growth equation with the system GMM estimations (table 16, 17, 21, 22). While the positive effect of agriculture exports at very low income levels decreases with surging economic development for the second quintile share in developing countries, the effect of the initial agriculture exports on subsequent growth rate of the second quintile share is negative at low income levels (compare table 11 equations 7, 8 with table 10 equations 2).

To reveal the systematic differences of the estimation methodologies, we, first, estimate a sample used in the growth equation in a system GMM approach. As we need two observations

[64] Results are robust to the inclusion of annual average rate of growth of the mean income on the right hand side of the regression.

with growth rates per country, i.e. three observations for the first and second quintile share, to apply the system GMM estimator, we omitted all countries with only two observations. Estimated results for the system GMM estimations are a mixture of the growth equation and the first difference of the growth equation. Second, we also test effects of the level and first differenced equations of a system GMM estimation separately in OLS. Estimated coefficients for system GMM estimation are here a mixture of a level equation and the first difference of the level equation. Thus the difference between the system GMM estimations and the growth estimations stems apparently from the fact that we regress the level of the first/second quintile on the level of openness indicators in the system GMM estimation, while we regress the growth rate on the level of the openness indicators in the growth equation.

Again, we control for budget deficit to GDP, financial development, secondary schooling, inflation and initial inequality in the growth equation. Batteries of regressions, however, could not confirm any significance of one of the eight openness indicators (table 16, 17).[66] Concerning the system GMM estimation, we control for secondary education, government consumption and inflation as additional macroeconomic variables. Looking at the overview, only import duties are relevant in all countries, but the coefficients of agriculture exports become insignificant compared to regressions without macroeconomic variables (table 21).

Considering the results for developing countries (table 22), the effect of agriculture exports on the first and second quintile share is highly significant and increased with respect to regressions excluding macroeconomic variables (compare table 12 equations 1 to 4 with table 11 equations 5 to 8). Thus a higher positive effect on very low income countries decreases more sharply with rising economic development. Taking the regression for the first quintile share in developing countries, the turning point to a negative impact is at a value around 5200 for the mean income (Costa Rica 1989), while in the regression without macroeconomic values the turning point is at a value around 5050 (compare table 12 equation 1, 2 with table 11 equation 5). In addition, significant results are confirmed by passed specification tests on first-order serial correlation in the unadjusted approach (table 12 equations 1 and 3).

While coefficients of food imports for the second quintile become insignificant in developing countries in specifications with macroeconomic variables (table 22), the effect of food imports on the first quintile in developing countries is analogue to the result controlling only for regional dummy variables (compare table 12 equation 5 and 6 with table 11 equations 9 and 10). The findings are confirmed by passed specification test on first-order serial correlation in the unadjusted approach (compare table 12 equation 5 with table 11 equation 9).

---

[65] The level of initial mean income is calculated by $-5.00 + 0.60 * \ln(Y) = 0$.
[66] We test the eight openness indicators for all, developing and industrial countries without outliers and with/without the growth rate of mean income.

Finally, agriculture imports affect the first quintile in developing countries and import duties the first quintile in all countries at low significance levels. Even if specification tests on first-order serial correlation are passed, the results are not robust using the unadjusted or adjusted income inequality measure approach (table 12 equations 5 and 8). Thus we emphasize the weakness of the findings for agriculture imports and import duties, as the coefficients for additional macroeconomic variables are either insignificant or, in case of a negative coefficient for secondary education (table 12 equation 7), in the opposite direction to estimations in the literature (Ghura, Leite, Tsangarides 2002) and are very singular with respect to robustness checks and tests in other specifications (table 21 and 22). Concerning additional macroeconomic variables, coefficients are almost never significant. Only in regressions on agriculture exports, secondary education and government consumption affect positively the second quintile share in developing countries (table 12 equation 3 and 4).[67]

Including mean income as interaction term for all eight openness indicators seems to describe more detailed the economic situation. In the system GMM estimations agriculture exports and food imports impact positively at very low income levels in developing countries, but this effect is diminished and becomes negative above a certain threshold. Empirical findings for agriculture imports and import duties, however, do not allow a clear conclusion. Finally, food exports, manufactures exports and export duties are found to be insignificant in both the growth equation and system GMM estimations using an interaction term (table 16, 17, 21, 22).

5.3.3 Openness indicators and pro – poor growth: total effect

Taking into account trade-offs between the distribution effect and the growth effect of openness on the income of the poor, we also test for the impact of our eight openness indicators on the mean income of the 20 and 20 - 40 percent poorest, i.e. the total effect. We choose to measure the total effect and derive possible trade–offs between the distribution and growth effect, because our panel is highly irregular and unbalanced and tests on the growth effect of the openness indicators are limited by data availability and could better be answered in samples without restrictions on income inequality data.

Controlling for budget deficit, financial development, secondary education, inflation and initial inequality, only agriculture imports are relevant in the growth equation (table 16, 17), i.e. agriculture imports impact significantly positive on the mean income of the second quintile in all countries and the first and second quintile in developing countries (table 13 equations 1 to 3).[68] Thus the positive effect of agriculture imports on the income of the poorest 20 and 20 to 40 percent works only through the growth effect, as we do not find any distribution effect (table 16

[67] While the positive coefficient of secondary education is in line with empirical findings for the first quintile share, the very low but positive effect of government consumption is not present in the adjusted approach and not confirmed in the literature (Ghura/Leite/Tsangarides 2002).
[68] We also tested initial per capita income as convergence term in total effects regressions of the growth equation. However, we omit inital per capita income, since its coefficient was never statistically significant

and 17).[69] In addition, the adjusted initial Gini coefficient is positive at a highly significant way (between 0.34 and 0.45), i.e. higher initial inequality would lead to a higher growth rate for the mean income of the poorest 20 and 20 to 40 percent.[70]

The picture changes considerably if we add secondary education, government consumption, inflation and, additionally, civil liberties, life expectancy and terms-of-trade in the system GMM approach. Relying on our overview, agriculture imports, food exports, manufactures export, export and import duties are now significant openness indicators with respect to the total effect (table 18 to 20). Agriculture imports impact highly significantly positive on the mean income of poorest 20 and 20 - 40 percent in all and developing countries (table 14 equations 1 to 8). Interpreting the system GMM estimation as level equation, a one percentage point rise in agriculture imports would increase the mean income of the first and second quintile between 20 and 26 percent. As the estimated residuals for agriculture imports vary only between -1.11 and +1.67 in our sample without outliers (table 6), however, a 0.1 percentage point rise of agriculture imports by trade reforms would be a more realistic perspective. This positive effect, however, is only present in regressions on the mean income of the poor and thus results from the growth effect alone (table 18 and 19).

Food exports affect negatively the mean income of the first and second quintile in all countries, the mean income of the poorest 20 percent in developing countries (table 14 equations 9 to 16) and the mean income of the first and second quintile in industrial countries using the unadjusted approach (table 14 equations 31 to 34). A one percentage point increase in food exports would diminish the mean income of the poorest 20 and 20 to 40 percent between 2 and 3 percent. The negative effect, however, is only present in regressions on the mean income of the poor and thus results from the growth effect alone (table 18 and 19).

Manufactures exports affect highly significantly positive the mean income of the first and second quintile in all and developing countries (table 14 equations 17 to 24) and the mean income of the first quintile in industrial countries applying the unadjusted approach (table 14 equation 35). Interpreting the system GMM estimation as level equation, a one percentage point rise in manufactures exports would increase the mean income of the first and second quintile between 1.1 to 2.1 percent in all and developing countries. As either only the total effect is significant or the total effect is more than doubled with respect to the distribution effect (table 18 and 19), manufacture exports work mainly through the growth effect on the income of the poor

---

[69] Concerning the result for the growth of the mean income of the first quintile (table 13 equation 2), we have to correct this statement, as we do find a positive coefficient (+2.20) to a 5 percent significance level in the random effects model for the growth of the first quintile. Thus part of the high positive value seems to stem from a distribution effect. The Hausmann specification test, however, is rejected to a 5 percent significance level, thus a fixed effects model has to be applied. The coefficient of agriculture imports is positive (+4.42), but insignificant in the fixed effects model.

[70] In regressions for the growth rate of the mean of the second quintile, around 70 percent of the positive effect of the initial Gini coefficient stem from a positive distribution effect on the growth rate of the second quintile, confirming the hypothesis of inequality convergence (Ravallion 2000). We do not present the results for the distribution effect due to insignificant openness indicators. The positive total effects of initial inequality are not directly comparable to Forbes (2001), since we do not apply a first-difference methodology (GMM) to estimate our growth equation, we use a different set of additional regressors, and our Gini coefficient is adjusted in a more accurate way.

in all and developing countries. This conclusion, however, can not be drawn for industrial countries as the small positive coefficient for the mean income of the first quintile is similar to the distribution effect (compare table 14 equation 35 to table 9 equations 3)

Export duties affect negatively the mean income of the poorest 20 percent in all and developing countries, and, amazingly, affect positively the mean income of the second quintile in industrial countries (table 14 equations 25 to 30). A one percentage point surge in export duties would decrease the mean income of the first quintile by 3 percent in all and developing countries, but increase the mean income of the poorest 20 - 40 percent by 11 percent in industrial countries. The positive coefficient should not be overinterpreted as coefficients are significant only to a ten percent level. In addition, the values for export duties vary only between 0 and 1.12 in industrial countries with a mean of 0.10 (table 7) and more than 70 percent of the observations have a value of zero. Thus the positive coefficient is only due to few observations with positive exports duties. Finally, import duties impact negatively on the mean income of the first quintile in industrial countries (table 14 equations 37 and 38). A one percentage points rise in import duties would diminish the mean income of the poorest 20 percent between 1.8 and 2.4 percent. This negative effect, however, results mainly from the distribution effect (table 9 equations 13 and 14).

Most additional macroeconomic variables impact on the income of the poor in the way expected. In all and developing countries higher secondary education, life expectancy and terms of trade increase the income of the poor, while raised government consumption and less civil liberties diminish the income of the poor (table 14 equations 1 to 28).[71] In addition, coefficients for additional macroeconomic variables are almost always statistically significant. Only the coefficient of inflation is amazingly positive, but almost never significant in developing and all countries. A one year rise of average years of secondary schooling would increase the mean income of the first and second quintile between 22 and 33 percent in developing countries. As the mean of average years of secondary education is at 1.21 years and the minimum and maximum values for developing countries are 0.12 and 3.52 years, respectively, a one year change in secondary schooling would be a very ambitious policy objective. A more realistic interpretation is a change of 0.1 in average years of secondary schooling that would increase the mean income of the first and second quintile between 2 and 3 percent. In addition, a one year increase in life expectancy would raise the mean income of the first and second quintile between 2 to 6 percent in all and developing countries. Finally, a one unit rise of civil liberties measured in a scale from one to seven with one indicating the most favorable state would diminish the mean income for the first and second quintile between 5 to 8 percent. While results for industrial countries point in the same direction, the coefficient of inflation is highly negative, terms of trade equals zero and only few coefficients are significant (table 14 equations 29 to 38). In addition, secondary education is only significant for income of the first quintile using

[71] The variable government consumption may be seen as a proxy for nonproductive public expenditures, political corruption or bad governance (Barro/Sala-i-Martin 1995).

the adjusted approach in industrial countries (table 15 equation 31, 32, 35, 36, 37, 38). Results on the total effect in general, however, have the shortcoming that tests on first order serial correlation are never passed.

5.3.4 Openness indicators, interaction term and pro–poor growth: total effect

Controlling for an interaction term, budget deficit, financial development, secondary education, inflation and initial inequality in the growth equation, we find no significant effects in the growth equation (table 16, 17). Concerning the system GMM estimation, we add secondary education, government consumption, inflation, civil liberties, life expectancy and terms of trade to the interaction term of our eight openness indicators. An important finding is that the set of significant openness indicators has changed with respect to the distribution effect. First, agriculture exports now affect also the mean income of the poorest 20 and 20 - 40 percent in all countries. Second, food exports, export and import duties impact significantly on the mean income of first and second quintile in all and developing countries. Finally, food imports become irrelevant with respect to the total effect, i.e. the distribution effect of food imports is completely absorbed by an opposite growth effect (table 21 and 22).

The coefficients of agriculture exports are significant in all and developing countries with expected effect, i.e. a positive effect on very low income countries decreases with rising economic development and turns negative at some level of mean income (table 15 equations 1 to 8).[72] Agriculture exports are positive for the first quintile share in developing countries in the unadjusted approach below a value around 6000 for the mean income, which means that higher agriculture exports would increase the first quintile in more than 70 percent of the developing countries in our sample (table 15 equation 5). The total effect of agriculture exports is dependent on the growth effect alone in all countries as we find no distribution effect (table 21). In developing countries, however, the significant distribution effect is raised by the growth effect (table 22). Thus there is no trade-off between the distribution and growth effect, but both work in the same direction.

Food exports, however, affect the mean income of the first and second quintile in the opposite direction. A negative effect at low levels of economic development diminishes and becomes positive with rising mean income in all and developing countries (table 15 equations 9 to 16). Food exports are positive for the income of the first quintile in developing countries in the unadjusted approach above a value around 5300 for the mean income (table 15 equation 13). In developing countries this effect is steeper than in all countries as a higher negative effect on very low income countries increases more sharply with rising economic development. The total

[72] Exceptions are regressions on the mean income of the first quintile in the adjusted approach (table 15 equations 2 and 6).

effect of food exports, however, is only driven by the growth effect as we do not find significant distribution effects for food exports (table 21 and 22).[73]

Concerning export and import duties, a negative impact at low levels of economic development diminishes and becomes positive with rising mean income in all and developing countries (table 15 equations 17 to 32), i.e. increased exports and import duties worsen the mean income of the poorest in low to middle income countries, while they are positive for the poor in high income countries. Exports duties are negative for the income of the poorest 20 percent in developing countries in the adjusted approach below a value around 5750 for the mean income (table 15 equation 22). Increased import duties, however, already affect positively the income of the first quintile at a value around 2100 for the mean income (table 15 equation 29 and 30). For both exports and import duties this effect is steeper in developing countries than in all countries as a higher negative effect on very low income countries increases more sharply with rising economic development. In addition, the growth effect is alone responsible for the impact of export and import duties on the mean income of the poorest 20 and 20 - 40 percent as almost all distribution effects are insignificant (table 21 and 22).[74]

Finally, the impact of the additional macroeconomic variables is very similar to regressions on the total effect without interaction term (compare table 15 with table 14). Interpretation of the results on the total effect in general, however, are weakened by failed tests on first order serial correlation in most regressions (table 15).

6. Conclusion

We departed from the question whether the poorest 20 and 20 to 40 percent benefit from trade openness in the agriculture, food and manufactures sector or in export and import duties. To answer this question we regressed the first and second quintile and the mean income of the first and second quintile on eight different openness indicators, interaction terms and additional macroeconomic variables in a growth equation and an adjusted and unadjusted system GMM approach (table 16 to 22).

Only a few openness indicators exhibit significant distribution effects on the poorest 40 percent. First, manufactures exports are weakly positive for the first quintile in all countries applying the system GMM estimator (table 18), a result mainly driven by effects in industrial countries (table 19 , 20) and not supported in the growth equation (table 16, 17). Second, liberalizing agricultural

[73] A negative distribution effect of food exports at low levels of economic development could be explained in the context of the Stolper-Samuelson theorem, if we assume that the food sector is the most protected sector producing intensively with unskilled labour and if tariffs are reduced the most in the food sector during trade reforms. Since trade liberalization is focused on the unskilled-labour intensive food sector, returns to unskilled labour should decrease. Thus sectoral protection patterns before trade liberalizations may significantly affect the impact of trade reforms (Goldberg/Pavcnik 2004). This explanation, however, seems to be irrelevant in our context since the total effect is only driven by the growth effect.

raw exports leads to a significant positive distribution effect on the first and second quintile share in low-income developing countries. The positive effect decreases with rising economic development and becomes negative at a higher level of income, supporting the Stolper–Samuelson theorem (table 22). The results, however, are neither present in regressions for all countries (table 21), nor in the growth equation (table 16, 17).[75] Finally, increased food imports impact positively on the first quintile share only at low income level in developing countries (table 22).[76] However, this effect becomes negative in higher income developing countries and is not confirmed in regressions for all countries (table 21) and the growth equation (table 16, 17). To summarize, only trade liberalization in agricultural raw materials exports and food imports leads to significant positive distribution effects in low income developing countries applying the system GMM approach. In addition, trade reforms in manufactures does not lead to any negative distribution effect in low income countries as proposed by the literature on wage inequality.[77]

Considering the total effect, we find more relevance of trade reforms on the income of the poorest 40 percent. First, trade liberalization in agricultural raw material imports, export duties, and promotion of manufactures exports lead to significant positive effects using the system GMM estimation, while higher food exports impact negatively on the mean income of the poorest 20 percent in all and developing countries (table 18, 19). Similar findings are confirmed for the mean income of the poorest 20 - 40 percent for agriculture imports, manufacture exports and food exports in all countries and agriculture imports and manufacture exports in developing countries (table 18, 19). Thus trade liberalization in agriculture imports, food exports, export duties, and promotion of manufactures exports work only through the growth effect on the income of the poor. In addition, these results are mainly relevant for developing countries since findings for industrial countries deviate in most of the cases.[78] In industrial countries higher export duties affect positively the mean income of the second quintile share to a low significance level and import duties are negative for the mean income of the poorest 20 percent, a result mainly driven by the distribution effect (table 20). Of all these effects, however, only the positive total effect of trade liberalization in agriculture imports can be confirmed in the growth equation (table 16, 17).

Second, trade liberalization in agricultural raw material exports, food exports, export duties and import duties affects the mean income of the 40 percent poorest if we control for an interaction

[74] One exception is the effect of import duties on the first quintile for all countries using the unadjusted approach (compare table 15 equation 25 with table 12 equation 7). While the distribution effect would indicate a reverse impact, the total effect is insignificant in the unadjusted approach.
[75] The result, however, is present in regressions for all countries on the first and second quintile, if we control only for regional dummy variables and use the adjusted approach in the system GMM estimation (table 21). In addition, the result is reversed in regressions for the growth rate of the second quintile share in the growth equation controlling only for regional dummy variables (table 16, 17).
[76] We also find a similar result for the regression on the second quintile, if we control only for regional dummy variables and use the unadjusted approach (table 22).
[77] One exception is the negative impact of manufacture imports on the growth rate of the first quintile in very low income countries (table 17).
[78] Exceptions are the regressions for food exports on the mean income of the first and second quintile and manufactures exports on the mean income of the poorest 20 percent using the unadjusted approach (table 20).

term. Liberalizing agriculture exports leads to a significant positive total effect on the first and second quintile share in low income developing countries.[79] The positive effect decreases with rising economic development and becomes negative at a higher level of income supporting the Stolper–Samuelson theorem (table 21, 22). While the total effect of agriculture exports is dependent on the growth effect alone in all countries (table 21), the significant distribution effect is raised by the growth effect in developing countries (table 22). Food exports, however, affect the mean income of the poorest 40 percent in the opposite direction, i.e. a negative effect at low levels of economic development diminishes and become positive with rising mean income in all and developing countries (table 21, 22). The total effect of food exports, however, is only driven by the growth effect due to insignificant distribution effects for food exports (table 21 and 22). Finally, export and import duties affect the mean income of the first and second quintile in the expected way, i.e. a negative impact at low levels of economic development diminishes and becomes positive with rising mean income in all and developing countries (table 21, 22). The growth effect is alone responsible for the impact of export and import duties on the mean income of the poorest 20 and 20 to 40 percent as almost all distribution effects are insignificant (table 21 and 22).[80]

Combining empirical findings of the system GMM estimation for both the distribution effect and the total effect estimation results suggest the importance of sector specific trade policy for the poorest 20 and 20 to 40 percent. Accepting higher adjusted trade sector openness indicators as measures for less restricted or more open trade policy, the findings suggest the conclusion that liberalizing agricultural raw material exports is very important for the poorest 40 percent of low income developing countries due to both the distribution effect and the total effect (table 22). In addition, liberalizing imports in agricultural raw materials is highly positively related to the mean income of the poor without changing the distribution (table 18, 19). Thus liberalized trade in agricultural raw materials, i.e. hide, rubber, cork, wood, waste paper, textile fibres or crude animal and vegetable material, is highly positively relevant for the income of the poorest 20 and 20 to 40 percent in (low-income) developing countries for the period 1980 to 1999.

In contrast, trade reforms in food exports affect negatively the mean income of the poorest 40 percent in low-income developing countries, a result only driven by the growth effect (table 22). Furthermore, higher food imports seem to have a positive distribution effect on the poorest 20 percent in low-income developing countries, an effect which is completely offset by the growth effect (table 22). Concerning trade in manufactures, exports exhibits a positive total effect on the poorest 40 percent in developing countries via the growth effect (table 19), while trade reforms in manufactures imports are never relevant. Finally, reduced export and import duties affect positively the mean income of the poorest 40 percent in low-income developing countries, an effect primarily driven by the growth effect (table 22). Findings for agriculture exports, food

[79] Exceptions are regressions on the mean income of the first quintile in the adjusted approach (table 21, 22).
[80] One exception is the effect of import duties on the first quintile for all countries using the unadjusted approach (table 21). While the distribution effect would indicate a reverse impact, the total effect is insignificant in the unadjusted approach.

exports, export and import duties, however, are only relevant if we exploit information on both the cross-country and within-country variation of the income of the poor in the system GMM estimation. In addition, results of the growth equation suggest positive total effects of agriculture imports on the poorest 20 and 20 to 40 percent in development countries driven by the growth effect alone (table 17).

Thus, empirical findings suggest the following policy recommendations with respect to poverty-reducing trade reforms in low-income developing countries. While results are not always consistent between the growth equation and the system GMM estimation, liberalization of agricultural raw material exports and imports seems to be the most promising approach. On the other hand, liberalization in food markets and manufactures imports are not associated with poverty alleviation in low-income developing countries. Finally, a promotion of manufactures exports and a reduction of export and import duties seem to increase mean income of the poorest 40 percent in low-income developing countries only via the growth effect.

References

Ades, Alberto, Di Tela, Rafael (1999). Rents, Competition, and Corruption. American Economic Review 89: 982 – 993.

Agénor, Pierre-Richard (2002). Macroeconomic Adjustment and the Poor: Analytical Issues and Cross-Country Evidence. Washington DC: The World Bank.

Agénor, Pierre- Richard (2003). Does Globalization hurt the poor? Washington DC: The World Bank.

Alesina, Alberto, Rodrik, Dani (1994). Distributive Politics and Economic Growth. Quarterly Journal of Economics 109(2): 465 – 490.

Anderson, Edward, White, Howard (2001). Growth versus Distribution: Does the Pattern of Growth Matter?, Institute of Development Studies, University of Sussex.

Arellano, Manuel, Bond, Stephen (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. Review of Economic Studies 58: 277 – 297.

Arellano, Manuel, Bover, Olympia (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics 68: 29 – 51.

Atkinson, Anthony B. (1993). The economics of inequality (2nd ed.). Oxford: Clarendon Press.

Atkinson, Anthony B., Brandolini, Andrea (2001). Promise and pitfalls in the use of “secondary” data-sets: income inequality in OECD countries as a case study. Journal of Economic Literature 39: 771 – 799.

Baldacci, Emanuelle, de Mello, Luiz, Inchauste, Gabriele (2002). Financial Crisis, Poverty, and Income Distribution, Working Paper 04/2002. Washington DC: International Monetary Fund.

Baldwin, Robert E. (2003). Openness and growth: What’s the empirical relationship? Working Paper 9578. NBER.

Bannister, Geoffrey J./ Thugge, Kaman (2001). International Trade and Poverty Alleviation. Working Paper 54/2001. Washington DC: International Monetary Fund.

Barro, Robert J. (2000). Inequality and growth in a Panel of Countries. Journal of Economic Growth 5: 5 – 32.

Barro, Robert J., Sala-i-Martin, Xavier (1995). Economic Growth. New York: McGraw-Hill.

Barro, Robert J., Lee, Jong-Wha (2000). International Data on Educational Attainment: Updates and Implications. Manuscript. Harvard University.

Berg, Andrew/Krueger, Anne (2003). Trade, Growth, and Poverty: A selective survey. Working Paper 30/2003. Washington DC: International Monetary Fund.

Blundell, Richard, Bond, Stephen (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics 87: 115 – 143.

Bond, Stephen, Hoeffler, Anke, Temple, Jonathan (2001). GMM Estimation of Empirical Growth Models.

Bourguignon, François (2001). The pace of economic growth and poverty reduction. Paper presented at CES-ifo Conference on Inequality and Growth, May 18-20, 2001, Munich: CESifo.

Breen, Richard, Garcia-Penalosa, Cecilia (1999). Income Inequality and Macroeconomic volatility: An empirical investigation. European University Institute, Oxford.

Chen, Shaohua, Ravallion, Martin (1997). What can new survey data tell us about recent changes in distribution and poverty? World Bank Economic Review 11(2): 357 – 382.

Chen, Shaohua, Ravallion, Martin (2000). How did the world's poorest fare in the 1990s? Working Paper 2409. Washington DC: The World Bank.

Chen, Shaohua, Ravallion, Martin (2001). Measuring pro-poor growth. Washington DC: The World Bank.

Cornia, Andrea Giovanni (2002). The Impact of Liberalization and Globalisation on Income Inequality in Developing and Transitional Economies. Paper presented at the CESifo Conference on Globalisation, Inequality and Well-Being, 8 – 9 November 2002, Munich.

Davoodi, Hamid R., Tiongson, Erwin R., Asawanuchit, Sawitree S. (2003). How useful are benefit incidence analyses of public education and health spending? Working Paper 227/2003. Washington DC: International Monetary Fund.

Deaton, Angus (1997). The analysis of household surveys. A microeconometric approach to development policy. Baltimore: John Hopkins University Press.

Deininger, Klaus/Squire, Lyn (1998b). New Ways of looking at old issues: inequality and growth. Journal of Development Economics 57: 259 – 287.

Dollar, David (1992). Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976 – 1985. Economic development and cultural change 40: 523 – 544.

Dollar, David, Kraay, Aart (2001a). Growth is good for the poor. Working Paper 2587. Washington DC: The World Bank.

Dollar, David, Kraay, Aart (2001b). Trade, growth and poverty. Washington DC: The World Bank.

DPD98 for Gauss. www.cemfi.es\~arellano\

Easterly, William, Fisher, Stanley (2001). Inflation and the poor. Journal of Money, Credit and Banking 33: 160 – 178.

Easterly, William, Sedaweh, Mirvat (2002). Global Development Network Growth Database. Update: 01/16/2002. Washington DC: The World Bank.

Eastwood, Robert, Lipton, Michael (2001). Pro-poor growth and pro-growth Poverty: Meaning, Evidence, and Policy Implications. Asian Development Review 19(1): 1 – 37.

Edwards, Sebastian (1997). Trade Policy, Growth, and Income Distribution. American Economic Review 87: 205 – 210.

Forbes, Kristin J. (2000). A reassessment of the relationship between inequality and growth. American Economic Review 90(4): 869 – 887.

Frankel, Jeffrey/Romer, David (1996). Trade and Growth. An empirical investigation. Working Paper 5476. NBER.

Gallup, John Luke, Radelet, Steven, Warner, Andrew (1999). Economic Growth and the Income of the Poor. CAER II Discussion Paper 36. Harvard Institute for International Development.

Ghura, Dhaneshwar, Leite, Carlos A., Tsangarides, Charalambos (2002). Is growth enough? Macroeconomic Policy and Poverty Reduction. Working Paper 118/2002. Washington DC: International Monetary Fund.

Glewwe, Paul, Hall, Gillette (1998). Are some groups more vulnerable to marcroeconomic shocks than others? Hypothesis tests based on panel data from Peru. Journal of Development Economics (56): 181 – 206.

Global Poverty Monitoring (continually updated). www.worldbank.org/research/povmon/index.htm.

Goldberg, Pinelopi Koujianou, Pavcnik, Nina (2004). Trade, inequality, and poverty: What do we know? Evidence from recent trade liberalization episodes in developing countries. Working Paper 10593. NBER.

Grossman, Gene M., Helpman, Elhanan (1991). Innovation and Growth in the Global Economy. MIT Press. Cambridge, Massachusetts.

Gugerty, Mary Kay, Roemer, Michael (1997). Does economic growth reduce poverty? CAER II Discussion Paper 50. Harvard Institute for International Development.

Gugerty, Mary Kay, Timmer, Peter C. (1999). Growth, Inequality, and Poverty Alleviation: Implications for Development Assistance. CAER II Discussion Paper 5. Harvard Institute for International Development.

Harrison, Ann (1996). Openness and growth: A time-series, cross-country analysis for developing countries. Journal of Development Economics 48: 419 – 447.

Helpman, Elhanan, Krugman, Paul, R. (1989). Trade Policy and Market Structure. MIT Press. Cambridge, Massachusetts.

Hertel, Thomas W., Martin, Will (1999). Developing country interests in liberalizing manufactures trade. Purdue University.

Heston, Alan, Summers, Robert (1991). The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950 – 1988. Quarterly Journal of Economics 106: 327 – 368.

Heston, Alan, Summers, Robert, Aten, Bettina (2002). Penn World Tables Version 6.1. Center for International Comparisons at the University of Pennsylvania (CICUP).

Hoekman, Bernard, Michalopulos, Constantine, Schiff, Maurice, Tarr, David (2002). Trade policy. Poverty Sourcebook. Washington DC: The World Bank.

Kakwani, Nanak. Pernia, Ernesto M. (2000). What is Pro-poor growth? Asian Development Review 18(1): 1 – 16.

Kakwani, Nanak, Son, Hyun H., Khandker, Shahidur (2003). Poverty Equivalent Growth Rate: with applications to Korea and Thailand.

Klasen, Stephan (2003). In search of the holy grail: How to achieve pro-poor growth? In: Stern, N., Tuggoden, B. (ed.) Towards pro-poor policies: Proceedings of the Annual Bank Conference on Development Economics – Europe. Washington DC: The World Bank.

Kraay, Aart (2003). When is Growth Pro-Poor? Evidence from a Panel of countries. Washington DC: The World Bank.

Li, Hongyi, Zou, Heng-fu (1998). Income Inequality is not harmful for growth: Theory and evidence. Review of Development Economics 2(3): 318 – 334.

Lopez, Humberto (2003). Macroeconomics and Inequality. Washington DC: The World Bank.

Lundberg, Mattias, Squire, Lyn (2001). The simultaneous evolution of growth and inequality. Washington DC: The World Bank.

McCulloch, Neil/ Winters, Alan L./ Cirera, Xavier (2001). Trade liberalization and Poverty: A Handbook. Centre for Economic Policy Research. London.

Milanovic, Branko (2003). Can we discern the effect of globalization on income distribution? Evidence from household surveys. Washington DC: The World Bank.

Perotti, Roberto (1996). Growth, Income Distribution, and Democracy: What the data say. Journal of Economic Growth 1: 149 – 187.

Pritchett, Lant (1996). Measuring outward orientation in LDCs: Can it be done? Journal of Development Economics 49: 307 – 335.

Ravallion, Martin (2000). Inequality Convergence. Working paper 2645. Washington DC: The World Bank.

Ravallion, Martin (2001a). Measuring aggregate welfare in developing countries: How well do national accounts and surveys agree? Washington DC: The World Bank.

Ravallion, Martin (2001b). Growth, Inequality and Poverty: Looking beyond averages. Washington DC: The World Bank.

Ravallion, Martin (2003). Pro-Poor Growth: A Primer. Working Paper 3242. Washington DC: The World Bank.

Reimer, Jeffrey F. (2002). Estimating the poverty impacts of trade liberalization. Purdue University.

Rodriguez, Francisco, Rodrik, Dani (2000). Trade policy and economic growth: A skeptic's guide to the cross-national evidence. Washington DC: The World Bank.

Rodrik, Dani (2000). Comments on 'Trade, Growth and Poverty' by David Dollar and Aart Kraay. Washington DC: The World Bank.

Romer, Christina D., Romer, David H. (1998). Monetary Policy and the well-being of the poor. Working Paper 6793. NBER.

Sachs, Jeffrey D., Warner, Andrew (1995). Economic convergence and economic policies. Working Paper 5039. NBER.

Spilimbergo, Antonio, Londoño, Juan Luis, Székely, Miguel (1999). Income distribution, factor endowments, and trade openness. Journal of Develoment Economics 59: 77 – 101.

Srinivasan, T.N., Bhagwati, Jagdish (2001). Outward-orientation and development: Are revisionists right? in: Lal, Deepak, Snape, Richard H. (ed.) Trade, development and political economcy: Essays in honour of Anne O. Krueger. London.

Temple, Jonathan (1999). The New Growth Evidence. Journal of Economic Literature 37: 112 – 156.

Timmer, Peter (1997). How well do the poor connect to the growth process? CAER II Discussion Paper 17. Harvard Institute for International Development.

UN (2002). World Population Prospects: The 2002 Revision Population Database. New York: UN. http://esa.un.org/unpp/

UNU/WIDER (2000). UNU/WIDER-UNDP World Income Inequality Database, Version 1.0, 12 September 2000.

Wacziarg, Romain, Welch, Karen Horn (2003). Trade liberalization and growth: New evidence. Working Paper 10152. NBER.

Whalley, John (2003). Assessing the benefits to developing countries of liberalization in services trade. Working Paper 10181. NBER.

Winters, Alan L. (2000a). Trade liberalisation and poverty. Working Paper 7. Poverty Research Unit. University of Sussex.

Winters, Alan L. (2000b). Trade and Poverty: Is there a connection?. University of Sussex.

Winters, Alan L., McCulloch, Neil, McKay, Andrew (2002). Trade liberalisation and Poverty: the empirical evidence. Discussion Paper in Economics 88. University of Sussex.

Wooldridge, Jeffrey M. (2000). Introductory Econometrics. Southern-Western College.

World Bank (2001). World Development Indicators. Washington DC: The World Bank.

World Bank (2002). World Development Indicators. Washington DC: The World Bank.

Table 1: Coverage of the data set

Region	Country	Observations dates	Source	No. of spells
East Asia Pacific (EAP)	China	1988, 91	UNU	1
		1994, 97	GPM	1
	Hongkong	1981, 86, 91	UNU	2
	Indonesia	1980, 84, 87, 90	UNU	3
		1993, 96, *99*	GPM, *WDI*	2
	Korea	1976, 80, 85, 88	UNU	3
	Malaysia	1976, 79, 84	UNU	2
		1987, 92, 95	GPM	2
	Philippines	1985, 88, 91	UNU	2
		1994, 97	UNU	1
	Singapore	1978, 88	UNU	1
	Thailand	1975, 81, 86, 90	UNU	3
		1992, 98	UNU	1
Eastern Europe and Central Asia (ECA)	Bulgaria	1991, 93	UNU	1
	Hungary	1982, 87	UNU	1
		1989, 93	GPM	1
	Latvia	1995, 98	GPM	1
	Poland	1985, 90, 93	UNU	2
	Romania	1989, 92	UNU	1
	Russia	1994, 98	GPM	1
Latin America and Caribbean (LAC)	Brazil	1980, 86	UNU	1
		1988, 93, 96	GPM	2
	Chile	1989, 92	UNU	1
	Colombia	1971, 78, 88	UNU	2
		1988, 91, 95	UNU	2
	Costa Rica	1981, 86, 89	UNU	2
		1993, 96	GPM	1
	Dominican Republic	1989, 96	GPM	1
	Ecuador	1988, 95	GPM	1
	El Salvador	1989, 95, *98*	GPM, *WDI*	2
	Guatemala	1987, 89	UNU	1
	Honduras	1989, 92, 96	GPM	2
	Jamaica	1988, 91	UNU	1
		1991, 96	UNU	1
	Mexico	1984, 89	UNU	1
		1989, 95*, 98*	GPM, *WDI*	2
	Panama	1979, 89	UNU	1
		1991, 95	GPM	1
	Paraguay	1995, *98*	GPM, *WDI*	1

Table 1: continued

	Peru	1986, 94	UNU	1
	Trinidad & Tobago	1976, 81	UNU	1
		1988, 92	GPM	1
	Venezuela	1971, 81, 87	UNU	2
		1987, 93, 96	GPM	2
Middle East and North Africa (MNA)	Algeria	1988, 95	GPM	1
	Egypt	1991, 95	UNU	1
	Jordan	1980, 87, 91	UNU	2
		1991, 97	UNU	1
	Morocco	1984, 91	UNU	1
		1991, 99	UNU	1
	Tunisia	1985, 90, *95*	GPM, *WDI*	2
	Turkey	1987, 94	GPM	1
	Yemen	1992, *98*	GPM, *WDI*	1
South Asia (SA)	Bangladesh	1973, 77, 81, 86	UNU	3
		1988, 91, 95	GPM	2
	India	1977, 83, 86, 89, 92	UNU	4
		1994, 97	UNU	1
	Pakistan	1979, 85, 88	UNU	2
		1991, 96	UNU	1
	Sri Lanka	1979, 87	UNU	1
		1990, 95	UNU	1
Sub-Saharan Africa (SSA)	Côte d'Ivoire	1985, 88	UNU	1
		1988, 95	UNU	1
	Ethiopia	1981, 95	GPM	1
	Ghana	1987, 92	GPM	1
		1992, 97	UNU	1
	Guinea	1991, 94	UNU	1
	Kenya	1992, 94	UNU	1
	Lesotho	1986, 93	GPM	1
	Madagascar	1980, 93, *99*	GPM, *WDI*	2
	Mali	1989, 94	GPM	1
	Mauritius	1986, 91	UNU	1
	Nigeria	1985, 97	GPM	1
	Senegal	1991, 95	UNU	1
	Zambia	1993, 96	UNU	1
Industrial Countries (IND)	Australia	1976, 79	UNU	1
		1981, 85, 89	UNU	2
		1995, 98	UNU	1

Table 1: continued

	Belgium	1979, 85, 88, 92	UNU	3
	Canada	1973, 77, 81, 84, 87	UNU	4
		1987, 91	UNU	1
	Denmark	1981, 87, 92	UNU	2
		1992, 95	UNU	1
	Finland	1978, 81, 84	UNU	2
		1987, 91	UNU	1
		1991, 94, 97	UNU	2
	France	1979, 84	UNU	1
	Germany	1973, 78, 81, 84	UNU	3
	Greece	1981, 88	UNU	1
	Ireland	1980, 87	UNU	1
	Italia	1978, 81, 84, 87, 91	UNU	4
	Japan	1977, 80	UNU	1
	Netherlands	1975, 79, 82	UNU	2
		1983, 87, 91	UNU	2
	Norway	1976, 79, 84, 91	UNU	3
	New Zealand	1973, 77, 80, 83, 86, 89	UNU	5
	Portugal	1980, 90	UNU	1
	Spain	1981, 91	UNU	1
	Sweden	1975, 81, 87, 92	UNU	3
	United Kingdom	1971, 74, 77, 80, 84, 88, 91	UNU	6
	USA	1974, 77, 80, 83, 86, 89	UNU	5
	No. of countries	No. of observations		No. of spells
Total	72	266		165

UNU: UNU/WIDER-UNDP World Income Inequality Database
GPM: Global Poverty Monitoring
WDI: World Development Indicators

Note:

Pooled OLS estimation: As all observations within each line have the same income/reference unit, spells are formed only within each line (e.g. Panama 1979, 89, 91, 95 results in two spells: 1979 – 89, 91 - 95). Thus two observations for the same year in one country (e.g. Jordan 1991) indicate different income/reference unit definitions (e.g. Jordan 91: net expenditure, person/ expenditure, household per capita).

System GMM estimation:

If the countries are split by the same income definition (e.g. Côte d'Ivoire 1 1985, 88; Côte d'Ivoire 2: 1988, 95; i.e the number of cross-section units increases), first-differenced equations are formed only within each line. (First-differenced equations for Morocco 1991 – 99, Ghana 1992 – 97, Guinea 1991 – 94, Madagascar 1993 – 99, Mali 1989 - 94, Zambia 1993 – 1996 and level equations for Morocco 1999, Ghana 1997, Guinea 1994, Madagascar 1999, Mali 1994, and Zambia 1996 could not be formed as the openness indicators are not available for the end period, a problem not present in the growth equation where we use only the initial values).

If the countries are not split by the same income definition, first-differenced equations are formed by all observations per country using the adjusted first/second quintile share. In this case we omit one of the two observations for the same year in one country (Canada 1987/1, Côte d'Ivoire 88/1, Colombia 88/1, Denmark 92/2, Finland 91/2, Jamaica 91/1, Jordan 91/2, Mexico 89/1, Morocco 91/1, Venezuela 87/2) and if the time length between observations in one country is only one year (Netherlands 1983). The number behind the year indicates whether we omit the first or second observation as ordered in the table.

Table 2: Adjustment regressions for first/second quintile income shares and Gini coefficients

Dep. Var.	First quintile share of income	Second quintile share of income	Gini coefficient
	(1)	(2)	(3)
Income (unknown tax treatment)	-0.0149***	-0.0127***	5.71***
	(0.0043)	(0.0049)	(1.90)
Income, net	0.0046	0.0046	-1.81
	(0.0036)	(0.0040)	(1.52)
Income, gross	-0.0071**	-0.0008	1.32
	(0.0046)	(0.0035)	(1.36)
Family	-0.0036	-0.0014	0.60
	(0.0023)	(0.0031)	(0.82)
Person	0.0119***	0.0185***	-6.62***
	(0.0026)	(0.0033)	(1.20)
Household per capita	0.0108***	0.0159***	-5.43***
	(0.0032)	(0.0041)	(1.51)
Equivalized	0.0265***	0.008***	-5.61***
	(0.0033)	(0.0029)	(0.96)
EAP	-0.0045**	-0.0248***	8.85***
	(0.0022)	(0.0029)	(0.97)
ECA	0.0196***	0.001	-1.00
	(0.005)	(0.0051)	(1.96)
LAC	-0.0272***	-0.0519***	18.86***
	(0.0024)	(0.0032)	(1.09)
MNA	-0.0117***	-0.0328***	12.00***
	(0.0036)	(0.0043)	(1.67)
SA	0.0081***	-0.0128***	4.65***
	(0.0027)	(0.0032)	(1.25)
SSA	-0.0199***	-0.0407***	16.00***
	(0.0042)	(0.0055)	(2.14)
Constant	0.0662***	0.123***	33.03***
	(0.0033)	(0.0036)	(1.34)
N	371	371	371
R-Squared	0.6647	0.6716	0.6997

Note: This table reports the results of pooled OLS Regression for the indicated inequality measures on the indicated variables. * denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses.

Table 3: Data Sources

Variable	Source	Comments
Share of Income: First/Second Quintile	UNU/WIDER-UNDP World Income Inequality Database, Version 1.0 (12 September 2000), Global Poverty Monitoring, World Bank (Chen, Ravallion 2000), World Development Indicators (2002)	for selection procedure see section 3
Real GDP Per Capita	Penn World Tables Version 6.1 (October 2002)	Constant 1996 US dollars using the Chain index
Gini coefficient:	UNU/WIDER-UNDP World Income Inequality Database, Version 1.0 (12 September 2000), Global Poverty Monitoring, World Bank (Chen, Ravallion 2000), World Development Indicators (2002)	for selection procedure see share of income quintile
Import duties	World Development Indicators (2001) (GB.TAX.IMPT.BM.ZS)	Import duties (% of imports) All levies collected on goods at the point of entry into the country.
Export duties	World Development Indicators (2001) (GB.TAX.EXPT.BX.ZS)	Export duties (% of exports) All levies collected on goods at the point of export.
Agriculture imports	World Development Indicators (2001) (TM.VAL.AGRI.ZS.UN)	Agricultural raw materials imports (% of merchandise imports) Agricultural raw materials comprise SITC section 2 (crude materials except fuels) excluding division 22 (oil seeds, oil nuts, oil kernels), 27 (crude fertilizers and minerals excluding coal, petroleum, and precious stones), and 28 (metalliferous ores and scrap).
Agriculture exports	World Development Indicators (2001) (TX.VAL.AGRI.ZS.UN)	Agricultural raw materials exports (% of merchandise exports)

Table 3: continued

Food imports	World Development Indicators (2001) (TM.VAL.FOOD.ZS.UN)	Food imports (% of merchandise imports) Food comprises the commodities in the SITC sections 0 (food, live animals), 1 (beverage, tobacco), 22 (oil seeds, oil nuts, oil kernels), and 4 (animal and vegetable oils and fats).
Food exports	World Development Indicators (2001) (TX.VAL.FOOD.ZS.UN)	Food exports (% of merchandise exports)
Manufactures imports	World Development Indicators (2001) (TM.VAL.MANF.ZS.UN)	Manufactures imports (% of merchandise imports) Manufactures comprise commodities in SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment) and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals)
Manufactures exports	World Development Indicators (2001) (TX.VAL.MANF.ZS.UN)	Manufactures exports (% of merchandise exports)
GDP	World Development Indicators (2001) (NY.GDP.MKTP.CD)	GDP in current US dollars
Oil exporter	World Development Indicators (2001) (TX.VAL.FUEL.ZS.UN)	Dummy variable equals one if fuel exports (% of merchandise exports) greater than 30
Government Consumption	Penn World Tables, Version 6.1 (October 2002)	Constant 1996 US dollars
Ln(1+inflation/100)	World Development Indicators (2001) (NY.GDP.DEFL.KD.ZG)	Inflation, GDP deflator (annual %)
	(FP.CPI.TOTL.ZG)	for missing values: Inflation, consumer prices (Laspeyres) (annual %) (Germany 73, 78, 81, 84; Ethiopia 81; Poland 90)

Table 3: continued

Secondary Education	Barro and Lee (2000)	Average years of secondary schooling in total population aged 25 and over Due to limited data availability for secondary education values are linearily interpolated between the years prior and after the observation.
M2 to GDP	Word Development Indicators (2001) (FM.LBL.MOMY.GD.ZS)	Money and quasi money (M2) to GDP
Overall Budget Surplus (+)/ Deficit (-) to GDP	World Development Indicators (2001) (GB.BAL.OVRL.GD.ZS)	Overall Budget, including grants
	Easterly, Sewadeh (2002): Global Development Network Growth Database, World Bank	for missing values: Data on overall budget/deficit from IMF Government Financial Statistics (Germany 1973, 78, 81, 84; Tunisia 1990; Latvia 1995)
Life expectancy	World development indicators (2001) (SP.DYN.LE00.IN)	life expectancy at birth, total (years) Values calcutated by linear interpolation for Guatemala 1989, India 1994, Kenya 1994
	World Population Prospects: The 2002 Revision Population Database	for missing value: Jordan 1980
Terms of Trade	Easterly, Sedaweh (2002): Global Development Network Growth Database, World Bank	Terms of Trade (goods and services, 1995 = 100)
Civil Liberties	Freedom House	Measured on a scale for 1 to 7. (1 indicates the most liberal country)
Area	Statistical Yearbook (Germany)	km^2

Table 4: Adjustment regressions for openness indicators

Dependent Variable:	Agriculture exports to GDP	Agriculture imports to GDP	Food exports to GDP	Food imports to GDP
ln(area)	0.19* (0.10)	-0.24*** (0.05)	0.26 (0.23)	-0.60*** (0.12)
ln(population)	-0.37*** (0.10)	0.14*** (0.05)	-1.60*** (0.31)	-0.38*** (0.14)
Oil exporter	-0.97*** (0.24)	-0.02 (0.10)	-3.39*** (0.75)	0.65 (0.54)
Constant	2.56*** (0.82)	2.35*** (0.41)	17.97*** (1.93)	14.74*** (1.22)
N	210	208	210	208
R - Squared	0.09	0.26	0.24	0.33

Dependent Variable:	Manufactures exports to GDP	Manufactures imports to GDP
ln(area)	-5.28*** (1.48)	-4.17*** (1.37)
ln(population)	2.59** (1.06)	-0.47 (0.93)
Oil exporter	-6.67*** (1.55)	-1.93 (1.68)
Constant	54.72 (11.24)	76.79 (10.81)
N	210	208
R-Squared	0.30	0.34

Note: This table reports the results of pooled OLS regression for sector specific exports and imports. The measure of trade openness is constructed by the residuals of the regressions. * denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses.

As we have some double observations per country per year (see table 1), the adjustment process may be biased. We checked for differences, but could not confirm any significant problem due to counting several observations of the openness indicators twice.

Table 5: Correlation matrix for adjusted openness indicators

	Imdu	Exdu	Agim	Agex	Foim	Foex	Maim	Maex
Imports duties	1							
Exports duties	**0.141** (0.036)	1						
Agriculture Imports	-0.105 (0.178)	**-0.193** (0.012)	1					
Agriculture Exports	-0.071 (0.363)	0.105 (0.176)	0.041 (0.554)	1				
Food imports	**0.182** (0.019)	-0.046 (0.557)	**0.264** (0)	0.021 (0.765)	1			
Food exports	**0.265** (0)	**0.229** (0.003)	-0.094 (0.179)	**0.194** (0.005)	0.051 (0.463)	1		
Manufactures imports	-0.076 (0.329)	-0.124 (0.111)	**0.524** (0)	**0.312** (0)	**0.434** (0)	0.036 (0.217)	1	
Manufactures exports	**-0.301** (0)	**-0.209** (0.006)	**0.625** (0)	**0.226** (0.001)	**0.205** (0.003)	-0.114 (0.10)	**0.831** (0)	1

Note: P–values of each correlation coefficient in parentheses. Correlation matrix is presented only for all available observations, i.e. some observations are counted twice (see table 1). Thus correlation matrix for openness indicators may differ for the growth equation as only initial values are used. Imdu/Exdu: Import/Export duties. Agim/Agex: Agriculture imports/exports. Foim/Foex: Food imports/exports. Maim/Maex: Manufactures imports/exports.

Table 6: Descriptive Statistics

Variable	Observ.	Mean	Std. Dev.	Min.	Max.
Q20	266	0.061	0.021	0.019	0.116
Adjusted Q20	266	0.058	0.018	0.015	0.113
Q40	266	0.108	0.024	0.050	0.156
Adjusted Q40	266	0.101	0.025	0.039	0.153
Income Q20	266	2689	2457	175	11266
Adjusted Income Q20	266	2658	2437	102	8501
Income Q40	266	4946	4424	287	15194
Adjusted Income Q40	266	4754	4424	245	14863
Real GDP per capita	266	8535	6767	528	26279
Growth Q20	165	0.17	4.71	-17.45	25.26
Growth Q40	165	-0.02	2.94	-9.05	18.50
Growth income Q20	165	1.81	5.64	-23.83	26.45
Growth income Q40	165	1.61	4.03	-15.42	16.85
Growth real GDP per capita	165	1.64	2.64	-9.35	9.42
Agriculture exports	210	0	1.71	-2.57	11.19
Agriculture imports	208	0	0.56	-1.11	3.02
Food exports	210	0	4.51	-7.21	24.59
Food imports	208	0	2.30	-3.62	11.35
Manufactures exports	210	0	12.59	-20.48	68.48
Manufactures imports	208	0	11.68	-20.03	77.94
Export duties	224	1.56	4.79	0	46.04
Import duties	223	9.09	9.33	0	50.84
Adjusted Gini	266	41.35	9.33	23.06	64.36
Gov. Consumption	266	17.95	9.82	3.40	69.11
Budget surplus	229	-3.43	4.00	-15.18	8.22
Secondary Education	240	1.82	1.12	0.12	5.09
Life expectancy	266	67.59	8.26	41.96	78.63
M2 to GDP	213	38.87	21.09	4.91	132.48
ln(1 + inflation/100)	266	0.16	0.30	-0.05	3.04
Terms of Trade	254	102.51	19.72	50.78	262.37
Civil liberties	260	3.11	1.74	1	7

Note: Descriptive statistics are presented for all available observations, i.e. some observations are counted twice (see table 1). Thus summary statistics for openness indicators (residuals) and additional macroeconomic variables differ for the growth equation as only initial values are used (table 1). Q20/40: first, second quintile share. Adjusted Q20/40: adjusted first, second quintile share. Income Q20/40: mean income of first, second quintile share (Q20/40 * mean income/0.2). Adjusted income Q20/40: mean income of adjusted first, second quintile share. Growth Q20/40: average annual growth rate of first, second quintile share using only spells with identical income inequality measures (table 1). Growth income Q20/40: average annual growth rate of mean income of first, second quintile share using only spells with identical income inequality measures.

Table 7: Descriptive Statistics - Regions

Variable	EAP	ECA	LAC	MNA	SA	SSA	IND
Q20	0.059	0.085	0.037	0.066	0.081	0.058	0.068
Adjusted Q20	0.060	0.080	0.037	0.056	0.076	0.047	0.067
Q40	0.102	0.133	0.079	0.107	0.122	0.100	0.126
Adjusted Q40	0.096	0.120	0.071	0.092	0.112	0.084	0.123
Income Q20	1612	3085	1023	1305	652	536	5782
Adjusted Income Q20	1699	2889	1024	1107	605	433	5761
Income Q40	2820	4754	2201	2126	975	949	10788
Adjusted Income Q40	2728	4274	1986	1817	887	793	10609
Real GDP per capita	5579	7156	5504	4017	1602	1832	17218
Growth Q20	0.39	-5.36	0.03	1.05	-0.46	0.36[81]	-0.19
Growth Q40	0.05	-2.68	0.33	0.72	-0.52	0.78	-0.40
Growth Income Q20	4.83	-7.31	0.75	1.32	2.69	-0.05	1.69
Growth Income Q40	4.49	-4.63	1.05	0.99	2.64	0.48	1.48
Growth real GDP p.cap.	4.44	-1.95	0.72	0.27	3.16	-0.39	1.88
Agriculture exports	1.31	0.36	-0.70	-0.97	0.06	0.16	0.05
Agriculture imports	0.50	0.10	-0.30	0.48	-0.52	-0.10	-0.01
Food exports	1.18	-2.06	1.25	-1.04	-0.16	3.76	-1.82
Food imports	0.27	-0.88	-0.75	3.11	-0.06	1.74	-0.86
Manufactures exports	11.24	1.22	-5.62	-1.72	-9.61	-3.65	2.92
Manufactures imports	12.11	-2.47	-2.88	2.01	-7.41	0.90	-2.19
Export duties	1.33	0.61	1.64	0.19	4.83	6.83	0.10
Imports duties	7.69	5.17	10.25	15.45	23.40	20.53	2.25
Adjusted Gini	42.77	33.85	52.20	44.32	36.92	48.70	32.91
Government Consumption	16.45	20.97	18.97	29.29	20.29	19.71	13.49
Budget surplus	-1.16	-3.40	-1.99	-4.24	-5.68	-1.77	-4.57
Secondary Education	1.50	1.41	1.26	1.24	0.91	0.64	2.94
Life expectancy	66.94	69.22	69.10	65.79	58.17	51.98	74.69
M2 to GDP	50.16	33.43	27.22	62.36	31.72	25.94	48.92
Ln(1+inflation)	0.09	0.46	0.29	0.13	0.10	0.12	0.07
Terms of Trade	102.53	99.34	102.23	107.69	104.46	111.97	93.13
Civil liberties	4.53	3.69	2.79	4.85	4.22	4.96	1.33

Note: Descriptive statistics are presented for all available observations, i.e. some observations are counted twice (see table 1). Thus summary statistics for openness indicators (residuals) and additional macroeconomic variables differ in the growth equation as only initial values are used (table 1). Q20/40: first, second quintile share. Adjusted Q20/40: adjusted first, second quintile share. Income Q20/40: mean income of first, second quintile share (Q20/40 * mean income/0.2). Adjusted Income Q20/40: mean income of adjusted first, second quintile share. Growth Q20/40: average annual growth rate of first, second quintile share using only spells with identical income inequality measures (table 1). Growth income Q20/40: average annual growth rate of mean income of first, second quintile share using only spells with identical income inequality measures.

[81] We present mean for growth Q20 and growth income Q20 in SSA without Guinea 1991 – 94, Kenya 1992 – 94, and Senegal 1991 – 95 and mean for growth Q40 and growth income Q40 in SSA without Kenya 1992 – 94. We omit these observations in regressions of the growth equation due to their incredible high growth rates, which may result from measurement errors.

Table 8: Openness indicators and regional dummy variables distribution effect (System GMM estimation)

Dep. Var.	**Y^{q20s} all**	**Y^{q20c} all**	**Y^{q20s} dev**	**Y^{q20c} dev**		**Y^{q20s} dev**	**Y^{q20c} dev**
	(1)	(2)	(3)	(4)		(5)	(6)
Manufacture Exports	**0.004*** (0.002)	**0.005**** (0.002)	0.004 (0.003)	**0.005*** (0.003)	Import duties	**0.005*** (0.003)	0.004 (0.003)
EAP	-0.06 (0.09)	-0.08 (0.08)	-0.42*** (0.10)	-0.41*** (0.09)		-0.34* (0.19)	-0.22 (0.26)
ECA	0.36*** (0.08)	0.33*** (0.06)					
LAC	-0.56*** (0.09)	-0.55*** (0.07)	-0.92*** (0.09)	-0.89*** (0.08)		-0.81*** (0.18)	-0.69*** (0.25)
MNA	0.03 (0.08)	-0.13* (0.07)	-0.33*** (0.08)	-0.47*** (0.09)		-0.23 (0.18)	-0.31 (0.26)
SA	0.32*** (0.07)	0.24*** (0.05)	-0.04 (0.07)	-0.10 (0.07)		-0.09 (0.18)	-0.02 (0.25)
SSA	-0.25*** (0.07)	-0.44*** (0.07)	-0.61*** (0.08)	-0.78*** (0.09)		-0.48** (0.22)	-0.65** (0.30)
Constant	-1.13*** (0.05)	-1.15*** (0.03)	-0.78*** (0.06)	-0.81*** (0.06)		-0.95*** (0.17)	-1.03*** (0.25)
m1	-1.42	-1.20	-1.42	-1.47		-1.57	-1.95*
m2	1.45	1.35	0.99	1.33		-0.94	1.61
N	181	181	124	127		121	119
1 – RSS/TSS	0.60	0.65	0.66	0.66		0.58	0.52

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}: $\ln(Q^{20}/0.2)$ unadjusted approach (regressions without outliers). Y^{q20c}: $\ln(Q^{20}/0.2)$ adjusted approach (regressions without outliers). all: all countries, dev: developing countries.

Table 9: Openness indicators, regional dummies and macroeconomic variables - distribution effect (System GMM estimation)

Dep. Var.	**Y^{q20s} all**	**Y^{q20c} all**	**Y^{q20s} indu**	**Y^{q20c} indu**	**Y^{q40s} indu**	**Y^{q40c} indu**		**Y^{q20s} indu**	**Y^{q20c} indu**
	(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
Manufacture Exports	**0.007*** (0.003)	**0.006**** (0.003)	**0.010***** (0.003)	**0.007***** (0.003)	**0.004**** (0.002)	**0.003**** (0.002)	Agriculture exports	0.004 (0.025)	**0.035**** (0.018)
Secondary Education	-0.05 (0.04)	0.01 (0.04)	**-0.12***** (0.03)	-0.02 (0.03)	-0.03 (0.02)	-0.01 (0.02)		**-0.11***** (0.03)	-0.02 (0.03)
Government Consumption	-0.001 (0.004)	-0.002 (0.003)	-0.007 (0.006)	0.001 (0.003)	0 (0.003)	0.001 (0.002)		-0.003 (0.006)	0.004 (0.004)
Ln(1+inflation)	0.05 (0.18)	0.15 (0.14)	0.04 (0.41)	0.11 (0.37)	0.20 (0.27)	0.26 (0.29)		-0.43 (0.48)	-0.32 (0.42)
EAP	-0.15 (0.10)	-0.06 (0.09)							
ECA	0.39*** (0.08)	0.44*** (0.08)							
LAC	-0.60*** (0.11)	-0.52*** (0.10)							
MNA	-0.09 (0.14)	-0.14 (0.15)							
SA	0.24** (0.09)	0.28*** (0.08)							
SSA	-0.43*** (0.12)	-0.55*** (0.13)							
Constant	-0.97*** (0.15)	-1.17*** (0.13)	-0.70*** (0.14)	-1.09*** (0.13)	-0.42*** (0.07)	-0.53*** (0.07)		-0.72*** (0.14)	-1.10*** (0.13)
m1	-1.36	-1.01	0.06	0.83	-1.11	0.23		0.33	0.89
m2	1.49	1.61	1.51	0.23	-0.47	1.16		0.87	0.61
N	161	161	57	54	57	54		57	54
1 – RSS/TSS	0.59	0.66	0.28	0.11	0.15	0.12		0.15	0.07

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{q20/40s}$: ln($Q^{20/40}$/0.2) unadjusted approach (regressions without outliers). $Y^{q20/40c}$: ln($Q^{20/40}$/0.2) adjusted approach (regressions without outliers). all: all countries. indu: industrial countries.

Table 9: continued

Dep. Var.	**Y^{q20s} Indu**	**Y^{q20c} indu**	**Y^{q40s} Indu**	**Y^{q40c} indu**		**Y^{q20s} indu**	**Y^{q20c} indu**
	(9)	(10)	(11)	(12)		(13)	(14)
Food Exports	**-0.023****	-0.007	**-0.011****	-0.007	Import duties	**-0.030*****	**-0.016****
	(0.011)	(0.011)	(0.006)	(0.006)		(0.010)	(0.007)
Secondary Education	**-0.12*****	-0.02	-0.03	-0.005		**-0.08*****	0.003
	(0.03)	(0.04)	(0.02)	(0.02)		(0.03)	(0.02)
Government Consumption	-0.002	0.003	0.002	0.003		-0.001	0.004
	(0.004)	(0.004)	(0.002)	(0.002)		(0.005)	(0.004)
Ln(1 + inflation)	-0.53	-0.24	-0.05	0.06		0.20	0.22
	(0.50)	(0.41)	(0.29)	(0.31)		(0.51)	(0.37)
Constant	-0.75***	-1.12***	-0.44***	-0.54***		-0.79***	-1.16***
	(0.14)	(0.14)	(0.08)	(0.07)		(0.13)	(0.09)
m1	-0.07	0.72	-1.29	-0.25		-1.22	-1.02
m2	0.46	0.60	-0.40	1.76*		0.26	-0.10
N	57	54	57	54		84	80
1 – RSS/TSS	0.27	0.04	0.16	0.09		0.25	0.10

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach. $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach. all: all countries. indu: industrial countries.

Table 10: Openness indicators, interaction term and regional dummy variables – distribution effect (Growth equation)

Dep. Var.	y^{q40} **all re**	y^{q40} **dev re**		y^{q20} **dev ols**
	(1)	(2)		(3)
Agriculture Exports	**-3.36**** (1.47)	**-5.00**** (2.32)	Manufactures imports	-**0.74*** (0.42)
Agriculture Exports * Y	**0.38**** (0.17)	**0.60**** (0.29)	Manufactures imports * Y	**0.09*** (0.05)
EAP	0.85 (0.76)	1.93 (1.51)		2.85** (1.15)
ECA	-1.22 (1.24)			
LAC	0.77 (0.68)	2.08 (1.45)		3.27*** (0.86)
MNA	0.93 (0.95)	2.31 (1.64)		2.90*** (0.89)
SA	0.06 (0.93)	1.22 (1.62)		1.01 (1.01)
SSA	1.63* (0.98)	2.91* (1.66)		2.02 (1.83)
Constant	-0.57 (0.43)	-1.74 (1.32)		-2.07*** (0.54)
Breusch Pagan	17.36***	17.11***		0.44
Wald - test	11.38	8.72		
F-test				7.91***
R-squared	0.10	0.11		0.10
N	115	79		73

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test/Wald-test indicates the F-statistic/Wald-statistic for the test on the overall significance of the regression. Ramsey Reset test, used to test for omitted variables in equation 3, is passed. Breusch-Pagan is a Lagrange multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. y^{q20}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40}: average annual growth rate of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation. re: results for random effects estimation. all: all countries. dev: developing countries.

Table 11: Openness indicators, interaction term and regional dummy variables - distribution effect (System GMM estimation)

Dep. Var.	Y^{q20s} **all**	Y^{q20c} **all**	Y^{q40s} **all**	Y^{q40c} **all**	Y^{q20s} **dev**	Y^{q20c} **dev**	Y^{q40s} **dev**	Y^{q40c} **dev**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agriculture Exports	0.32 (0.216)	**0.35**** (0.17)	0.19 (0.124)	**0.22**** (0.09)	**0.72***** (0.281)	**0.70***** (0.25)	**0.52***** (0.15)	**0.49***** (0.13)
Agriculture Exports * Y	-0.04 (0.024)	**-0.04*** (0.02)	-0.02 (0.014)	**-0.02**** (0.01)	**-0.08***** (0.032)	**-0.08***** (0.03)	**-0.06***** (0.02)	**-0.06***** (0.02)
EAP	-0.09 (0.09)	-0.10 (0.07)	-0.20*** (0.05)	-0.26*** (0.05)	-0.44*** (0.08)	-0.41*** (0.07)	-0.33*** (0.04)	-0.33*** (0.06)
ECA	0.34*** (0.08)	0.31*** (0.08)	0.13*** (0.03)	0.07* (0.04)				
LAC	-0.59*** (0.09)	-0.58*** (0.07)	-0.47*** (0.05)	-0.56*** (0.06)	-0.94*** (0.09)	-0.91*** (0.08)	-0.61*** (0.05)	-0.65*** (0.06)
MNA	0.03 (0.08)	-0.12 (0.08)	-0.14*** (0.04)	-0.28*** (0.04)	-0.32*** (0.08)	-0.46*** (0.09)	-0.28*** (0.04)	-0.37*** (0.05)
SA	0.27*** (0.07)	0.17*** (0.04)	0.01 (0.03)	-0.08*** (0.03)	-0.08 (0.07)	-0.15** (0.06)	-0.12*** (0.02)	-0.16*** (0.04)
SSA	-0.25*** (0.08)	-0.48*** (0.09)	-0.28*** (0.05)	-0.45*** (0.06)	-0.59*** (0.08)	-0.08*** (0.03)	-0.41*** (0.05)	-0.55*** (0.06)
Constant	-1.12*** (0.06)	-1.13*** (0.04)	-0.48*** (0.02)	-0.50*** (0.02)	-0.77*** (0.05)	-0.81*** (0.06)	-0.34*** (0.02)	-0.42*** (0.03)
m1	-1.62	-1.44	-2.21**	-2.69***	-1.60	-1.58	-2.04**	-2.76***
m2	1.15	1.57	-1.00	2.78***	1.02	1.54	-0.92	2.46**
N	184	183	184	183	127	129	127	129
1 – RSS/TSS	0.59	0.65	0.65	0.70	0.66	0.67	0.63	0.62

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach (regressions without outliers). $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach (regressions without outliers). all: all countries. dev: developing countries.

Table 11: continued

Dep. Var.	**Y^{q20s} dev**	**Y^{q20c} dev**	**Y^{q40s} dev**	**Y^{q40c} dev**
	(9)	(10)	(11)	(12)
Food imports	**0.46*****	**0.44****	**0.219***	**0.23***
	(0.171)	(0.18)	(0.115)	(0.14)
Food imports *Y	**-0.06*****	**-0.05****	**-0.027***	-0.03
	(0.021)	(0.02)	(0.014)	(0.02)
EAP	-0.38***	-0.37***	-0.30***	-0.30***
	(0.10)	(0.09)	(0.06)	(0.07)
LAC	-0.90***	-0.89***	-0.58***	-0.63***
	(0.08)	(0.08)	(0.05)	(0.06)
MNA	-0.28***	-0.47***	-0.24***	-0.35***
	(0.10)	(0.10)	(0.05)	(0.06)
SA	-0.01	-0.01	-0.08***	-0.13***
	(0.07)	(0.07)	(0.03)	(0.05)
SSA	-0.60***	-0.82***	-0.41***	-0.53***
	(0.15)	(0.15)	(0.09)	(0.09)
Constant	-0.83***	-0.85***	-0.38***	-0.45***
	(0.06)	(0.06)	(0.03)	(0.04)
m1	-1.53	-1.47	-1.91*	-2.54**
m2	1.01	1.03	-0.78	2.19**
N	124	128	124	128
1 – RSS/TSS	0.65	0.65	0.61	0.59

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach (regressions without outliers). $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach (regressions without outliers). dev: developing countries.

Table 12: Openness indicators, interaction term and macroeconomic variables - distribution effect (System GMM estimation)

Dep. Var.	**Y^{q20s} dev**	**Y^{q20c} dev**	**Y^{q40s} dev**	**Y^{q40c} dev**		**Y^{q20s} dev**	**Y^{q20c} dev**
	(1)	(2)	(3)	(4)		(5)	(6)
Agriculture exports	**1.02*****	**1.02****	**0.75*****	**0.76*****	Food Imports	**0.55****	**0.59****
	(0.34)	(0.48)	(0.17)	(0.24)		(0.24)	(0.28)
Agriculture exports * Y	**-0.12*****	**-0.12****	**-0.09*****	**-0.09*****	Food imports *Y	**-0.06****	**-0.07****
	(0.04)	(0.05)	(0.02)	(0.03)		(0.03)	(0.03)
Secondary Education	0.10	0.09	**0.08*****	**0.09****		0.08	0.06
	(0.06)	(0.06)	(0.04)	(0.04)		(0.07)	(0.07)
Government Consumption	0.005	-0.002	**0.006****	0.002		0.002	-0.006
	(0.005)	(0.004)	(0.003)	(0.003)		(0.005)	(0.005)
Ln(1+inflation)	0.03	0.13	-0.03	0.06		0.10	0.18
	(0.18)	(0.15)	(0.12)	(0.09)		(0.18)	(0.15)
EAP	-0.59***	-0.51***	-0.37***	-0.34***		-0.50***	-0.44***
	(0.09)	(0.07)	(0.06)	(0.05)		(0.12)	(0.10)
LAC	-1.03***	-0.97***	-0.61***	-0.64***		-0.99***	-0.93***
	(0.08)	(0.08)	(0.05)	(0.05)		(0.08)	(0.09)
MNA	-0.42***	-0.53***	-0.26***	-0.32***		-0.37***	-0.53***
	(0.10)	(0.11)	(0.06)	(0.06)		(0.13)	(0.13)
SA	-0.16**	-0.17***	-0.12**	-0.12**		0.07	-0.10
	(0.08)	(0.05)	(0.06)	(0.05)		(0.12)	(0.10)
SSA	-0.72***	-0.02***	-0.41***	-0.51***		-0.74***	-1.03***
	(0.07)	(0.09)	(0.05)	(0.05)		(0.23)	(0.25)
Constant	-0.86***	-0.83***	-0.52***	-0.59***		-0.87***	-0.79***
	(0.13)	(0.13)	(0.07)	(0.09)		(0.14)	(0.14)
m1	-1.71*	-1.60	-2.06**	-2.60***		-1.69*	-1.65*
m2	1.02	1.79*	-0.91	2.33**		0.96	1.67*
N	107	109	107	109		107	110
1 – RSS/TSS	0.68	0.69	0.63	0.64		0.66	0.67

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach (regressions without outliers). $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach (regressions without outliers). dev: developing countries.

Table 12: continued

	Y^{q20s} dev	Y^{q20c} dev		Y^{q20s} all	Y^{q20c} all
	(5)	(6)		(7)	(8)
Agriculture Imports	1.04	**1.37***	Import duties	**0.039***	0.018
	(0.74)	(0.76)		(0.02)	(0.021)
Agriculture Imports * Y	-0.12	**-0.15**	Import duties * Y	**-0.005***	-0.002
	(0.09)	(0.09)		(0.003)	(0.003)
Secondary Education	0.08	0.07		**-0.060***	0.005
	(0.07)	(0.07)		(0.04)	(0.03)
Government Consumption	0.002	-0.005		0	0
	(0.006)	(0.005)		(0.003)	(0.003)
Ln(1+inflation)	0.12	0.20		-0.03	0.08
	(0.18)	(0.15)		(0.14)	(0.15)
EAP	-0.62***	-0.54***		-0.25**	-0.12
	(0.10)	(0.08)		(0.10)	(0.09)
ECA				0.40***	0.42***
				(0.08)	(0.07)
LAC	-1.07***	-1.00***		-0.66***	-0.56***
	(0.08)	(0.07)		(0.09)	(0.12)
MNA	-0.50***	-0.63***		-0.10	-0.19
	(0.10)	(0.10)		(0.15)	(0.17)
SA	-0.10	-0.08		-0.04	-0.08
	(0.09)	(0.07)		(0.12)	(0.09)
SSA	-0.71***	-0.91***		-0.28	-0.39*
	(0.10)	(0.12)		(0.19)	(0.20)
Constant	-0.78***	-0.73***		-0.91***	-1.14***
	(0.14)	(0.14)		(0.12)	(0.08)
m1	-1.67*	-1.64*		-1.89*	-2.01**
m2	1.03	1.40		-0.43	1.31
N	106	109		184	180
1 – RSS/TSS	0.66	0.67		0.56	0.59

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. Y^{q20s}: $\ln(Q^{20}/0.2)$ unadjusted approach (regressions without outliers). Y^{q20c}: $\ln(Q^{20}/0.2)$ adjusted approach (regressions without outliers). all: all countries. dev: developing countries.

Table 13: Openness indicators, interaction term and macro-economic variables - total effect (Growth equation)

Dep. Var.	$\mathbf{y^{p40}}$ **all re**	$\mathbf{y^{p20}}$ **dev re**	$\mathbf{y^{p40}}$ **dev re**
	(1)	(2)	(3)
Agriculture Imports	**2.47****	**4.33*****	**2.70***
	(1.21)	(1.64)	(1.40)
Secondary Education	0.04	0.36	-0.002
	(0.83)	(1.56)	(1.33)
Budget Surplus	0.09	0.26	0.27
	(0.16)	(0.26)	(0.22)
Adjusted Gini coefficient	**0.40*****	**0.34****	**0.38*****
	(0.12)	(0.17)	(0.14)
Ln(1+inflation)	-4.50	-3.37	-2.09
	(5.27)	(7.02)	(5.99)
M2/GDP	-0.02	-0.02	-0.003
	(0.03)	(0.05)	(0.04)
EAP	-1.48	5.21	2.25
	(2.58)	(5.79)	(4.95)
ECA	-3.48		
	(4.40)		
LAC	-6.67**	-0.23	-2.93
	(3.11)	(6.82)	(5.82)
MNA	-6.00*	0.65	-1.68
	(3.21)	(6.30)	(5.38)
SA	2.23	10.23*	7.10
	(2.55)	(5.62)	(4.80)
SSA	-3.16	3.95	1.04
	(3.62)	(6.67)	(5.70)
Constant	-10.98**	-15.17**	14.81***
	(5.13)	(6.52)	(5.57)
Breusch-Pagan	11.14***	3.48*	9.52***
R-squared	0.34	0.40	0.39
N	67	50	50

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-tests/Wald-tests, i.e. tests on the overall significance of the regression, are passed in all equations. Breusch-Pagan is a Lagrange multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. y^{q20}: average annual growth rate of the mean of the first quintile share (regressions without outliers). y^{q40}: average annual growth rate of the mean of the second quintile share (regressions without outliers). re: results for random effects estimation. all: all countries. dev: developing countries.

Table 14: Openness indicators and macroeconomic variables total effect (System GMM estimation)

Dep. Var.	Y^{p20s} all	Y^{p20c} all	Y^{p40s} all	Y^{p40c} all	Y^{p20s} dev	Y^{p20c} dev	Y^{p40s} dev	Y^{p40c} dev
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agriculture	**0.21*** **	**0.25*** **	**0.20*** **	**0.21*** **	**0.23** **	**0.26** **	**0.23** **	**0.24** **
Imports	(0.08)	(0.08)	(0.07)	(0.08)	(0.10)	(0.11)	(0.09)	(0.11)
Secondary	**0.12** **	**0.18*** **	**0.17*** **	**0.19*** **	**0.33*** **	**0.27** **	**0.29*** **	**0.28*** **
Education	(0.05)	(0.04)	(0.03)	(0.03)	(0.11)	(0.11)	(0.09)	(0.10)
Government	**-0.01*** **	**-0.01*** **	**-0.01*** **	**-0.01*** **	**-0.01** **	**-0.02*** **	-0.01	**-0.01* **
Consumption	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)
Ln(1+inflation)	0.22	0.22	0.14	0.17	0.24	0.24	0.15	0.17
	(0.24)	(0.18)	(0.15)	(0.13)	(0.23)	(0.19)	(0.15)	(0.13)
Civil liberties	-0.03	**-0.06* **	**-0.05** **	**-0.06** **	-0.05	**-0.07* **	**-0.06** **	**-0.07** **
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Life	**0.05*** **	**0.04*** **	**0.04*** **	**0.04*** **	**0.03*** **	**0.03*** **	**0.03*** **	**0.03*** **
expectancy	(0.01)	(0.01)	(0.008)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Terms of	**0.008*** **	**0.007*** **	**0.006*** **	**0.005*** **	**0.009*** **	**0.007*** **	**0.007*** **	**0.006*** **
Trade	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-0.99***	-0.87***	-1.04***	-1.05***	-1.40***	-1.27***	-1.19***	-1.12***
	(0.18)	(0.19)	(0.16)	(0.19)	(0.12)	(0.13)	(0.11)	(0.13)
ECA	0.31**	0.37**	0.09	0.04				
	(0.15)	(0.15)	(0.12)	(0.13)				
LAC	-1.21***	-1.10***	-1.03***	-1.10***	-1.55***	-1.46***	-1.12***	-1.13***
	(0.15)	(0.15)	(0.12)	(0.12)	(0.10)	(0.11)	(0.10)	(0.11)
MNA	-0.74***	-0.78***	-0.76***	-0.85***	-1.04***	-1.14***	-0.85***	-0.90***
	(0.20)	(0.21)	(0.17)	(0.18)	(0.09)	(0.10)	(0.09)	(0.10)
SA	-0.77***	-0.83***	-1.03***	-1.15***	-1.20***	-1.23***	-1.18***	-1.22***
	(0.22)	(0.22)	(0.20)	(0.19)	(0.15)	(0.16)	(0.15)	(0.15)
SSA	-1.20***	-1.42***	-1.14***	-1.32***	-1.60***	-1.83***	-1.29***	-1.41***
	(0.37)	(0.37)	(0.34)	(0.34)	(0.30)	(0.31)	(0.28)	(0.28)
Constant	3.86***	4.60***	5.20***	5.58***	5.10***	5.40***	5.82***	6.03***
	(0.68)	(0.69)	(0.62)	(0.61)	(0.62)	(0.65)	(0.60)	(0.59)
m1	-1.07	-0.65	-1.06	-0.69	-1.07	-0.69	-0.98	-0.69
m2	0.32	1.12	-1.19	1.29	0.91	1.48	-0.91	1.64
N	155	156	155	156	101	104	101	104
1 – RSS/TSS	0.91	0.91	0.94	0.94	0.77	0.76	0.80	0.78

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 14: continued

Dep. Var.	Y^{p20s} all	Y^{p20c} all	Y^{p40s} all	Y^{p40c} all	Y^{p20s} dev	Y^{p20c} dev	Y^{p40s} dev	Y^{p40c} dev
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Food Exports	**-0.03*** **	**-0.02** **	**-0.02** **	**-0.02** **	**-0.02* **	**-0.02* **	-0.02	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Secondary Education	**0.08****	**0.15** **	**0.14*** **	**0.16*** **	**0.27*** **	**0.22** **	**0.26*** **	**0.24** **
	(0.05)	(0.05)	(0.03)	(0.03)	(0.09)	(0.10)	(0.08)	(0.10)
Government Consumption	**-0.01*** **	**-0.01*** **	**-0.01** **	**-0.01** **	**-0.01*** **	**-0.02*** **	**-0.01* **	**-0.01** **
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)
Ln(1+inflation)	0.26	0.30	0.20	**0.24* **	0.28	0.30	0.21	**0.24* **
	(0.25)	(0.20)	(0.16)	(0.13)	(0.26)	(0.21)	(0.17)	(0.14)
Civil liberties	-0.04	**-0.06* **	**-0.05** **	**-0.07** **	-0.04	**-0.06* **	**-0.06* **	**-0.07** **
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Life expectancy	**0.06*** **	**0.05*** **	**0.05*** **	**0.05*** **	**0.05*** **	**0.05*** **	**0.04*** **	**0.04*** **
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Terms of Trade	**0.008*** **	**0.007*** **	**0.005*** **	**0.004*** **	**0.009*** **	**0.008*** **	**0.007*** **	**0.006*** **
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-0.79***	-0.68***	-0.86***	-0.87***	-1.37***	-1.23***	-1.15***	-1.09***
	(0.20)	(0.23)	(0.10)	(0.23)	(0.15)	(0.13)	(0.15)	(0.14)
ECA	0.49***	0.55***	0.25	0.20				
	(0.17)	(0.15)	(0.15)	(0.13)				
LAC	-1.19***	-1.12***	-1.02***	-1.11***	-1.70***	-1.64***	-1.28***	-1.30***
	(0.16)	(0.17)	(0.13)	(0.14)	(0.13)	(0.10)	(0.12)	(0.08)
MNA	-0.59***	-0.59***	-0.61***	-0.69***	-1.04***	-1.13***	-0.84***	-0.89***
	(0.20)	(0.20)	(0.16)	(0.17)	(0.12)	(0.10)	(0.12)	(0.08)
SA	-0.75***	-0.83***	-1.01***	-1.14***	-1.30***	-1.36***	-1.28***	-1.34***
	(0.25)	(0.25)	(0.23)	(0.22)	(0.19)	(0.17)	(0.18)	(0.15)
SSA	-0.91*	-1.14**	-0.88**	-1.06**	-1.47***	-1.70***	-1.17***	-1.29***
	(0.47)	(0.49)	(0.44)	(0.45)	(0.41)	(0.41)	(0.39)	(0.38)
Constant	3.29***	4.03***	4.68***	5.08***	4.39***	4.76***	5.17***	5.46***
	(0.79)	(0.80)	(0.74)	(0.71)	(0.81)	(0.81)	(0.79)	(0.76)
m1	-0.97	-0.49	-1.19	-0.96	-1.06	-0.60	-1.13	-0.89
m2	0.83	0.43	-0.72	1.08	0.96	0.13	0.26	0.66
N	157	158	157	158	103	106	103	106
1 – RSS/TSS	0.91	0.90	0.94	0.93	0.75	0.74	0.79	0.76

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 14: continued

Dep. Var.	Y^{p20s} all	Y^{p20c} all	Y^{p40s} all	Y^{p40c} all	Y^{p20s} dev	Y^{p20c} dev	Y^{p40s} dev	Y^{p40c} dev
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Manufactures Exports	0.014***	0.017***	0.011***	0.013***	0.017***	0.021***	0.015***	0.017***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.006)	(0.006)	(0.005)	(0.005)
Secondary Education	0.07	0.13**	0.13***	0.14***	0.29**	0.22*	0.26**	0.24*
	(0.05)	(0.05)	(0.04)	(0.04)	(0.12)	(0.13)	(0.12)	(0.13)
Government Consumption	-0.01***	-0.01***	-0.01***	-0.01***	-0.01**	-0.02***	-0.01*	-0.01**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
Ln(1+inflation)	0.16	0.16	0.12	0.14	0.09	0.08	0.05	0.06
	(0.23)	(0.17)	(0.15)	(0.12)	(0.23)	(0.17)	(0.15)	(0.12)
Civil liberties	-0.04	-0.07**	-0.05**	-0.07**	-0.06*	-0.08**	-0.07**	-0.08**
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Life Expectancy	0.04***	0.03***	0.04***	0.03***	0.03***	0.02***	0.03***	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Terms of Trade	0.007***	0.006***	0.004***	0.004***	0.007***	0.006***	0.005***	0.005**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-1.02***	-0.91***	-1.06***	-1.06***	-1.45***	-1.33***	-1.23***	-1.17***
	(0.19)	(0.19)	(0.18)	(0.19)	(0.11)	(0.10)	(0.11)	(0.12)
ECA	0.31**	0.38***	0.10	0.06				
	(0.14)	(0.14)	(0.12)	(0.11)				
LAC	-1.23***	-1.12***	-1.06***	-1.12***	-1.56***	-1.46***	-1.15***	-1.16***
	(0.15)	(0.15)	(0.12)	(0.13)	(0.12)	(0.10)	(0.11)	(0.09)
MNA	-0.69***	-0.71***	-0.70***	-0.78***	-0.98***	-1.08***	-0.79***	-0.84***
	(0.19)	(0.19)	(0.16)	(0.16)	(0.09)	(0.11)	(0.09)	(0.08)
SA	-0.88***	-0.92***	-1.12***	-1.21***	-1.31***	-1.31***	-1.29***	-1.30***
	(0.22)	(0.20)	(0.20)	(0.19)	(0.13)	(0.12)	(0.13)	(0.11)
SSA	-1.33***	-1.55***	-1.23***	-1.40***	-1.76***	-2.01***	-1.42***	-1.54***
	(0.37)	(0.35)	(0.35)	(0.34)	(0.28)	(0.26)	(0.27)	(0.25)
Constant	4.64***	5.34***	5.78***	6.11***	5.95***	6.26***	6.54***	6.68***
	(0.72)	(0.67)	(0.62)	(0.58)	(0.66)	(0.64)	(0.55)	(0.58)
m1	-0.69	-0.10	-1.30	-1.22	-0.92	-0.14	-1.30	-1.17
m2	-0.07	0.66	-1.67	1.05	0.15	0.66	-1.01	1.04
N	156	157	156	157	102	105	102	105
1 – RSS/TSS	0.91	0.92	0.94	0.94	0.78	0.78	0.80	0.79

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 14: continued

Dep. Var.	**Y^{p20s} all**	**Y^{p20c} all**	**Y^{p20s} dev**	**Y^{p20c} dev**	**Y^{p40s} indu**	**Y^{p40c} indu**
	(25)	(26)	(27)	(28)	(29)	(30)
Export duties	**-0.03*****	**-0.03****	**-0.03*****	**-0.03****	**0.11***	**0.11***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)	(0.07)
Secondary Education	0.05	**0.13*****	0.08	0.04	**0.10*****	**0.12*****
	(0.04)	(0.04)	(0.17)	(0.16)	(0.03)	(0.03)
Government Consumption	**-0.01****	**-0.01****	**-0.02***	**-0.03*****	-0.003	-0.002
	(0.006)	(0.006)	(0.01)	(0.01)	(0.004)	(0.004)
Ln(1+inflation)	0.16	0.29	0.23	0.36	**-0.88***	-0.80
	(0.25)	(0.27)	(0.28)	(0.31)	(0.52)	(0.51)
Civil liberties	-0.02	**-0.07***	-0.03	**-0.07***	-0.003	-0.02
	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
Life expectancy	**0.06*****	**0.05*****	**0.06*****	**0.06*****	**0.04****	**0.04****
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Terms of Trade	**0.004*****	**0.003****	**0.006*****	**0.005****	0	0
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-0.86***	0.67***	-1.14***	-0.99***		
	(0.21)	(0.24)	(0.19)	(0.18)		
ECA	0.30**	0.42***				
	(0.15)	(0.14)				
LAC	-1.25***	-1.14***	-1.58***	-1.54***		
	(0.16)	(0.18)	(0.12)	(0.09)		
MNA	-0.69***	-0.68***	-1.00***	-1.13***		
	(0.19)	(0.18)	(0.09)	(0.09)		
SA	-0.91***	-0.91***	-1.12***	-1.10***		
	(0.26)	(0.27)	(0.27)	(0.25)		
SSA	-1.05*	-1.18**	-1.37***	-1.60***		
	(0.58)	(0.59)	(0.52)	(0.53)		
Constant	3.85***	4.78***	4.02***	4.60***	5.88***	6.16***
	(0.81)	(0.80)	(1.09)	(1.01)	(1.29)	(1.23)
m1	-1.17	-1.15	-1.04	-0.80	-1.15	-1.51
m2	-1.15	-0.14	-0.80	-0.08	-1.15	-0.94
N	165	162	90	90	75	72
1 – RSS/TSS	0.90	0.90	0.72	0.73	0.54	0.56

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries. indu: industrial countries.

Table 14: continued

Dep. Var.	Y^{p20s} indu	Y^{p20c} indu	Y^{p40s} indu	Y^{p40c} indu		Y^{p20s} indu	Y^{p20c} indu		Y^{p20s} indu	Y^{p20c} indu
	(31)	(32)	(33)	(34)		(35)	(36)		(37)	(38)
Food exports	**-0.027****	-0.017	**0.019****	-0.016	Manufactures	**0.008***	0.008	Import	**-0.024***	**-0.018***
	(0.012)	(0.017)	(0.010)	(0.011)	Exports	(0.005)	(0.005)	duties	(0.013)	(0.009)
Secondary	0.01	**0.10****	**0.10*****	**0.11*****		0.01	**0.10****		0.03	**0.12*****
Education	(0.05)	(0.05)	(0.03)	(0.03)		(0.04)	(0.05)		(0.04)	(0.04)
Government	**-0.009***	-0.002	-0.005	-0.003		**-0.011****	-0.005		-0.006	0
Consumption	(0.005)	(0.005)	(0.004)	(0.004)		(0.006)	(0.005)		(0.005)	(0.005)
ln(1+inflation)	-0.90	-0.61	-0.74	-0.62		-0.18	-0.06		-0.60	-0.58
	(0.68)	(0.61)	(0.57)	(0.55)		(0.47)	(0.49)		(0.66)	(0.59)
Civil liberties	-0.03	-0.07	-0.05	**-0.06***		0.02	-0.04		0.01	-0.05
	(0.06)	(0.05)	(0.03)	(0.03)		(0.06)	(0.05)		(0.07)	(0.05)
Life	0.06	0.04	**0.05***	0.04		**0.08***	0.06		**0.04****	0.03
expectancy	(0.04)	(0.04)	(0.03)	(0.03)		(0.04)	(0.04)		(0.02)	(0.02)
Terms of	0.003	0.003	0	0		0.004	0.003		0	0
Trade	(0.003)	(0.004)	(0.002)	(0.002)		(0.003)	(0.004)		(0.002)	(0.002)
Constant	4.08	4.86*	5.55***	5.93***		2.68	4.01		5.36***	6.48***
	(2.70)	(2.53)	(2.05)	(2.05)		(3.02)	(3.04)		(1.66)	(1.34)
m1	1.07	1.33	-1.26	-1.23		1.21	1.55		-0.89	-0.89
m2	-0.27	-0.71	-1.12	0.61		-0.03	-1.01		-0.77	-1.57
N	54	52	54	52		54	52		76	73
1 – RSS/TSS	0.45	0.45	0.61	0.61		0.42	0.46		0.28	0.38

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). indu: industrial countries.

Table 15: Openness indicators, interaction term and macroeconomic variables - total effect (System GMM estimation)

Dep. Var.	**Y^{p20s} all**	**Y^{p20c} all**	**Y^{p40s} all**	**Y^{p40c} all**	**Y^{p20s} dev**	**Y^{p20c} dev**	**Y^{p40s} dev**	**Y^{p40c} dev**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agriculture Exports	**0.75****	0.64	**0.60*****	**0.51***	**1.32****	1.22	**1.09****	**0.99***
	(0.30)	(0.44)	(0.23)	(0.29)	(0.57)	(0.76)	(0.49)	(0.58)
Agriculture Exports * y	**-0.08****	-0.07	**-0.07*****	**-0.06***	**-0.15****	-0.14	**-0.13****	**-0.11***
	(0.03)	(0.05)	(0.03)	(0.03)	(0.07)	(0.09)	(0.06)	(0.07)
Secondary Education	**0.10***	**0.17*****	**0.16*****	**0.18*****	**0.37*****	**0.31*****	**0.34*****	**0.32*****
	(0.05)	(0.05)	(0.04)	(0.04)	(0.10)	(0.12)	(0.10)	(0.11)
Government Consumption	**-0.02*****	**-0.02*****	**-0.01*****	**-0.01*****	**-0.01*****	**-0.02*****	**-0.01****	**-0.01*****
	(0.004)	(0.004)	(0.04)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Ln(1+inflation)	0.25	0.28	0.20	**0.23***	0.21	0.24	0.15	0.19
	(0.25)	(0.20)	(0.16)	(0.13)	(0.26)	(0.21)	(0.17)	(0.14)
Civil liberties	-0.03	**-0.06****	**-0.05****	**-0.06****	**-0.05***	**-0.07****	**-0.06****	**-0.07****
	(0.21)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Life expectancy	**0.06*****	**0.05*****	**0.05*****	**0.04*****	**0.04*****	**0.04*****	**0.04*****	**0.03*****
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Terms of Trade	**0.007*****	**0.006*****	**0.005*****	**0.004*****	**0.008*****	**0.006*****	**0.006*****	**0.005*****
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-0.87***	-0.77***	-0.93***	-0.96***	-1.40***	-1.29***	-1.18***	-1.14***
	(0.20)	(0.22)	(0.19)	(0.22)	(0.15)	(0.13)	(0.15)	(0.15)
ECA	0.45***	0.53***	0.22*	0.17				
	(0.15)	(0.15)	(0.13)	(0.12)				
LAC	-1.19***	-1.10***	-1.02***	-1.11***	-1.65***	-1.59***	-1.23***	-1.26***
	(0.16)	(0.17)	(0.12)	(0.14)	(0.13)	(0.11)	(0.12)	(0.09)
MNA	-0.49***	-0.51**	-0.54***	-0.65***	-0.90***	-1.00***	-0.72***	-0.78***
	(0.19)	(0.21)	(0.16)	(0.17)	(0.12)	(0.10)	(0.12)	(0.09)
SA	-0.69***	-0.82***	-0.97***	-1.15***	-1.22***	-1.33***	-1.21***	-1.31***
	(0.24)	(0.27)	(0.22)	(0.43)	(0.16)	(0.18)	(0.17)	(0.16)
SSA	-0.93**	-1.15**	-0.90**	-1.11***	-1.46***	-1.71***	-1.17***	-1.32***
	(0.43)	(0.48)	(0.41)	(0.43)	(0.33)	(0.36)	(0.32)	(0.33)
Constant	3.35***	4.19***	4.73***	5.28***	4.69***	5.20***	5.44***	5.87***
	(0.70)	(0.81)	(0.68)	(0.71)	(0.64)	(0.78)	(0.69)	(0.73)
m1	-0.67	-0.15	-1.07	-0.84	-0.88	-0.23	-0.91	-0.66
m2	0.88	1.13	-1.43	1.06	0.94	1.20	-0.91	0.71
N	156	156	156	156	102	104	102	104
1 – RSS/TSS	0.90	0.90	0.93	0.93	0.77	0.74	0.80	0.77

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 15: continued

Dep. Var.	Y^{p20s} all	Y^{p20c} all	Y^{p40s} all	Y^{p40c} all	Y^{p20s} dev	Y^{p20c} dev	Y^{p40s} dev	Y^{p40c} dev
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Food Exports	**-0.16***	**-0.19****	**-0.17****	**-0.18****	**-0.44*****	**-0.40*****	**-0.43*****	**-0.42*****
	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.10)	(0.10)
Food Exports * Y	0.015	**0.020****	**0.017***	**0.018****	**0.052*****	**0.047*****	**0.050*****	**0.049*****
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Secondary Education	**0.08***	**0.15*****	**0.15*****	**0.16****	**0.31*****	**0.26****	**0.29*****	**0.27****
	(0.04)	(0.04)	(0.03)	(0.03)	(0.10)	(0.11)	(0.10)	(0.11)
Government Consumption	**-0.01*****	**-0.01*****	**-0.01****	**-0.01****	**-0.01****	**-0.02*****	-0.01	**-0.01***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)
Ln(1+inflation)	0.25	0.30	0.20	**0.24***	0.26	0.28	0.19	0.21
	(0.26)	(0.20)	(0.16)	(0.14)	(0.25)	(0.21)	(0.16)	(0.14)
Civil liberties	-0.03	**-0.06***	**-0.04***	**-0.06****	-0.04	-0.05	**-0.05***	**-0.06****
	(0.03)	(0.03)	(0.01)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Life expectancy	**0.06*****	**0.05*****	**0.05*****	**0.05*****	**0.04*****	**0.04*****	**0.04*****	**0.04*****
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Terms of Trade	**0.008*****	**0.007*****	**0.006*****	**0.005*****	**0.010*****	**0.009*****	**0.008*****	**0.007*****
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-0.83***	-0.73***	-0.91***	-0.91***	-1.37***	-1.24***	-1.15***	-1.09***
	(0.20)	(0.23)	(0.20)	(0.23)	(0.12)	(0.13)	(0.13)	(0.14)
ECA	0.44***	0.49***	0.19	0.15				
	(0.16)	(0.15)	(0.14)	(0.13)				
LAC	-1.22***	-1.15***	-1.05***	-1.13***	-1.64***	-1.59***	-1.22***	-1.24***
	(0.16)	(0.18)	(0.13)	(0.14)	(0.09)	(0.07)	(0.08)	(0.07)
MNA	-0.65***	-0.66***	-0.68***	-0.76***	-1.01***	-1.10***	-0.81***	-0.85***
	(0.19)	(0.20)	(0.16)	(0.16)	(0.08)	(0.07)	(0.08)	(0.06)
SA	-0.82***	-0.91***	-1.10***	-1.20***	-1.38***	-1.41***	-1.36***	-1.39***
	(0.24)	(0.24)	(0.22)	(0.21)	(0.16)	(0.15)	(0.15)	(0.13)
SSA	-0.95**	-1.18**	-0.93**	-1.10***	-1.53***	-1.75***	-1.22***	-1.33***
	(0.45)	(0.46)	(0.42)	(0.42)	(0.32)	(0.34)	(0.31)	(0.31)
Constant	3.30***	3.99***	4.68***	5.05***	4.58***	4.87***	5.36***	5.57***
	(0.79)	(0.78)	(0.72)	(0.68)	(0.77)	(0.78)	(0.74)	(0.71)
m1	-0.98	-0.54	-1.22	-1.02	-1.05	-0.62	-1.14	-0.92
m2	0.70	0.08	-1.05	0.78	0.96	-0.29	0.57	0.43
N	157	158	157	158	103	106	103	106
1 – RSS/TSS	0.91	0.91	0.94	0.94	0.78	0.76	0.82	0.79

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 15: continued

Dep. Var.	Y^{p20s} all	Y^{p20c} all	Y^{p40s} all	Y^{p40c} all	Y^{p20s} dev	Y^{p20c} dev	Y^{p40s} dev	Y^{p40c} dev
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Export Duties	**-0.51*****	**-0.41****	**-0.45*****	**-0.38****	**-0.79*****	**-0.58***	**-0.68*****	**-0.52****
	(0.19)	(0.21)	(0.16)	(0.18)	(0.26)	(0.30)	(0.21)	(0.25)
Export Duties * Y	**0.058****	**0.046***	**0.053*****	**0.044****	**0.093*****	**0.067***	**0.081*****	**0.062****
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.04)	(0.03)	(0.03)
Secondary Education	0.05	**0.13*****	**0.12*****	**0.14*****	0.05	0.03	0.08	0.07
	(0.04)	(0.04)	(0.03)	(0.03)	(0.15)	(0.16)	(0.13)	(0.14)
Government Consumption	**-0.01****	**-0.02****	**-0.01****	**-0.01*****	**-0.03****	**-0.04*****	**-0.03***	**-0.03*****
	(0.006)	(0.006)	(0.005)	(0.006)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(1+inflation)	0.13	0.27	0.06	0.20	0.20	0.34	0.12	0.26
	(0.23)	(0.26)	(0.16)	(0.17)	(0.26)	(0.29)	(0.19)	(0.19)
Civil liberties	-0.01	**-0.06***	-0.02	**-0.05***	-0.02	**-0.06***	-0.03	**-0.06***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)
Life expectancy	**0.05*****	**0.04*****	**0.05*****	**0.04*****	**0.05*****	**0.05*****	**0.05*****	**0.05*****
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Terms of Trade	**0.004*****	**0.003****	**0.004****	**0.002***	**0.007*****	**0.006*****	**0.007*****	**0.005*****
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
EAP	-0.92***	-0.71***	-0.91***	-0.88***	-1.15***	-1.01***	-0.93***	-0.86***
	(0.21)	(0.24)	(0.20)	(0.22)	(0.17)	(0.18)	(0.15)	(0.16)
ECA	0.25*	0.39***	0.08	0.06				
	(0.14)	(0.14)	(0.11)	(0.11)				
LAC	-1.29***	-1.17***	-1.06***	-1.16***	-1.57***	-1.54***	-1.16***	-1.20***
	(0.16)	(0.18)	(0.13)	(0.14)	(0.11)	(0.14)	(0.09)	(0.10)
MNA	-0.76***	-0.72***	-0.75***	-0.82***	-1.05***	-1.16***	-0.87***	-0.91***
	(0.18)	(0.17)	(0.14)	(0.14)	(0.08)	(0.08)	(0.07)	(0.05)
SA	-0.93***	-0.91***	-1.11***	-1.16***	-1.03***	-1.05***	-0.98***	-0.99***
	(0.26)	(0.26)	(0.22)	(0.23)	(0.26)	(0.25)	(0.24)	(0.22)
SSA	-1.22**	-1.30**	-1.10***	-1.22**	-1.58***	-1.75***	-1.26***	-1.33***
	(0.58)	(0.58)	(0.50)	(0.50)	(0.50)	(0.51)	(0.43)	(0.44)
Constant	4.27***	5.12***	5.03***	5.59***	4.56***	5.04***	4.80***	5.24***
	(0.79)	(0.77)	(0.74)	(0.73)	(0.98)	(0.95)	(0.92)	(0.92)
m1	-1.16	-1.12	-1.65*	-1.80*	-1.10	-0.91	-1.48	-1.30
m2	-1.53	-0.65	-1.52	-0.88	-1.31	-0.67	-0.92	-0.62
N	165	162	165	162	90	90	90	90
1 – RSS/TSS	0.90	0.90	0.93	0.93	0.75	0.75	0.79	0.80

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 15: continued

Dep. Var.	Y^{p20s} all	Y^{p20c} all	Y^{p40s} all	Y^{p40c} all	Y^{p20s} dev	Y^{p20c} dev	Y^{p40s} dev	Y^{p40c} dev
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Import duties	-0.06 (0.05)	**-0.08*** (0.04)	**-0.10**** (0.04)	**-0.09**** (0.04)	**-0.13**** (0.06)	**-0.13**** (0.06)	**-0.14**** (0.06)	**-0.13**** (0.05)
Import duties * Y	0.007 (0.006)	**0.010*** (0.006)	**0.012**** (0.005)	**0.012**** (0.005)	**0.017**** (0.008)	**0.017**** (0.008)	**0.018***** (0.007)	**0.017**** (0.007)
Secondary Education	0.06 (0.05)	**0.13***** (0.05)	**0.12***** (0.03)	**0.13***** (0.04)	0.19 (0.15)	0.12 (0.15)	0.15 (0.13)	0.10 (0.13)
Government Consumption	**-0.01*** (0.006)	**-0.01*** (0.006)	-0.01 (0.005)	-0.01 (0.006)	-0.01 (0.01)	**-0.03**** (0.01)	-0.01 (0.01)	**-0.03**** (0.01)
Ln(1+inflation)	-0.04 (0.20)	0.16 (0.48)	-0.11 (0.14)	0.09 (0.15)	0.01 (0.19)	0.23 (0.25)	-0.06 (0.15)	0.15 (0.16)
Civil liberties	-0.01 (0.03)	-0.05 (0.03)	-0.03 (0.02)	**-0.04*** (0.02)	-0.01 (0.03)	-0.03 (0.03)	-0.03 (0.02)	-0.04 (0.02)
Life expectancy	**0.05***** (0.01)	**0.04***** (0.01)	**0.04***** (0.01)	**0.04***** (0.01)	**0.04*** (0.02)	**0.04**** (0.02)	**0.04**** (0.02)	**0.04***** (0.02)
Terms of Trade	**0.004***** (0.001)	**0.003**** (0.001)	**0.004***** (0.001)	**0.003**** (0.001)	**0.005***** (0.002)	**0.005**** (0.002)	**0.006***** (0.002)	**0.005***** (0.002)
EAP	-0.99*** (0.20)	-0.80*** (0.22)	-0.96*** (0.18)	-0.94*** (0.20)	-1.17*** (0.19)	-0.99*** (0.17)	-0.90*** (0.16)	-0.81*** (0.15)
ECA	0.20 (0.13)	0.29** (0.13)	-0.007 (0.10)	-0.04 (0.10)				
LAC	-1.27*** (0.13)	-1.22*** (0.17)	-1.06*** (0.10)	-1.19*** (0.12)	-1.47*** (0.10)	-1.46*** (0.12)	-1.06*** (0.09)	-1.12*** (0.09)
MNA	-0.77*** (0.18)	-0.80*** (0.18)	-0.79*** (0.14)	-0.89*** (0.14)	-1.00*** (0.14)	-1.15*** (0.14)	-0.81*** (0.12)	-0.90*** (0.10)
SA	-1.06*** (0.33)	-0.94*** (0.32)	-1.10*** (0.28)	-1.11*** (0.30)	-1.20*** (0.29)	-1.06*** (0.29)	-1.00*** (0.26)	-0.92*** (0.27)
SSA	-1.25*** (0.42)	-1.33*** (0.40)	-1.18*** (0.36)	-1.29*** (0.35)	-1.48*** (0.33)	-1.58*** (0.31)	-1.17*** (0.28)	-1.21*** (0.27)
Constant	4.51*** (0.80)	5.10*** (0.82)	5.43*** (0.70)	5.67*** (0.77)	5.28*** (1.17)	5.22*** (1.13)	5.47*** (1.03)	5.37*** (1.03)
m1	-1.01	-1.20	-1.09	-1.85*	-0.82	-0.77	-0.82	-1.24
m2	-0.81	-0.43	-1.47	-1.16	-0.56	-0.74	-0.77	-1.13
N	170	167	170	167	94	94	94	94
1 – RSS/TSS	0.90	0.90	0.93	0.94	0.73	0.75	0.80	0.80

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level. Results for one–step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. m1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/ total sum of squares. $Y^{p20/40s}$: logarithm of mean income of 20/20 to 40 percent poorest (unadjusted approach, regressions without outliers). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach, regressions without outliers). all: all countries. dev: developing countries.

Table 16: First/Second Quintile and Openness Indicators
All countries (Growth equation)

I. Openness Indicators

	Agex	Agim	Foex	Foim	Maex	Maim	Exdu	Imdu
1) Distribution effect								
y^{q20} = regional dummies	-	-	-	-	-	-	-	-
y^{q40} = regional dummies	-	-	-	-	-	-	-	-
y^{q20} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
y^{q40} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
y^{p20} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
y^{p40} = regional dummies + macroeconomic variables	-	2.47**	-	-	-	-	-	-

II. Openness Indicators and interaction term

	Agex Yagex	Agim Yagim	Foex Yfoex	Foim Yfoim	Maex Ymaex	Maim Ymaim	Exdu Yexdu	Imdu Yimdu
1) Distribution effect								
y^{q20} = regional dummies	-	-	-	-	-	-	-	-
y^{q40} = regional dummies	-3.36** 0.38**	-	-	-	-	-	-	-
y^{q20} = regional dummies macroeconomic variables	-	-	-	-	-	-	-	-
y^{q40} = regional dummies macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
y^{p20} = regional dummies macroeconomic variables	-	-	-	-	-	-	-	-
y^{p40} = regional dummies macroeconomic variables	-	-	-	-	-	-	-	-

Note: Under the rubric specifications we denote the different basic equations which are tested with eight different combinations of the openness indicators. E.g. y^{q20} = regional dummies means that the growth rate of the first quintile share is regressed on regional dummy variables and eight different combinations. In the matrix we indicate coefficients of significant openness indicators. * denotes signficance at 90 % level, ** at the 95 % level, and *** at the 99 % level (two-sided alternative). $y^{q20/40}$: regressions without outliers for growth rate of first/second quintile. $y^{p20/40}$: regressions without outliers for growth rate of mean income of first/second quintile. Agex/Agim: Agriculture exports/imports. Foex/Foim: Food exports/imports. Maex/Maim: Manufactures exports/imports. Exdu/Imdu: Export/Import duties. Yagex/Yagim: Agriculture exports/imports * ln(Y). Yfoex/Yfoim: Food exports/imports * ln(Y). Ymaex/Ymaim: Manufactures exports/imports * ln(Y). Yexdu/Yimdu: Export/Import duties * ln(Y).

Table 17: First/Second Quintile and Openness Indicators
Developing countries (Growth equation)

I. Openness Indicators

	Agex	Agim	Foex	Foim	Maex	Maim	Exdu	Imdu
1) Distribution effect								
y^{q20} = regional dummies	-	-	-	-	-	-	-	-
y^{q40} = regional dummies	-	-	-	-	-	-	-	-
y^{q20} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
y^{q40} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
y^{p20} = regional dummies + macroeconomic variables	-	4.33***	-	-	-	-	-	-
y^{p40} = regional dummies + macroeconomic variables	-	2.70*	-	-	-	-	-	-

II. Openness Indicators and interaction term

	Agex Yagex	Agim Yagim	Foex Yfoex	Foim Yfoim	Maex Ymaex	Maim Ymaim	Exdu Yexdu	Imdu Yimdu
1) Distribution effect								
y^{q20} = regional dummies	-	-	-	-	-	-0.74* 0.09*	-	-
y^{q40} = regional dummies	-5.00** 0.60**	-	-	-	-	-	-	-
y^{q20} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
y^{q40} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
y^{p20} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
y^{p40} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-

Note: Under the rubric specifications we denote the different basic equations which are tested with eight different combinations of the openness indicators. E.g. y^{q20} = regional dummies means that the growth rate of the first quintile share is regressed on regional dummy variables and eight different combinations. In the matrix we indicate coefficients of significant openness indicators. * denotes signficance at 90 % level, ** at the 95 % level, and *** at the 99 % level (two-sided alternative). $y^{q20/40}$: regressions without outliers for growth rate of first/second quintile. $y^{p20/40}$: regressions without outliers for growth rate of mean income of first/second quintile. Agex/Agim: Agriculture exports/imports. Foex/Foim: Food exports/imports. Maex/Maim: Manufactures exports/imports. Exdu/Imdu: Export/Import duties. Yagex/Yagim: Agriculture exports/imports * ln(Y). Yfoex/Yfoim: Food exports/imports * ln(Y). Ymaex/Ymaim: Manufactures exports/imports * ln(Y). Yexdu/Yimdu: Export/Import duties * ln(Y).

Table 18: First/Second Quintile and Openness Indicators All countries (System GMM estimation)

Openness indicators:	Agex	Agim	Foex	Foim	Maex	Maim	Exdu	Imdu
1) Distribution effect								
Specifications:								
Y^{q20s} = regional dummies	-	-	-	-	0.004*	-	-	-
Y^{q20c} = regional dummies	-	-	-	-	0.005**	-	-	-
Y^{q40s} = regional dummies	-	-	-	-	-	-	-	-
Y^{q40c} = regional dummies	-	-	-	-	-	-	-	-
Y^{q20s} = regional dummies + macroeconomic variables	-	-	-	-	0.007***	-	-	-
Y^{q20c} = regional dummies + macroeconomic variables	-	-	-	-	0.006**	-	-	-
Y^{q40s} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
Y^{q40c} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
Y^{p20s} = regional dummies + macro-economic variables	-	0.21***	-0.03***	-	0.014***	-	-0.03***	-
Y^{p20c} = regional dummies + macro-economic variables	-	0.25***	-0.02**	-	0.017***	-	-0.03**	-
Y^{p40s} = regional dummies + macro-economic variables	-	0.20***	-0.02**	-	0.011***	-	-	-
Y^{p40c} = regional dummies + macro-economic variables	-	0.21***	-0.02**	-	0.013***	-	-	-

Note: Under the rubric specifications we denote the different basic equations which are tested with openness indicators. E.g. Y^{q20} = regional dummies means that the first quintile share is regressed on regional dummy variables and eight different combinations. In the matrix we indicate coefficients of significant openness indicators. * denotes signficance at 90 % level, ** at the 95 % level, and *** at the 99 % level (two-sided alternative). $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach. $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach. $Y^{p20/40s}$: logarithm of mean income of the 20/20 to 40 percent poorest (unadjusted approach). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach). All regressions without outliers. Agex/Agim: Agriculture exports/imports. Foex/Foim: Food exports/imports. Maex/Maim: Manufactures exports/imports. Exdu/Imdu: Export/Import duties.

Table 19: First/Second Quintile and Openness Indicators Developing countries (System GMM estimation)

Openness indicators:	Agex	Agim	Foex	Foim	Maex	Maim	Exdu	Imdu
1) Distribution effect								
Specifications:								
Y^{q20s} = regional dummies	-	-	-	-	-	-	-	0.005*
Y^{q20c} = regional dummies	-	-	-	-	0.005*	-	-	-
Y^{q40s} = regional dummies	-	-	-	-	-	-	-	-
Y^{q40c} = regional dummies	-	-	-	-	-	-	-	-
Y^{q20s} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
Y^{q20c} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
Y^{q40s} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
Y^{q40c} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
Y^{p20s} = regional dummies + macro-economic variables	-	0.23**	-0.02*	-	0.017***	-	-0.03***	-
Y^{p20c} = regional dummies + macro-economic variables	-	0.26**	-0.02*	-	0.021***	-	-0.03**	-
Y^{p40s} = regional dummies + macro-economic variables	-	0.23**	-	-	0.015***	-	-	-
Y^{p40c} = regional dummies + macro-economic variables	-	0.24**	-	-	0.017***	-	-	-

Note: Under the rubric specifications we denote the different basic equations which are tested with openness indicators. E.g. Y^{q20} = regional dummies means that the first quintile share is regressed on regional dummy variables and eight different combinations. In the matrix we indicate coefficients of significant openness indicators. * denotes signficance at 90 % level, ** at the 95 % level, and *** at the 99 % level (two-sided alternative). $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach. $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach. $Y^{p20/40s}$: logarithm of mean income of the 20/20 to 40 percent poorest (unadjusted approach). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach). All regressions without outliers. Agex/Agim: Agriculture exports/imports. Foex/Foim: Food exports/imports. Maex/Maim: Manufactures exports/imports. Exdu/Imdu: Export/Import duties.

Table 20: First/Second Quintile and Openness Indicators Industrial countries (System GMM estimation)

Openness indicators:	Agex	Agim	Foex	Foim	Maex	Maim	Exdu	Imdu
1) Distribution effect								
Specifications:								
Y^{q20s} = macro-economic variables	-	-	-0.023**	-	0.010***	-	-	-0.030***
Y^{q20c} = macro-economic variables	0.035**	-	-	-	0.007***		-	-0.016**
Y^{q40s} = macro-economic variables	-	-	-0.011**	-	0.004***	-	-	-
Y^{q40c} = macro-economic variables	-	-	-	-	0.003**	-	-	-
2) Total effect								
Y^{p20s} = macro-economic variables	-	-	-0.027**	-	0.008*	-	-	-0.024*
Y^{p20c} = macro-economic variables	-	-	-	-	-	-	-	-0.018*
Y^{p40s} = macro-economic variables	-	-	-0.019**	-	-	-	0.11*	-
Y^{p40c} = macro-economic variables	-	-	-	-	-	-	0.11*	-

Note: Under the rubric specifications we denote the different basic equations which are tested with openness indicators. E.g. Y^{q20} = regional dummies means that the first quintile share is regressed on regional dummy variables and eight different combinations. In the matrix we indicate coefficients of significant openness indicators. * denotes signficance at 90 % level, ** at the 95 % level, and *** at the 99 % level (two-sided alternative). $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach. $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach. $Y^{p20/40s}$: logarithm of mean income of the 20/20 to 40 percent poorest (unadjusted approach). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach). All regressions without outliers. Agex/Agim: Agriculture exports/imports. Foex/Foim: Food exports/imports. Maex/Maim: Manufactures exports/imports. Exdu/Imdu: Export/Import duties.

Table 21: First/Second Quintile and Openness Indicators plus Interactions term - All countries (System GMM estimation)

Openness indicators:	Agex Yagex	Agim Yagim	Foex Yfoex	Foim Yfoim	Maex Ymaex	Maim Ymaim	Exdu Yexdu	Imdu Yimdu
1) Distribution effect								
Specifications:								
Y^{q20s} = regional dummies	-	-	-	-	-	-	-	-
Y^{q20c} = regional dummies	0.35** -0.04	-	-	-	-	-	-	-
Y^{q40s} = regional dummies	-	-	-	-	-	-	-	-
Y^{q40c} = regional dummies	0.22** -0.02**	-	-	-	-	-	-	-
Y^{q20s} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	0.039* -0.005*
Y^{q20c} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
Y^{q40s} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
Y^{q40c} = regional dummies + macroeconomic variables	-	-	-	-	-	-	-	-
2) Total effect								
Y^{p20s} = regional dummies + macro-economic variables	0.75** -0.08**	-	-0.16* 0.15	-	-	-	-0.51*** 0.058**	-
Y^{p20c} = regional dummies + macro-economic variables	-	-	-0.19** 0.02**	-	-	-	-0.41** 0.046*	-0.08* 0.010*
Y^{p40s} = regional dummies + macro-economic variables	0.60*** -0.07***	-	-0.17** 0.017*	-	-	-	-0.45*** 0.053***	-0.10** 0.012**
Y^{p40c} = regional dummies + macro-economic variables	0.51* -0.06*	-	-0.18** 0.018**	-		-	-0.38** 0.044**	-0.09** 0.012**

Note: Under the rubric specifications we denote the different basic equations which are tested with openness indicators. E.g. Y^{q20} = regional dummies means that the first quintile share is regressed on regional dummy variables and eight different combinations. In the matrix we indicate coefficients of significant openness indicators. * denotes signficance at 90 % level, ** at the 95 % level, and *** at the 99 % level (two-sided alternative). $Y^{q20/40s}$: $\ln(Q^{20/40}/0.2)$ unadjusted approach. $Y^{q20/40c}$: $\ln(Q^{20/40}/0.2)$ adjusted approach. $Y^{p20/40s}$: logarithm of mean income of the 20/20 to 40 percent poorest (unadjusted approach). $Y^{p20/40c}$: logarithm of mean income of 20/20 to 40 percent poorest (adjusted approach). All regressions without outliers. Agex/Agim: Agriculture exports/imports. Foex/Foim: Food exports/imports. Maex/Maim: Manufactures exports/imports. Exdu/Imdu: Export/Import duties. Yagex/Yagim: Agriculture exports/imports * ln(Y). Yfoex/Yfoim: Food exports/imports * ln(Y). Ymaex/Ymaim: Manufactures exports/imports * ln(Y). Yexdu/Yimdu: Export/Import duties * ln(Y).

Table 22: First/Second Quintile and Openness Indicators plus Interactions term - Developing countries (System GMM estimation)

Openness indicators:	**Agex Yagex**	**Agim Yagim**	**Foex Yfoex**	**Foim Yfoim**	**Maex Ymaex**	**Maim Ymaim**	**Exdu Yexdu**	**Imdu Yimdu**
1) Distribution effect								
Specifications:								
Y^{q20s} = regional dummies	0.72*** -0.08***	-	-	0.46*** -0.06***	-	-	-	-
Y^{q20c} = regional dummies	0.70*** -0.08***	-	-	0.44** -0.05**	-	-	-	-
Y^{q40s} = regional dummies	0.51*** -0.06***	-	-	0.22* -0.03*	-	-	-	-
Y^{q40c} = regional dummies	0.49*** -0.06***	-	-	0.23* -0.03	-	-	-	-
Y^{q20s} = regional dummies + macro-economic variables	1.02*** -0.12***	-	-	0.55** -0.06**	-	-	-	-
Y^{q20c} = regional dummies + macro-economic variables	1.02** -0.12**	1.37* -0.15*	-	0.59** -0.07**	-	-	-	-
Y^{q40s} = regional dummies + macro-economic variables	0.75*** -0.09***	-	-	-	-	-	-	-
Y^{q40c} = regional dummies + macro-economic variables	0.76*** -0.09***	-	-	-	-	-	-	-
2) Total effect								
Y^{p20s} = regional dummies + macro-economic variables	1.32** -0.15**	-	-0.44*** 0.052***	-	-	-	-0.79*** 0.093***	-0.13** 0.017**
Y^{p20c} = regional dummies + macro-economic variables	-	-	-0.40*** 0.047***	-	-	-	-0.58* 0.067*	-0.13** 0.017**
Y^{p40s} = regional dummies + macro-economic variables	1.09** -0.13**	-	-0.43*** 0.050***	-	-	-	-0.68*** 0.081***	-0.14** 0.018***
Y^{p40c} = regional dummies + macro-economic variables	0.99* -0.11*	-	-0.42*** 0.049***	-		-	-0.52** 0.062**	-0.13** 0.017**

Note: see table 21.