# Trade openness, gains from variety and government spending*

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**Abstract**

This paper investigates empirically the effect of the diversity of imports on government size and provides evidence for the love of variety effect on the government share described in Hanslin (2008). I argue that crowding out of firms is an important cost of public good provision. However, due to the access to foreign varieties, national costs of public good provision are lower and therefore, public good provision is higher. Especially for OECD countries this channel seems to exist. The diversity of imported products has a positive effect on government consumption, particularly when these goods are differentiated. In addition, this positive effect is decreasing in country size. Further, the direct effect of the share of differentiated on total imported products on the government share is negative.

Keywords: International trade, trade openness, public expenditure, gains from variety
JEL Classification: F10, H10

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# 1 Introduction

Through the increasing international integration of goods markets new challenges for the public sector arise. On the hand hand, a large literature points out that an increase in competition between countries puts pressure on governments and leads to a race to the bottom. An increasing integration of markets erodes the tax base and therefore tends to increase the costs of public goods provision. On the other hand, in open economies, governments have the possibility to increase public good provision on costs of foreign countries. The literature discusses two channels, how costs of public good provision can be exported: (1) due to the terms of trade (TOT) externality and (2) the love of variety effect (LOVE). In their theoretical contributions van der Ploeg (1987), Turnovsky (1988), Devereux (1991) and Anderson et al. (1996), for instance, show that in open economies, the costs of taxation can be exported if changes in public spending influence the terms of trade. Anderson (2006) and Epifani and Gancia (2008) argue that increasing integration of goods markets reinforces this effect which leads to larger governments. The intuition behind the TOT-externality is as follows. Since the public sector has a stronger home bias than the private sector, a shift from private to public expenditure increases the demand for domestic goods. This in turn leads to a crowding out of exports and to an increase of domestic prices. Epifani and Gancia (2008) argue that this channel works only if the domestic and foreign goods are imperfect substitutes. Otherwise prices would be determined on the world market. They provide empirical evidence for the positive effect of openness on government consumption due to the TOT-externality. In order to test for this channel, Epifani and Gancia (2008) interact trade openness with the inverse of the elasticity of substitution and find a significant positive coefficient for this interaction term.

The second channel, the love of variety effect (LOVE), I highlighted in an earlier theoretical study (Hanslin, 2008). In a Dixit-Stiglitz-Krugman framework, under the assumption of monopolistic competition with endogenous firm entry, an important cost of the public sector is its negative effect on the number of firms. However, with integrated goods markets consumers have access to foreign varieties. Therefore, the national costs of public good provision are lower and optimal public good provision higher in open economies than in closed ones. One crucial assumption for this result to hold is that consumers have a love of variety. Almost three decades ago, new trade theory starting with Krugman (1979, 1980, 1981), Ethier (1982) pointed on the importance of gains from trade due to the im-

port of new varieties. It took some time until first empirical studies quantified these gains from variety. Broda and Weinstein (2006) show that import of new varieties at a very disaggregated level brought welfare gains to the United States arising from a decrease in the consumer price index. In Broda and Weinstein (2004) it is shown that new imported varieties on the four-digit level brought an increase in welfare for many countries. In another study Broda et al. (2006) show that there are productivity gains in various countries arising from new imported products.

Focusing on the extensive margin of imports, this paper provides empirical evidence for the LOVE and the following hypothesis deduced from Hanslin (2008). First, a broad access to foreign varieties should increase the government share relative to GDP. However, there are only gains from varieties if imported goods are differentiated. Hence, the number of different imported products should only increase the government share if they are differentiated. Second, since gains from variety are larger the smaller the country, country size should be negatively correlated with the government share. Third, the positive effect of imported varieties on government share should be smaller the larger the country. Fourth, if love of variety is high, the government share should be small. This follows from the high costs of public good provision if there is high love of variety.

The measure for the diversity of imports is obtained by counting the different imported products from the rest of the world. A product in this paper is defined at the four-digit level of the Standard International Trade Classification (SITC) code, Revision 2, reported in the NBER U.N. trade data by Feenstra et al. (2005). Unfortunately, there is a change in reporting trade in 1984. While from 1964 until 1983 each product independent of the trade value is reported, from 1984 until 2000 low valued trade flows below \$100'000 are not reported. Because of data reliability and the before mentioned censoring, the main focus is put on the early OECD sample covering the years from 1964 to 1983.

Estimating panel fixed effect regressions for OECD and non OECD countries and different time spans, I find strong and very robust results for the LOVE in the early non-censored OECD sample. The number of different imported products has a positive effect on government consumption. This positive effect works especially if it is accounted for the number of differentiated[1] imported products. Further, I find that the positive effect of new imported varieties on government consumption is decreasing in country size. In addition, the share of differentiated imported products affects government consumption

[1] According to the classification by Rauch (1999).

negatively. I argue that the share of differentiated products in the consumption basket is positively correlated with the love of variety and therefore, costs of public good provision are higher.

The paper is organized as follows. Section 2 presents a simple version of Hanslin (2008) with labor as the only production factor. Section 3 presents the empirical model and the data. Section 4 describes the main results and in section 5 it is controlled for robustness of these results. Finally, section 6 concludes.

## 2 A simple model

This section presents the theoretical framework in order to illustrate the love of variety effect (LOVE) on government spending highlighted in Hanslin (2008). Here, I concentrate on the simplest possible version in order to focus on the main implications.[2]

There are two countries, home ($H$) and foreign ($F$), which differ in the amount of labor endowment (country size). In each country there is a private and a public sector, both producing consumption goods. The nontraded public good is produced with a share $g_i$ ($i = H, F$) of labor endowment $\bar{L}_i$ according to a linear production function, $G_i = g_i \bar{L}_i$. The representative household's income is given by $w_i \bar{L}_i$, where $w_i$ denotes the wage rate in country $i$. Net income - income available for consumption of private goods - is given by $I_i := w_i \bar{L}_i - T_i$, where $T_i = g_i w_i \bar{L}_i$ is the income tax imposed by the government. The private sector is characterized by a continuum of industries of measure 1 indexed by $j \in [0, 1]$. In each industry and country various firms produce differentiated goods with labor under monopolistic competition. Each firm is monopolist for one variety, after having incurred some fixed cost. There is free entry, that is, the equilibrium number of firms in an industry is endogenously determined. I assume free trade between the two countries in an exogenous fraction $\tau \in [0, 1]$ of the industries and no trade for the remaining fraction $1 - \tau$. Without loss of generality I refer to trading industries with index $j \leq \tau$ and to the nontrading industries with index $j > \tau$.[3]

The representative household derives utility from consumption of the different varieties in each industry and the country specific public good $G$. Household's preference for private

[2] A richer version of the model presented in this section is found in Hanslin (2008).

[3] This way of modeling openness is due to Epifani and Gancia (2008).

goods versus the public good is captured in the parameter $\eta \in (0,1)$.

$$U_i = \eta \int_0^1 \log Y_{ij} dj + (1-\eta) \log G_i \quad for \quad i = H, F \tag{1}$$

where subutility $Y_{ij}$ is a CES aggregator of the varieties consumed in industry $j$

$$Y_{ij} = \left( \int_{k \in \mathscr{N}_{ij}} \left(y_{kj}^i\right)^\nu dk \right)^{\frac{1}{\nu}}, \quad i = H, F. \tag{2}$$

with $\nu \in (0,1)$. $y_{kj}^i$ denotes consumption of variety $k$ in industry $j$ by the representative household in country $i$.[4] The elasticity of substitution between any two varieties from industry $j$ is given by $\sigma = \frac{1}{1-\nu}$. The assumption $\nu \in (0,1)$ implies $\sigma > 1$. A higher value of $\nu$ implies a lower love of variety, a higher elasticity of substitution and less market power for any individual firm. Within any industry $j > \tau$, the household consumes only the varieties produced in the own country, within an industry $j \leq \tau$, the household consumes all varieties produced in country $H$ and $F$. An increase in $\tau$ implies broader access to foreign varieties and, with love of variety, to an increase in utility. $\mathscr{N}_{ij}$ is the index set of all varieties from industry $j$ which are available for consumption in country $i$. Since the elasticity of substitution between the subutilities $Y_{ij}$ is equal to 1, the household allocates its expenditures equally among the industries. Moreover, since the measure of all industries is equal to 1, this amount equals net income $I_i$.

Each firm in an industry produces one variety with labor according to the following production function with increasing returns to scale

$$x_{kj} = \begin{cases} A(L_{kj} - L^*) & \text{if } L_{kj} \geq L^* \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

where $x_{kj}$ denotes output of firm $k$ in industry $j$ located in country $H$ or $F$, $L_{kj}$ is the input of labor of an individual firm, $A$ denotes labor productivity and $L^*$ the overhead labor needed to run the plant. Because of the fix cost the firms have an incentive to specialize and the number of firms equals the number of varieties. The assumption of monopolistic competition with free firm entry implies

$$p = \frac{w}{A\nu}, \quad x = \frac{AL^*\nu}{(1-\nu)}, \quad n_i = \frac{(1-g_i)\bar{L}_i}{L^*}(1-\nu) \tag{4}$$

[4]The location of production does not matter for the household's optimal consumption choice.

The government employs $g_i\bar{L}_i$ for public good production, $(1-g_i)\bar{L}_i$ remains available for production of private goods. The price $p$ and the quantity per firm $x$ are independent of government activity and equalized between the two countries. However, since the endowment left for the private sector is decisive for the number of firms in the market, an expansion of the public sector reduces the number of active firms.

In order to determine optimal public good provision the indirect utility of the representative household is maximized given the government share in the foreign country.

$$\max_{g_i} \quad \eta\tau \log Y_{i,j\leq\tau}(g_H, g_F) + \eta(1-\tau)\log Y_{i,j>\tau}(g_i) + (1-\eta)\log G_i(g_i) \tag{5}$$

s.t.

$$\begin{aligned} Y_{i,j>\tau}(g_i) &= (n_i(g_i))^{\frac{1}{\nu}}\, x_i \\ Y_{i,j\leq\tau}(g_i, g_{i'}) &= \left(\tfrac{I_i(g_i)+I_{i'}(g_{i'})}{I_i(g_i)}\right)^{\frac{1-\nu}{\nu}} Y_{i,j>\tau}(g_i) \end{aligned} \tag{6}$$

where $I_i(g_i) = n_i p_i x_i$. This optimization problem results in the following first order condition:

$$\underbrace{\eta\tau\frac{1-\nu}{\nu}\left(\frac{1}{1-g_i} - \frac{1}{1-g_i+(1-g_{i'})\bar{L}_{i'}/\bar{L}_i}\right)}_{>0} \underbrace{-\frac{\eta}{\nu}\frac{1}{1-g_i}}_{<0} + \underbrace{(1-\eta)\frac{1}{g_i}}_{>0} = 0 \tag{7}$$

for $i, i' \in \{H, F\}$ and $i \neq i'$.

The third term in equation (7) represents the positive marginal utility of a higher supply of the public good. The second term represents the marginal utility loss due to the crowding out of private firms in tradable and nontradable industries. The first bracket is positive and dampens the negative effect of the second term. This positive effect comes from the fact that domestic public good production affects only the number of domestic firms - not the number of available foreign varieties. Since households have a love for varieties, utility in open industries is higher than in closed ones. Due to the crowding out of domestic firms, the number of domestic relative to foreign varieties decreases which increases the relative utility gain in open industries. This dampening effect is larger the more varieties the country imports (measured by $\tau$). It follows from (7) that the effect of the asymmetry between countries on optimal government share vanishes if $\nu \to 1$. When goods are homogeneous there are no gains from variety. In this case, optimal government share is given by $g = 1 - \eta$, identical for both countries.

Since households have a love of variety ($\nu < 1$), an increase in $\tau$ reduces the national

cost of public good provision. For instance, a decontrol of protected industries or new technologies which make trade more feasible in certain industries may be reflected in an increase in $\tau$. An opening of industries enables access to new varieties and therefore, households' utility increases.

According to equation (7) we can conclude that costs of public good provision are low if the country imports a lot of different varieties ($\tau$ large), the country is relatively small ($\bar{L}_H$ low) and if love of variety is low ($\nu$ large). Since the share of government consumption is higher the smaller the national costs of public good provision, the following holds in equilibrium (applying the implicit function theorem to equation (7)):[5]

$$\frac{\partial g_H}{\partial \tau} > 0 \quad \text{if} \quad \nu < 1 \tag{8}$$

$$\frac{\partial g_H}{\partial \bar{L}_H} < 0 \tag{9}$$

$$\frac{\partial g_H}{\partial \nu} > 0 \, . \tag{10}$$

Further, gains from imported varieties are smaller, the larger the country:

$$\frac{\partial^2 g_H}{\partial \tau \partial \bar{L}_H} < 0 \, . \tag{11}$$

The intuition is as follows: In an open economy there are gains from trade due to the fact that the imported goods are differentiated. The size of the gains from variety determine the national cost of public good provision. If gains from variety are high, optimal public good provision is high since its costs are low. The smaller the country, the larger the gains from trade and therefore, the lower the national cost of public good provision. For a given amount of imported varieties, the national cost of public good provision is lower the smaller the country, since the relative gain from variety through trade is larger.

# 3 Empirical Model and Data

The empirical work attempts to provide evidence on the following hypothesis:

1. The number of imported products has a positive effect on the government share if the imported products are differentiated. (8)

[5] Proofs of these results are found in Hanslin (2008).

2. The positive effect of imported products on the government share is decreasing in country size. (11)

3. A high share of differentiated products implies a low government share. (10)

4. A high GDP implies a low government share. (9)

Although $\tau$ is a bilateral measure for openness, the intuition which drives the result are the welfare gains from new imported varieties. While the hypothesis 1, 2 and 4 should be intuitively clear, hypothesis 3 requires an explanation. Since love of variety is difficult to measure, we need a proxy which is positively correlated with love of variety (LOV). The composition of the consumption basket and therefore also the composition of the imported products provide information for the countries preference. If the share of differentiated on total imported products is large, households value differentiated goods more. This in turn implies that LOV is high.

In view of the above mentioned hypothesis the following equation should be estimated.

$$\begin{aligned} g_{it} =& \beta_1 importdiv_{it} + \beta_2 \left(importdiv_{it} * loggdp_{it}\right) + \\ & \beta_3 diff_{it} + \beta_4 \left(importdiv_{it} * diff_{it}\right) + \\ & \beta_5 loggdp_{it} + \boldsymbol{\beta_6' X_{it}} + \eta_t + \mu_i + \epsilon_{it} \end{aligned} \tag{12}$$

where $i$ indexes countries, $t$ indexes time, $g_{it}$ denotes government consumption as a log share of GDP, $importdiv_{it}$ is the number of different imported products (normalized), $diff_{it}$ is the share of differentiated on total imported products, other time varying potential covariates are included in the vector $X_{it}$, $\eta_t$ are time fixed effects, $\mu_i$ denotes country fixed effects and $\epsilon_{it}$ is the idiosyncratic error term.

In this paper a product is defined on the four-digit level. The measure for import diversity used in this empirical study is the number of different imported products from the rest of the world, normalized by the union of all traded products in the world over time.[6] Let $J_{it}^j = 1$ if country $i$ imports a strictly positive amount of category $j$ in year $t$ and zero otherwise.

$$importdiv_{it} = \frac{\sum_j J_{it}^j}{\sum_i \sum_t \sum_j J_{it}^j}$$

[6]The only reason for the normalization is to obtain a measure lying between zero and one. $importdiv = 1$ implies that a country imports each four-digit product which has been traded at least once between 1964 and 2000 and between any two countries.

$\sum_i \sum_t \sum_j J_{it}^j = 1069$ for the time period 1962 to 2000. The data source for the measure of import diversity is the NBER U.N. trade data by Feenstra et al. (2005) where imports and exports are reported in the Standard International Trade Classification (SITC) code, revision 2, at the four-digit level. The disadvantage of this aggregate four-digit trade flows is that we underestimate the increase in the number of varieties. The advantage of this aggregate level is that it is insensitive against false increases due to splitting of categories. Further, goods on this aggregate level are more differentiated, implying that that gains from varieties should be even higher. If there is evidence for the love of variety effect (LOVE), it should already exist on a more aggregate level.

The share of differentiated imported products is computed using Rauch (1999)'s liberal classification. Rauch (1999) divided commodities into three categories: Differentiated goods, reference priced goods and goods traded on organized exchanges.[7] According to Rauch (1999): "Possession of a reference price distinguishes homogeneous from differentiated products. Homogeneous commodities can be further divided into those whose reference prices are quoted on organized exchanges and those whose reference prices are quoted only in trade publications." Examples of differentiated goods are: newspapers journals, periodicals; spectacles and spectacle frames; footwear; blouses of textile fabrics; telecommunications equipment; cutlery; woven fabrics; fresh or dried figs; non alcoholic beverages; etc. Reference priced goods are, for instance: fresh milk and cream; frozen fish fillet; fresh apples; natural honey; cigarettes; electric current; etc. Broda and Weinstein (2006) provide estimations of the elasticity of substitution for the three commodity groups which are summarized in table 18. They find that the average elasticity of substitution of goods classified as differentiated is much lower than the one of goods traded on organized exchange. Goods classified as reference priced have (on average) a slightly higher elasticity of substitution than differentiated goods and a much lower elasticity than goods traded on organized exchange. It follows that countries with a large share of differentiated goods have on average a lower elasticity of substitution. Based on these elasticities one should not conclude that only goods classified as differentiated are really differentiated and reference priced goods are homogeneous goods. Since the difference between the elasticity of substitution of reference priced goods and differentiated goods is very close, I distinguish between two measures for the share of differentiated imports. The restrictive measure $diff_r$ stands for the share of differentiated commodities while the liberal measure $diff_l$

[7] The share of four-digit products falling into these classification is 55%, 28% and 18% respectively.

for share of differentiated plus the share of reference priced goods. More formal:

$$diff_r = \frac{\sum_j d^j J^j_{it}}{\sum_j J^j_{it}}$$
$$diff_l = \frac{\sum_j (d^j J^j_{it} + r^j J^j_{it})}{\sum_j J^j_{it}}$$

where $d^j = 1$ ($r^j = 1$) if the $J^j$ category is classified by Rauch as differentiated (reference priced) and equal to zero otherwise. Figure 3 plots the distributions of the two measures over time.

Following the previous studies on openness and government spending, as for instance Rodrik (1998) and Epifani and Gancia (2008), the measure for government size is government consumption as a share of GDP from Heston et al. (2006) (Penn World Tables 6.2, henceforth PWT).[8] Figure 1 plots the unweighted sample means of the share of government consumption over time for OECD and non OECD countries separately. A few things stand out. The share of government consumption is much lower in the OECD subsample. The peak around 1993 in the OECD subsample is due to Czech Republic, Hungary, Poland and Slovak Republic. The jump in 1970 in the non OECD sample is mainly due to the high government share of countries for which data on the government spending is only available for 1970 and onwards.

Real GDP is measured in purchasing power parity (PPP) dollars at 2000 prices (Laspeyres), drawn from PWT. Potential time varying covariates included in the vector $X_{it}$ are on the one hand population and the widely used measure for trade openness (export plus import as a share of real GDP in constant prices), also drawn from PWT. All the variables mentioned so far are in logs and according to the previous literature trade openness is lagged one period to reduce the endogeneity problem. Further potential covariates for which it is controlled for are the political regime (*polity2* from the Polity IV dataset), dependency ratio (*depend*) to control for demographic characteristics, urbanization rate (*urban*) and whether the country was affected or involved in violence and wars (*war*). The *polity2* is an composite Polity index which ranges from -10 (hereditary monarchy) to 10 (consolidated democracy). It is the difference between the Polity Democracy index and the Polity Autocracy index (both ranging from zero to ten). The dependency ratio, which is the share of population below 15 and beyond 64, relative to the population between 15

[8] According to Rodrik (1998) this measure includes only government consumption and no public investments or income transfers.

and 64, is constructed using World Development Indicators from World Bank (henceforth WDI). The urbanization rate (the share of population living in urban areas) is also drawn from WDI. The measure for violence/war is ACTOTAL from Major Episodes of Political Violence (MEPV) and conflict regions which ranges from zero (no violence) to ten. This composite index consists of international violence and war, civil violence and war and ethnic violence and war.[9]

The unbalanced panel data covers 156 countries (the full list is reported in Appendix B) of a time span from 1964 to 2000. Unfortunately, there is a change in reporting trade flows in the World Trade Data between 1983 and 1984. After 1984 trade flows below \$100'000 per year were not reported in the original data from United Nations. However, Feenstra et al. (2005) indicate that some adjustments had been made for these low valued trade flows. This break can be seen clearly in figure 2, where the distribution of the variable *importdiv* is plotted over time. The difference between the OECD and non OECD countries is distinct. While the sample average among OECD increased after 1983 it dropped for non OECD. Further the distribution for non OECD after 1983 is much broader than it is before, especially there is a much longer tail at the bottom. This indicates that for many developing countries a lot of low valued trade flows were not reported and therefore, the number of imported varieties is underestimated for many countries. The distribution for the OECD sample has increased only slightly. However, beside that the data source changed, I do not have a good explanation why the average of imported products increased significantly in 1984. If this structural break in *importdiv* is only a level effect we correctly control for it with the inclusion of time dummies. However, this figure suggests that it seems wise to look at the different time and country sample separately.

All variables are computed as four year averages, except the last period which covers five years. Hence, there are five periods from 1964 until 1983 and four periods from 1984 to 2000. Table 1 provides descriptive statistics (sample means, standard deviations and extreme values) of the variables, separately for OECD and non OECD and the two time periods.

[9]In order to obtain an idea for the dimension of this measure, United States, for instance, have an ACTOTAL equal to 2 in the years 2003 and 2004.

# 4 Regressions

According to the theoretical model we have the following predictions on the coefficients in equation (12). We expect $\beta_1$ to be positive if we do not include the interaction term $importdiv*diff$. However, if we include the interaction term, $\beta_1$ should not be significantly different from zero while $\beta_4$ should be positively significant. The reason is, that import of new varieties does only bring gains from trade if the goods are differentiated. And the more so, the more differentiated the varieties. $\beta_2$ is expected to be negative, since the gains from variety should decrease in the country size.[10] The sign of $\beta_3$ is also expected to be negative. The share of differentiated goods in the import basket implies that differentiated varieties are more important. Therefore, I expect that the share of differentiated products is positively correlated with the love of variety and a high love of variety implies a that there are high national cost of public good provision.

Table 2 presents some first regression results for the whole country sample. In addition to time dummies, the dummy variable *oecd*after84* allows for different structural breaks between the two country groups (as suggested by figure 2). Further, in all columns it is controlled for country size and level of development, that is log GDP and log population.[11] GDP is negatively and log of population positively significant, implying GDP per capita is negatively significant.

In the first column the number of imported varieties is insignificantly different from zero. Including the interaction term of *importdiv* with log GDP in column (2), increases the effect of *importdiv* to 1.9 while the interaction term is negative. Both variables are highly significant. The interpretation of this result is in line of the above constructed hypothesis. An increase in the number of imported varieties increases the government share. However, this increase is lower, the larger the country. In column (3) and (5), the shares of differentiated imports (the restrictive and liberal measure respectively) is included controlling for the love of variety. In both column it is negative and significant at the 5% and 10% level respectively. The negative sign is also in line with the theoretical

[10] Existing theories about how country size may affect the share of government consumption is manifold. Assuming that the public good is a normal good we should expect it to increase with GDP. According to Wagner's law the government share should increase as the economy develops. According to Alesina and Spolaore (1997) larger countries have a smaller government share due to economies of scale in public good provision. In another paper Alesina et al. (2000) argue that country size and openness to trade is negatively correlated since large countries - in contrast to small countries - can 'afford' to be closed. Empirical evidence for these hypothesis is given in Alesina and Wacziarg (1998) where it is shown that the share of government consumption is smaller in larger countries and that small countries tend to be more open to trade.

[11] Note that since GDP and population enter in logs, controlling for log GDP per capita is redundant.

model and the hypothesis mentioned above. Further, in columns (4) and (6) the interaction term of *importdiv* with $diff_r$ and $diff_l$ respectively is included. Against the hypothesis the interaction terms are negative. However, *importdiv* increases from 1.9 (2.1) to 4.4 (6.0) implying that there might be a problem of multicollinearity. Note that the interaction terms are highly correlated with the levels ($> 0.9$). In sum the effect of an increase in *importdiv* is still positive.

The lower panel of table 2 shows the results with a full set of control variables. The results of the main measures of interest do not change much. Similar to the findings of others (e.g., Rodrik (1998), Alesina and Wacziarg (1998), Epifani and Gancia (2008)) *lagopenness* is significantly positive. The variables *polity*2, *depend* and *urban* are not significantly different from zero (results not reported). The violence/war index is positively correlated with the share of government consumption.

Table 2 reports the baseline regression including OECD and non OECD countries. However, the data quality within and between these two country groups may differ substantially. It is apparent from figure 2 that not only the pattern over time for the number of imported products is very different for the two country samples, but also that within group heterogeneity is much higher in the non OECD sample. Since the OECD country group is much more homogeneous and on average data is more reliable, it might be sensible to look at the two country groups separately.

Table 3 reports a first set of regressions for the OECD sample according to (12) including some but not all controls. In column (1) to (5), the main measures of interest have the expected sign according to the hypothesis derived from the model. In column (6) *importdiv* gets negatively significant at the 5% level. In sum however, the effect of an increase in *importdiv* is still positive for the average country. As table 4 shows, the results and robustness depend on the controls included in the regression.

In contrast to the finding of many authors that trade openness (export plus import as a share of GDP) has a positive effect on government size, for the OECD countries this seems not to be the case. For OECD countries lagged openness is negatively significant at the 1% level.[12] Since in table 2 lagged openness is positive and in table 3 negative, the

[12]Rodrik (1998) already found the different pattern between richer and poorer countries. Rodrik (1998) argues that the positive relation between trade openness and government spending is due to the external risk. According to Rodrik (1998) developed countries react with an increase in public employment and work programs, which is reflected in an increase in government consumption. However, developed countries have social welfare programs. Since social security is not included in the measure for government consumption from PWT, we should not necessarily find an effect there.

positive effect is driven by non OECD countries.

How we should deal with the structural break in the explanatory variables is not that obvious. Including time dummies is clearly a necessary procedure. However, if the change in reporting trade is country specific, the country fixed effect in the early period is different than it is for the second period. The tables 5 and 6 report the results if we allow the country fixed effect to change between the two periods.[13] This procedure doubles the numbers of groups. A country's observations before and after 1984 are considered as observations from two different countries. However, standard errors are clustered by country. An argument for a change in country fixed effects might be that censoring trade flows below $100'000 affects small countries differently than large countries. Table 5 does not control for additional covariates. In contrast to table 4 *loggdp* is not significantly negative anymore. Column (2) in table 5 implies that an increase of import variety has a positive effect on government consumption for the average country. However, for large countries the overall effect would be negative. In column (4), $diff_r$ and the interaction term $importdiv * diff_r$ are included. *importdiv* gets insignificant and the interaction term is positive and highly significant. This means that the positive effect of imported varieties especially works if goods are differentiated. If the share of differentiated goods in the imported good basket increases, implying that love of variety increases, government consumption decreases. Columns (5) and (6) shows the same specification as in (3) and (4) with $diff_l$ instead of $diff_r$. In column (6) the effects are even stronger. The positive effect of an increase in imported varieties does not only have a positive effect on government consumption for the average country but also for the largest country in the sample ($\frac{\partial g}{\partial importdiv} = -0.475 * loggdp + 22.7 * diff_l$).

The estimation is quite robust with respect to the inclusion of further controls (table 6). Overall (except $diff_r$ in column (3)) the effects are slightly smaller but mostly keep their expected sign and do not lose significance. Quite the contrary, some even gain in significance (especially $diff_r$ and $diff_l$). In column (4) *importdiv* is still positively significant (at 5% level), despite the inclusion of the interaction term $importdiv * diff_r$. It can be argued that since $diff_r$ does not take into account all differentiated products, there are still differentiated products captured in *importdiv*. In column (6) *importdiv*

[13] Consider a fixed effects estimation of $y_{it} = \beta x_{it} + c_i + D_{84} + u_{it}$, where $D_{84}$ is a dummy equal to zero for the first period and equal to one for the second period and $c_i$ is a country fixed effect. It follows that $E(y_{it}|\beta x_{it}, c_i, D_{84}) = \beta x_{it} + c_i + D_{84}$. If a structural break in the explanatory variable $x_{it}$ is country specific, $D_{84}$ insufficiently accounts for the break in $x_{it}$. In order to account correctly for country specific breaks, the country fixed effects should be interacted with the period dummy.

gets negatively significant, correcting somehow for what $importdiv * diff_l$ overstates the effect of differentiated imported varieties. The interaction terms are very interesting from a theoretical point of view. Empirically, however, it incorporates some problems of multicollinearity.[14] Comparing the interaction term $importdiv * loggdp$ and $diff$ in table 4 with tables 5, 6 the specification for allowing fixed effects to be different for the two periods yields much more robust results with respect to the inclusion of controls.

The results so far are quite convincing that the LOVE exists in the data. Nevertheless, the sources of trade data for the two periods are different and low valued trade flows below \$100'000 are not reported in the later period. In the early sample no censoring has taken place. A closer look on the early sample seems appropriate. Table 7 and 8 provide estimation results for the OECD sample and the period from 1964 to 1983. In table 7 results without further controls are shown. The estimated coefficients are quite similar to the regression in table 5. The results are robust with respect to further controls as it can be seen in table 8. While in column (3) $importdiv$ is significant at 5% level, in column (6) $importdiv$ is still significant. We may argue that the interaction term $importdiv * diff_r$ does not capture all differentiated products and therefore $importdiv$ stays significant. Since the $diff_l$ is a less restrictive measure of differentiated products, $importdiv * diff_l$ captures a broader set of differentiated imports.

In column (6), table 8, the effect of $importdiv$ on the share of government consumption is positive for each country. $\frac{\partial g}{\partial importdiv} = -0.33 * loggdp + 14.07 * diff_l$ is positive even for the largest country ($loggdp = 22.36$) and lowest value of $diff_l = 0.786$ in the data. For average country the effect of an increase in imported varieties is equal to $\frac{\partial g}{\partial importdiv} = 5.8$. An increase of 1 percentage point in $diff_l$ (e.g. from 0.8 to 0.81) implies (for the average country) an increase in $g$ of about one percentage point.

Results for the late OECD sample (table 9) do provide no support for the hypothesis. The estimated coefficients and standard errors are quite large indicating that either the problem of multicollinearity is severe or/and data is much more volatile.

Finally, the non OECD country sample is examined. The data among non OECD countries is much more volatile. Separate regressions for the two time periods leads to insignificant estimators.[15] The number of observations is too low for the degree of volatility. Therefore, only results for the whole time span are reported. Analog to the OECD

[14] We should always have in mind, that multicollinearity between the explanatory variables is large. Especially between $importdiv$, $importdiv * diff$ and $importdiv * loggdp$.

[15] Results not reported.

sample the first regression shows results with constant country fixed effects (table 10) and the second allows the country fixed effects to be different between the two periods (11). Although in table 11 the signs of the coefficients are "correct", they are not significant.

The results so far indicate that for the OECD countries the love of variety effect on government consumption may exist. In order to minimize the possibility that these findings are a coincidence and a consequence of certain specifications, the next section presents various robustness checks, especially for the early OECD sample.

# 5 Robustness

**Log specification**

Whether one should logarithmize or not is often a difficult question. However, one should be aware that with taking logs one imposes some functional form and results may depend upon taking logs. Rodrik (1998) logarithmized all shares and found a positive relationship between lagged openness and government consumption. Alesina and Wacziarg (1998) replicated Rodrik's regression with and without logarithmized government share and with a more or less similar country sample. They find that openness is significantly positive with log ratios, however it is not significant without log ratios. My motivation of using log government shares originated from the symmetric Nash equilibrium of the governments. Solving equation (7) for two symmetric countries ($\bar{L}_H = \bar{L}_F$), the shares in both countries is identical and equal to

$$g = \frac{1-\eta}{1+\eta\frac{1-\nu}{\nu}(1-\tau/2)} \ .$$

Taking logs of both sides we obtain

$$\log g = \log(1-\eta) - \log(1+\eta\frac{1-\nu}{\nu}(1-\tau/2))$$

For realistic values of the elasticity of substitution ($\sigma > 2$, i.e. $\nu > 0.5$) the expression $(\eta\frac{1-\nu}{\nu}(1-\tau/2))$ is small and therefore, the following equation holds approximately:

$$\log g \approx \log(1-\eta) - \eta\frac{1-\nu}{\nu} + \eta\frac{1-\nu}{\nu}\tau/2$$

.

However, in view of the different findings depending on taking logs mentioned above,

it is reasonable to check for robustness of this log specification. Table 12 provides the results and confirms that the log specification does not drive the results. If we compare the estimations for the variables in bold, they keep their expected sign and are highly significant. Note however, that lagged openness is now insignificantly different from zero while it is significantly negative under the log specification.

**Dynamic panel estimation**

One may argue that the share of government consumption reacts rather slowly on changes in the economic environment and therefore past realizations of the dependent variable may affect its current level. In order to capture this persistence a lagged value of government consumption is included on the right-hand side of the estimation equation.[16] Table 13 shows the results with Arellano and Bond's GMM estimator for the early OECD sample. There seems to be some persistence in government consumption. The coefficient on lagged government share is around 0.3 and significant at the 5% level. The estimations of the main measures are strongly robust and do not lose their significance. Note, however, that in contrast to table 7 *lagopenness* has lost its significance.

**Alternative measure for** *importdiv*

Further, we may argue that only counting the number of different products imported from the rest of the world is biased towards counting too few products. There might be also gains from consuming both German and Italian cars. An alternative to the *importdiv* measure used so far is to distinguish between the countries of origin as well. Column (1) to (3) in table 14 show the results with this alternative measure which counts a good manifold if classified as differentiated by Rauch (1999). For example, the product category "passenger motor cars, for transport of passengers and goods" is classified as differentiated. If a country imports cars from Germany and Italy, the product category "passenger motor cars, for transport of passengers and goods" is counted twice. Finally this new measure is logarithmized.[17] Hence, the coefficient on *importdiv* can be interpreted as an elasticity. According to column (1) a 1% increase in imported varieties implies a 0.1% increase in the share of government consumption for the average country. For the smallest country in

[16] In order not to loose observations through the introduction of the lag, the first observation for government consumption is the average between 1960-1963.

[17] The mean of this new measure is equal to 8.36, standard deviation is 0.51, min and max are equal to 6.88 and 9.36 respectively (these figures are for the OECD sample and the early period).

the sample, a 1% increase in imported varieties would even increase the share of government consumption by approximately 0.5%. Since this new measure already accounts for differentiated goods, the interaction term $importdiv * diff$ is, due to a multicollinearity problem, not included in the regression.[18]

**Alternative measure for** $diff$

Using the share of differentiated imports is one alternative to proxy the love of variety. According to Dixit-Stiglitz, the love of variety is inversely related to the elasticity of substitution. Since there is literature providing estimations of the elasticity of substitution (see Broda and Weinstein, 2006), we may take use of them. Consider the following inverse of a weighted elasticity of substitution:

$$lov_{it} = \left( s_{it}^{d} \sigma^{d} + s_{it}^{r} \sigma^{r} + (1 - s_{it}^{d} - s_{it}^{r}) \sigma^{h} \right)^{-1}$$

where $s_{it}^{d}$ ($\sigma^{d}$) denotes the share (elasticity) of differentiated goods and $s_{it}^{r}$ ($\sigma^{r}$) the share (elasticity) of reference priced goods and $\sigma^{h}$ the elasticity of homogeneous goods. For the elasticity of substitution, the average of the two periods provided in table 18 is taken, that is $\sigma^{d} = 4.95$, $\sigma^{r} = 6.85$ and $\sigma^{h} = 13.45$. As we would expect, the correlations between the two $diff$ measures and $lov$ are very high: $corr(lov, diff_{r}) = 0.91$ and $corr(lov, diff_{l}) = 0.89$.

The regression results for this alternative proxy for the love of variety are found in table 14 column (4). Again, the results are extremely robust. While *importdiv* is not significantly different from zero, its interaction term with *loggdp* is negatively significant and its interaction term with $lov$ is positively significant. The new proxy $lov$ itself is negatively significant.

**Yearly data**

In order to exclude the possibility that the results depend on averaging the data, the last three columns in table 14 provide the results with yearly data including all controls. Concerning the significance the results are extremely robust. However, the magnitude of the estimated effects differs slightly if we compare them with the results in table 7.

[18] If the interaction term $importdiv * diff$ is included, the estimations of the main variables of interest (in bold) become insignificant.

# 6 Conclusion

To be done.

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# A Appendix

Figure 1

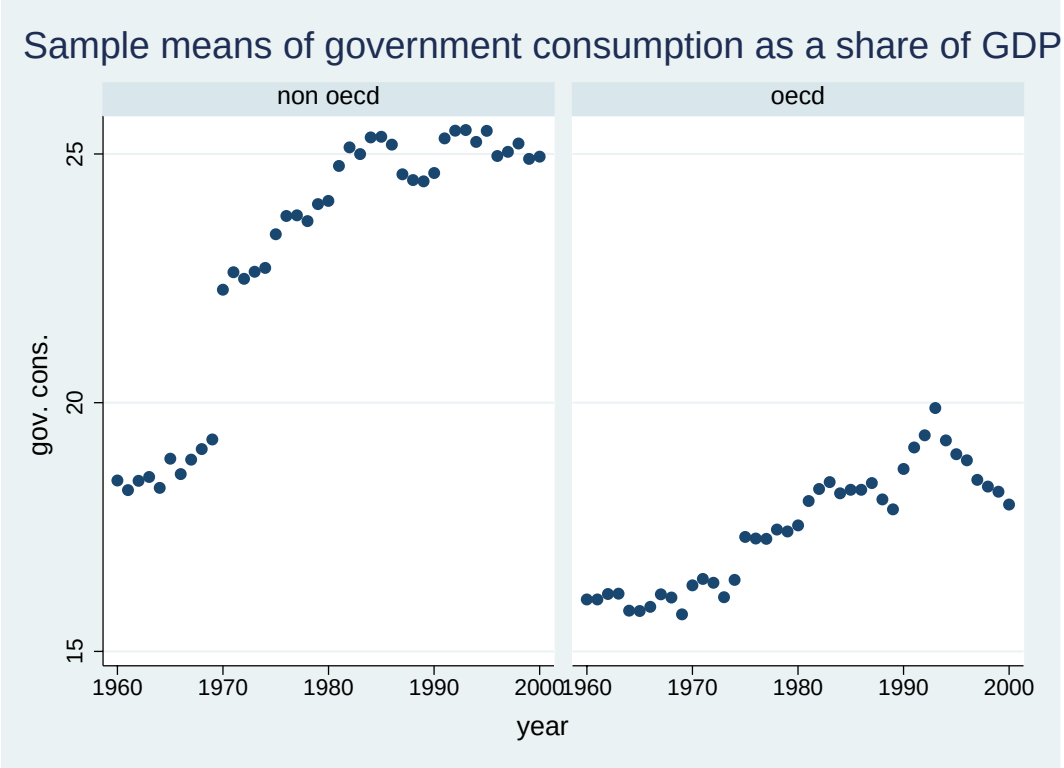
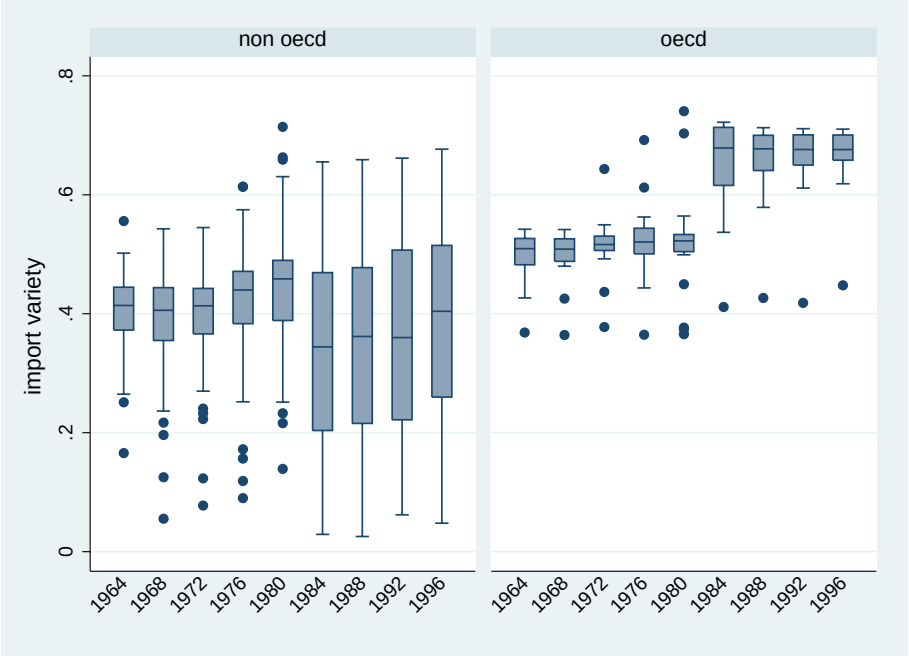


Figure 2: Distribution of *impordiv*




1964 refers to the time period 1964-1967, 1968 to 1968-1971 and so on. 50% of the distribution are within the box, the whiskers and adjacent lines comprise the lower and upper adjacent value and the data points are outlayers. The lowest outlayers within the OECD sample are Turkey (1964 to 1983) and Iceland (1984 to 2000).

Figure 3: Distribution of $diff_r$ and $diff_l$

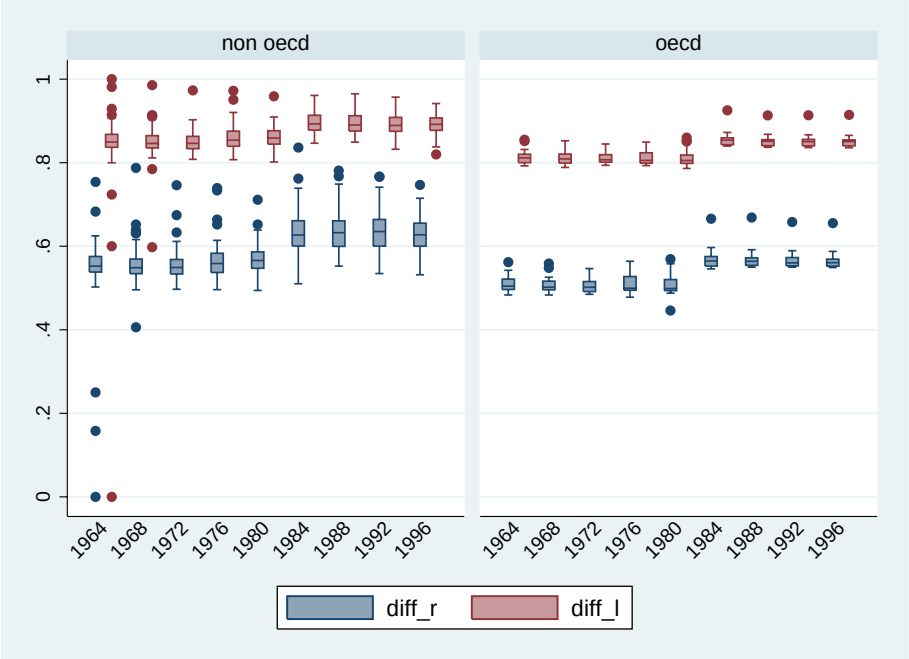


Table 1: Sample descriptive statistics

| | | non OECD | | OECD | |
|---|---|---|---|---|---|
| | | <1984 | ≥1984 | <1984 | ≥1984 |
| $g$ | mean (std) | 2.96 (0.49) | 3.08 (0.46) | 2.80 (0.27) | 2.89 (0.29) |
| | [min,max] | [1.60,4.23] | [1.38,4.35] | [1.95,3.44] | [2.04,3.57] |
| $importdiv$ | mean (std) | 0.41 (0.09) | 0.36 (0.16) | 0.51 (0.05) | 0.66 (0.06) |
| | [min,max] | [0.06,0.71] | [0.03,0.68] | [0.35,0.74] | [0.41,0.72] |
| $diff_r$ | mean (std) | 0.56 (0.04) | 0.63 (0.05) | 0.51 (0.02) | 0.57 (0.02) |
| | [min,max] | [0.49,0.79] | [0.51,0.84] | [0.45,0.57] | [0.55,0.67] |
| $diff_l$ | mean (std) | 0.85 (0.03) | 0.89 (0.02) | 0.81 (0.02) | 0.85 (0.02) |
| | [min,max] | [0.78,0.99] | [0.82,0.97] | [0.79,0.86] | [0.84,0.93] |
| $loggdp$ | mean (std) | 16.30 (1.70) | 16.69 (1.78) | 18.93 (1.43) | 19.42 (1.43) |
| | [min,max] | [11.26,20.72] | [11.28, 21.57] | [14.56,22.36] | [15.42,22.92] |
| $logpop$ | mean (std) | 8.40 (1.83) | 8.65 (1.81) | 9.60 (1.42) | 9.74 (1.41) |
| | [min,max] | [3.78,13.82] | [3.67,13.79] | [5.26,12.37] | [5.49,12.54] |
| $polity2$ | mean (std) | -3.49 (6.29) | -0.52 (6.52) | 6.35 (6.47) | 8.48 (3.72) |
| | [min,max] | [-10,10] | [-10,10] | [-9,10] | [-7,10] |
| $depend$ | mean (std) | 0.86 (0.14) | 0.77 (0.18) | .60 (0.11) | 0.51 (0.06) |
| | [min,max] | [0.42,1.15] | [0.38,1.17] | [0.46,1.03] | [.40,.84] |
| $urban$ | mean (std) | 37.33 (23.54) | 46.19 (23.67) | 67.69 (16.58) | 73.40 (12.56) |
| | [min,max] | [2.31,100] | [5.04,100] | [24.13,95.61] | [38.20,97.19] |
| $war$ | mean (std) | 0.93 (1.93) | 1.23 (2.30) | 0.22 (0.68) | 0.18 (0.67) |
| | [min,max] | [0.00,14.00 | [0.00,14.00] | [0.00,3.75] | [0.00,4.00] |
| $lagopenness$ | mean (std) | 3.95 (0.76) | 4.09 (0.72) | 3.33 (0.63) | 3.76 (0.54) |
| | [min,max] | [1.95,6.41] | [1.42,6.44] | (1.73,4.66) | [2.52,4.93] |

Table 2: All countries: 1964-2000

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | 0.163 | 1.934*** | 1.941*** | 4.366*** | 2.145*** | 6.040*** |
| | (0.115) | (0.642) | (0.638) | (1.208) | (0.641) | (2.251) |
| **importdiv*loggdp** | | -0.106*** | -0.111*** | -0.139*** | -0.117*** | -0.135*** |
| | | (0.038) | (0.038) | (0.039) | (0.037) | (0.039) |
| **diff**$_r$ | | | -0.775** | 0.047 | | |
| | | | (0.322) | (0.443) | | |
| **importdiv*diff**$_r$ | | | | -3.121** | | |
| | | | | (1.339) | | |
| **diff**$_l$ | | | | | -0.797* | 0.444 |
| | | | | | (0.464) | (0.813) |
| **importdiv*diff**$_l$ | | | | | | -4.019* |
| | | | | | | (2.219) |
| loggdp | -0.201*** | -0.162*** | -0.156*** | -0.153*** | -0.160*** | -0.163*** |
| | (0.042) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) |
| logpop | 0.262*** | 0.248*** | 0.254*** | 0.250*** | 0.253*** | 0.253*** |
| | (0.072) | (0.073) | (0.073) | (0.074) | (0.073) | (0.073) |
| oecd*after84 | 0.032 | 0.063* | 0.074** | 0.073** | 0.066* | 0.062* |
| | (0.033) | (0.034) | (0.035) | (0.035) | (0.034) | (0.035) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 |
| # countries | 156 | 156 | 156 | 156 | 156 | 156 |
| $R^2$ | 0.141 | 0.148 | 0.154 | 0.159 | 0.151 | 0.154 |
| Including a full set of controls (results for *depend*, *polity*2 and *urban* not reported) | | | | | | |
| **importdiv** | 0.155 | 2.727*** | 2.566*** | 5.940*** | 2.743*** | 9.129*** |
| | (0.132) | (0.848) | (0.862) | (1.582) | (0.840) | (2.887) |
| **importdiv*loggdp** | | -0.151*** | -0.145*** | -0.191*** | -0.152*** | -0.190*** |
| | | (0.049) | (0.049) | (0.053) | (0.048) | (0.052) |
| **diff**$_r$ | | | -0.651* | 0.441 | | |
| | | | (0.361) | (0.478) | | |
| **importdiv*diff**$_r$ | | | | -4.078*** | | |
| | | | | (1.546) | | |
| **diff**$_l$ | | | | | -0.084 | 1.974** |
| | | | | | (0.521) | (0.961) |
| **importdiv*diff**$_l$ | | | | | | -6.372** |
| | | | | | | (2.642) |
| loggdp | -0.229*** | -0.172*** | -0.165*** | -0.162*** | -0.172*** | -0.180*** |
| | (0.053) | (0.054) | (0.055) | (0.054) | (0.054) | (0.053) |
| logpop | 0.328*** | 0.307*** | 0.305*** | 0.296*** | 0.307*** | 0.302*** |
| | (0.097) | (0.098) | (0.098) | (0.099) | (0.098) | (0.100) |
| oecd*after84 | 0.005 | 0.047 | 0.049 | 0.047 | 0.047 | 0.038 |
| | (0.038) | (0.038) | (0.038) | (0.038) | (0.038) | (0.039) |
| war | 0.016*** | 0.016*** | 0.016*** | 0.015*** | 0.016*** | 0.015*** |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| lagopenness | 0.095*** | 0.099*** | 0.095*** | 0.080*** | 0.099*** | 0.086*** |
| | (0.028) | (0.028) | (0.028) | (0.029) | (0.029) | (0.030) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 987 | 987 | 987 | 987 | 987 | 987 |
| # countries | 140 | 140 | 140 | 140 | 140 | 140 |
| $R^2$ | 0.176 | 0.186 | 0.191 | 0.198 | 0.186 | 0.193 |

Notes: Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: OECD, 1964-2000

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | 0.009 | 4.236*** | 4.475*** | -1.929 | -0.590 | -10.640** |
| | (0.240) | (1.504) | (1.494) | (1.978) | (1.932) | (4.888) |
| **importdiv*loggdp** | | -0.209*** | -0.215*** | -0.192** | -0.232*** | -0.177*** |
| | | (0.077) | (0.077) | (0.074) | (0.073) | (0.067) |
| **diff**$_r$ | | | -0.661 | -6.135*** | -5.897*** | |
| | | | (0.575) | (1.664) | (1.718) | |
| **importdiv*diff**$_r$ | | | | 10.913*** | 9.988*** | |
| | | | | (3.071) | (3.022) | |
| **diff**$_l$ | | | | | | -10.685*** |
| | | | | | | (3.479) |
| **importdiv*diff**$_l$ | | | | | | 17.269*** |
| | | | | | | (5.762) |
| loggdp | -0.376*** | -0.246*** | -0.242*** | -0.248*** | -0.163* | -0.191** |
| | (0.055) | (0.079) | (0.079) | (0.078) | (0.084) | (0.081) |
| logpop | 0.818*** | 0.807*** | 0.780*** | 0.763*** | 0.642*** | 0.578*** |
| | (0.146) | (0.137) | (0.128) | (0.124) | (0.129) | (0.135) |
| polity2 | 0.012*** | 0.011*** | 0.011*** | 0.011*** | 0.013*** | 0.013*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| depend | 0.498*** | 0.541*** | 0.572*** | 0.551*** | 0.412** | 0.407** |
| | (0.169) | (0.167) | (0.172) | (0.170) | (0.165) | (0.163) |
| lagopenness | | | | | -0.145*** | -0.144*** |
| | | | | | (0.045) | (0.046) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 234 | 234 | 234 | 234 | 229 | 229 |
| # countries | 28 | 28 | 28 | 28 | 28 | 28 |
| $R^2$ | 0.480 | 0.515 | 0.518 | 0.533 | 0.584 | 0.590 |

Notes: Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: OECD, 1964-2000

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | 4.573* | -4.698** | -3.240* | 7.138 | -13.580*** | -10.630*** |
| | (2.336) | (1.831) | (1.800) | (4.458) | (3.799) | (3.613) |
| **importdiv*loggdp** | -0.250*** | 0.013 | -0.015 | -0.263*** | 0.046 | 0.015 |
| | (0.079) | (0.066) | (0.068) | (0.080) | (0.063) | (0.064) |
| **diff**$_r$ | 0.681 | -4.275*** | -3.662*** | | | |
| | (1.604) | (1.314) | (1.280) | | | |
| **importdiv*diff**$_r$ | 0.082 | 8.449*** | 6.842*** | | | |
| | (3.374) | (2.388) | (2.306) | | | |
| **diff**$_l$ | | | | 1.547 | -8.352*** | -6.976*** |
| | | | | (2.555) | (2.467) | (2.453) |
| **importdiv*diff**$_l$ | | | | -2.639 | 15.377*** | 12.577*** |
| | | | | (4.983) | (4.256) | (4.124) |
| loggdp | -0.257** | -0.566*** | -0.503*** | -0.254** | -0.576*** | -0.517*** |
| | (0.103) | (0.072) | (0.074) | (0.105) | (0.071) | (0.073) |
| logpop | 0.693*** | 0.670*** | 0.516*** | 0.674*** | 0.629*** | 0.487*** |
| | (0.142) | (0.120) | (0.114) | (0.144) | (0.121) | (0.115) |
| depend | | 0.548*** | 0.379*** | | 0.554*** | 0.378*** |
| | | (0.158) | (0.142) | | (0.158) | (0.142) |
| polity2 | | 0.009*** | 0.010*** | | 0.009*** | 0.010*** |
| | | (0.002) | (0.002) | | (0.002) | (0.002) |
| urban | | 0.011*** | 0.012*** | | 0.011*** | 0.012*** |
| | | (0.002) | (0.001) | | (0.002) | (0.001) |
| war | | 0.052*** | 0.052*** | | 0.051** | 0.051** |
| | | (0.020) | (0.020) | | (0.020) | (0.020) |
| lagopenness | | | -0.169*** | | | -0.165*** |
| | | | (0.038) | | | (0.038) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 243 | 234 | 229 | 243 | 234 | 229 |
| # countries | 29 | 28 | 28 | 29 | 28 | 28 |
| $R^2$ | 0.389 | 0.638 | 0.705 | 0.384 | 0.642 | 0.707 |

Notes: Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: OECD, 1964-2000
Country fixed effects are allowed to be different for the two periods

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | -0.106 | 12.824*** | 11.818*** | 5.356 | 10.475** | -9.226 |
| | (0.537) | (3.705) | (3.680) | (3.902) | (3.975) | (5.629) |
| **importdiv*loggdp** | | -0.638*** | -0.575*** | -0.650*** | -0.507** | -0.475*** |
| | | (0.175) | (0.176) | (0.150) | (0.192) | (0.154) |
| **diff**$_r$ | | | -1.383 | -7.864*** | | |
| | | | (0.904) | (1.782) | | |
| **importdiv*diff**$_r$ | | | | 14.444*** | | |
| | | | | (4.221) | | |
| **diff**$_l$ | | | | | -2.146* | -13.627*** |
| | | | | | (1.181) | (2.338) |
| **importdiv*diff**$_l$ | | | | | | 22.724*** |
| | | | | | | (5.162) |
| loggdp | -0.245* | 0.027 | -0.012 | 0.039 | -0.064 | -0.055 |
| | (0.121) | (0.145) | (0.158) | (0.136) | (0.176) | (0.148) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 243 | 243 | 243 | 243 | 243 | 243 |
| # groups | 55 | 55 | 55 | 55 | 55 | 55 |
| $R^2$ | 0.281 | 0.409 | 0.422 | 0.460 | 0.425 | 0.473 |

Notes: Robust standard errors clustered by countries in parentheses. Fixed effects interacted with period.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: OECD, 1964-2000
Country fixed effects are allowed to be different for the two periods

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | -0.223 | 8.659*** | 7.851*** | 4.599** | 6.823*** | -6.133** |
| | (0.229) | (2.628) | (2.107) | (2.053) | (2.435) | (2.913) |
| **importdiv*loggdp** | | -0.444*** | -0.384*** | -0.503*** | -0.337*** | -0.360*** |
| | | (0.125) | (0.103) | (0.083) | (0.118) | (0.080) |
| **diff**$_r$ | | | -1.582*** | -6.412*** | | |
| | | | (0.489) | (0.803) | | |
| **importdiv*diff**$_r$ | | | | 10.389*** | | |
| | | | | (2.049) | | |
| **diff**$_l$ | | | | | -1.761** | -10.239*** |
| | | | | | (0.848) | (1.389) |
| **importdiv*diff**$_l$ | | | | | | 16.161*** |
| | | | | | | (3.123) |
| loggdp | -0.382*** | -0.132 | -0.147 | -0.050 | -0.199* | -0.138 |
| | (0.084) | (0.103) | (0.087) | (0.081) | (0.115) | (0.094) |
| logpop | 0.457** | 0.438** | 0.363* | 0.233 | 0.385* | 0.236 |
| | (0.205) | (0.204) | (0.182) | (0.181) | (0.190) | (0.180) |
| depend | 0.131 | 0.167 | 0.282 | 0.252 | 0.252 | 0.271 |
| | (0.287) | (0.251) | (0.245) | (0.232) | (0.264) | (0.250) |
| polity2 | 0.008*** | 0.008*** | 0.008*** | 0.008*** | 0.008*** | 0.008*** |
| | (0.002) | (0.002) | (0.002) | (0.001) | (0.002) | (0.002) |
| urban | 0.012*** | 0.010*** | 0.010*** | 0.009*** | 0.010*** | 0.009*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| war | 0.032* | 0.004 | 0.007 | 0.005 | 0.005 | 0.005 |
| | (0.018) | (0.012) | (0.011) | (0.012) | (0.012) | (0.013) |
| lagopenness | -0.199*** | -0.208*** | -0.218*** | -0.225*** | -0.211*** | -0.213*** |
| | (0.049) | (0.053) | (0.041) | (0.034) | (0.045) | (0.035) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 229 | 229 | 229 | 229 | 229 | 229 |
| # groups | 53 | 53 | 53 | 53 | 53 | 53 |
| $R^2$ | 0.653 | 0.689 | 0.702 | 0.719 | 0.698 | 0.718 |

Notes: Robust standard errors clustered by countries in parentheses. Fixed effects interacted with period.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: OECD, 1964-1983

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | -0.337 | 13.827*** | 12.733*** | 6.521** | 10.492** | -9.202* |
| | (0.402) | (3.174) | (2.981) | (2.524) | (4.163) | (5.025) |
| **importdiv*loggdp** | | -0.688*** | -0.619*** | -0.866*** | -0.507** | -0.634*** |
| | | (0.144) | (0.140) | (0.129) | (0.203) | (0.166) |
| **diff**$_r$ | | | -1.539 | -10.247*** | | |
| | | | (0.963) | (1.891) | | |
| **importdiv*diff**$_r$ | | | | 20.364*** | | |
| | | | | (4.790) | | |
| **diff**$_l$ | | | | | -2.382 | -15.016*** |
| | | | | | (1.563) | (3.153) |
| **importdiv*diff**$_l$ | | | | | | 26.536*** |
| | | | | | | (6.774) |
| loggdp | -0.157 | 0.005 | -0.025 | 0.059 | -0.073 | -0.035 |
| | (0.130) | (0.133) | (0.138) | (0.115) | (0.143) | (0.123) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 132 | 132 | 132 | 132 | 132 | 132 |
| # countries | 27 | 27 | 27 | 27 | 27 | 27 |
| $R^2$ | 0.279 | 0.426 | 0.444 | 0.514 | 0.445 | 0.515 |

Notes: Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: OECD, 1964-1983

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | 6.895*** | 7.546*** | 5.493** | -3.442 | -4.516 | -4.968 |
| | (2.366) | (2.709) | (2.585) | (5.140) | (4.328) | (3.818) |
| **importdiv*loggdp** | -0.757*** | -0.647*** | -0.532*** | -0.598*** | -0.426*** | -0.328** |
| | (0.120) | (0.135) | (0.134) | (0.154) | (0.159) | (0.145) |
| **diff**$_r$ | -7.155*** | -6.503*** | -6.408*** | | | |
| | (1.778) | (1.580) | (1.157) | | | |
| **importdiv*diff**$_r$ | 14.931*** | 10.578*** | 9.863*** | | | |
| | (4.280) | (3.403) | (2.673) | | | |
| **diff**$_l$ | | | | -10.103*** | -10.798*** | -9.785*** |
| | | | | (3.282) | (2.556) | (2.123) |
| **importdiv*diff**$_l$ | | | | 18.360*** | 16.099*** | 14.069*** |
| | | | | (6.508) | (4.686) | (4.106) |
| loggdp | -0.094 | -0.196 | -0.041 | -0.151 | -0.296** | -0.152 |
| | (0.138) | (0.125) | (0.120) | (0.139) | (0.130) | (0.123) |
| logpop | 0.595** | 0.729*** | 0.257 | 0.564** | 0.677*** | 0.262 |
| | (0.250) | (0.229) | (0.193) | (0.268) | (0.228) | (0.195) |
| depend | | 0.568** | 0.285 | | 0.589** | 0.298 |
| | | (0.225) | (0.204) | | (0.230) | (0.216) |
| polity2 | | 0.011*** | 0.008*** | | 0.011*** | 0.008*** |
| | | (0.003) | (0.002) | | (0.003) | (0.002) |
| urban | | 0.005 | 0.010*** | | 0.005 | 0.011*** |
| | | (0.004) | (0.002) | | (0.004) | (0.002) |
| war | | -0.003 | -0.002 | | 0.000 | 0.000 |
| | | (0.020) | (0.020) | | (0.021) | (0.022) |
| lagopenness | | | -0.263*** | | | -0.251*** |
| | | | (0.041) | | | (0.041) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 132 | 127 | 124 | 132 | 127 | 124 |
| # countries | 27 | 26 | 26 | 27 | 26 | 26 |
| $R^2$ | 0.552 | 0.730 | 0.823 | 0.548 | 0.736 | 0.822 |

Notes: Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: OECD, 1984-2000

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| **importdiv** | 1.047** | 5.431 | 5.777 | -10.337 | 10.904 | 5.227 | -46.646* | 3.307 |
| | (0.418) | (6.944) | (7.084) | (23.958) | (31.846) | (7.411) | (26.935) | (43.182) |
| **importdiv*loggdp** | | -0.231 | -0.249 | 0.093 | 0.868 | -0.219 | 0.507 | 1.458* |
| | | (0.365) | (0.372) | (0.654) | (0.765) | (0.390) | (0.532) | (0.755) |
| **diff**$_r$ | | | 0.743 | -9.739 | 31.283 | | | |
| | | | (1.333) | (13.451) | (28.819) | | | |
| **importdiv*diff**$_r$ | | | | 16.852 | -47.449 | | | |
| | | | | (21.795) | (45.517) | | | |
| **diff**$_l$ | | | | | | 1.131 | -25.397** | 27.259 |
| | | | | | | (2.558) | (12.644) | (32.650) |
| **importdiv*diff**$_l$ | | | | | | | 44.501** | -35.600 |
| | | | | | | | (20.657) | (50.221) |
| loggdp | -0.387*** | -0.222 | -0.205 | -0.434 | -1.024* | -0.213 | -0.672* | -1.357** |
| | (0.101) | (0.293) | (0.299) | (0.485) | (0.558) | (0.304) | (0.400) | (0.523) |
| logpop | | | | | -0.137 | | | -0.195 |
| | | | | | (0.337) | | | (0.349) |
| depend | | | | | 0.354 | | | 0.437 |
| | | | | | (0.432) | | | (0.429) |
| polity2 | | | | | 0.001 | | | 0.001 |
| | | | | | (0.003) | | | (0.003) |
| urban | | | | | 0.012*** | | | 0.011*** |
| | | | | | (0.003) | | | (0.003) |
| war | | | | | 0.003 | | | 0.012 |
| | | | | | (0.027) | | | (0.020) |
| Time Dummies | yes | yes | yes | yes | yes | yes | yes | yes |
| # Obs. | 111 | 111 | 111 | 111 | 107 | 111 | 111 | 107 |
| # countries | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 27 |
| $R^2$ | 0.396 | 0.400 | 0.401 | 0.407 | 0.557 | 0.402 | 0.428 | 0.573 |

Notes: Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: non OECD, 1964-2000

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | 1.404* | 1.509** | 4.298*** | 6.070*** | 5.779*** | 2.552** |
| | (0.750) | (0.753) | (1.342) | (1.853) | (1.971) | (1.108) |
| **importdiv*loggdp** | -0.073 | -0.086* | -0.116** | -0.189*** | -0.198*** | -0.150** |
| | (0.045) | (0.046) | (0.047) | (0.065) | (0.071) | (0.065) |
| **diff**$_r$ | | -0.869** | 0.048 | 0.414 | 0.309 | -0.659 |
| | | (0.360) | (0.469) | (0.532) | (0.531) | (0.417) |
| **importdiv*diff**$_r$ | | | -3.641** | -4.528** | -3.793** | |
| | | | (1.484) | (1.756) | (1.800) | |
| loggdp | -0.167*** | -0.155*** | -0.155*** | -0.168*** | -0.141** | -0.146** |
| | (0.049) | (0.050) | (0.049) | (0.059) | (0.062) | (0.063) |
| logpop | 0.237*** | 0.243*** | 0.241*** | 0.255** | 0.297** | 0.295** |
| | (0.083) | (0.084) | (0.086) | (0.126) | (0.128) | (0.127) |
| polity2 | | | | -0.005** | -0.005** | -0.005** |
| | | | | (0.002) | (0.002) | (0.002) |
| depend | | | | -0.263* | -0.226 | -0.187 |
| | | | | (0.141) | (0.144) | (0.145) |
| lagopenness | | | | 0.102*** | 0.107*** | 0.121*** |
| | | | | (0.031) | (0.031) | (0.030) |
| aidpc | | | | | 0.000 | 0.000 |
| | | | | | (0.000) | (0.000) |
| war | | | | | 0.014*** | 0.014** |
| | | | | | (0.005) | (0.005) |
| urban | | | | | -0.004* | -0.005** |
| | | | | | (0.002) | (0.002) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 907 | 907 | 907 | 758 | 733 | 733 |
| # countries | 127 | 127 | 127 | 112 | 109 | 109 |
| $R^2$ | 0.141 | 0.149 | 0.156 | 0.199 | 0.212 | 0.205 |

Notes: Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11: non OECD, 1964-2000

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | 0.403** | 1.578 | 1.480 | 0.269 | 1.593 | 0.181 |
| | (0.189) | (1.410) | (1.413) | (2.253) | (1.408) | (4.266) |
| **importdiv*loggdp** | | -0.069 | -0.064 | -0.048 | -0.070 | -0.061 |
| | | (0.079) | (0.079) | (0.082) | (0.079) | (0.087) |
| **diff**$_r$ | | | -0.312 | -0.679 | | |
| | | | (0.421) | (0.589) | | |
| **importdiv*diff**$_r$ | | | | 1.514 | | |
| | | | | (2.187) | | |
| **diff**$_l$ | | | | | -0.149 | -0.570 |
| | | | | | (0.790) | (1.318) |
| **importdiv*diff**$_l$ | | | | | | 1.429 |
| | | | | | | (3.762) |
| loggdp | -0.197*** | -0.173*** | -0.169** | -0.170** | -0.172** | -0.170** |
| | (0.062) | (0.065) | (0.067) | (0.066) | (0.066) | (0.066) |
| logpop | 0.359* | 0.346* | 0.339* | 0.337* | 0.346* | 0.344* |
| | (0.195) | (0.195) | (0.195) | (0.195) | (0.196) | (0.196) |
| depend | -0.048 | -0.080 | -0.068 | -0.071 | -0.075 | -0.074 |
| | (0.197) | (0.196) | (0.201) | (0.201) | (0.200) | (0.200) |
| polity2 | -0.002 | -0.002 | -0.002 | -0.002 | -0.002 | -0.002 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| urban | -0.007 | -0.007 | -0.006 | -0.006 | -0.007 | -0.006 |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| war | 0.019*** | 0.020*** | 0.020*** | 0.020*** | 0.020*** | 0.020*** |
| | (0.006) | (0.005) | (0.005) | (0.005) | (0.005) | (0.006) |
| lagopenness | 0.070* | 0.070* | 0.068 | 0.070* | 0.069 | 0.070 |
| | (0.042) | (0.042) | (0.042) | (0.042) | (0.042) | (0.043) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 758 | 758 | 758 | 758 | 758 | 758 |
| # groups | 195 | 195 | 195 | 195 | 195 | 195 |
| $R^2$ | 0.246 | 0.247 | 0.248 | 0.248 | 0.247 | 0.247 |

Notes: Robust standard errors clustered by countries in parentheses. Fixed effects interacted with period.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 12: No log variables: OECD, 1964-1983

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **importdiv** | -2.597 | 224.079*** | 199.011*** | 171.545*** | 138.859*** | -10.885 |
| | (4.765) | (52.605) | (42.978) | (47.316) | (50.520) | (71.015) |
| **importdiv*gdp** | | -11.307*** | -9.589*** | -11.945*** | -6.524** | -7.906*** |
| | | (2.599) | (2.171) | (2.483) | (2.633) | (2.829) |
| **diff**$_r$ | | | -32.698*** | -91.973*** | | |
| | | | (10.073) | (26.365) | | |
| **importdiv*diff**$_r$ | | | | 136.335** | | |
| | | | | (63.470) | | |
| **diff**$_l$ | | | | | -55.650*** | -161.316*** |
| | | | | | (17.955) | (39.257) |
| **importdiv*diff**$_l$ | | | | | | 213.220*** |
| | | | | | | (78.660) |
| gdp | -9.193*** | -4.214* | -4.587** | -3.189 | -6.172** | -5.139** |
| | (2.196) | (2.278) | (2.190) | (2.391) | (2.371) | (2.495) |
| pop | 13.025*** | 12.880*** | 11.119*** | 9.200** | 11.153*** | 8.564** |
| | (4.527) | (4.095) | (4.114) | (4.309) | (4.066) | (4.278) |
| depend | 7.984 | 10.082** | 13.319** | 12.134** | 13.516** | 12.831** |
| | (5.074) | (4.598) | (5.131) | (5.162) | (5.371) | (5.307) |
| polity2 | 0.176*** | 0.157*** | 0.159*** | 0.158*** | 0.157*** | 0.159*** |
| | (0.053) | (0.051) | (0.052) | (0.050) | (0.054) | (0.052) |
| urban | 0.149** | 0.104 | 0.112 | 0.102 | 0.119 | 0.115 |
| | (0.073) | (0.075) | (0.077) | (0.075) | (0.073) | (0.071) |
| war | 0.460 | -0.369 | -0.258 | -0.330 | -0.223 | -0.264 |
| | (0.337) | (0.359) | (0.336) | (0.351) | (0.359) | (0.379) |
| lagopenness | 0.023 | -0.001 | 0.008 | 0.003 | 0.011 | 0.008 |
| | (0.039) | (0.037) | (0.038) | (0.038) | (0.037) | (0.037) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 124 | 124 | 124 | 124 | 124 | 124 |
| # countries | 26 | 26 | 26 | 26 | 26 | 26 |
| $R^2$ | 0.592 | 0.670 | 0.690 | 0.700 | 0.697 | 0.711 |

Notes: Robust standard errors in parentheses.
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 13: Arellano-Bond GMM estimation: OECD, 1964-1983

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| laggovshare | 0.465*** | 0.392*** | 0.411** | 0.306** | 0.420** | 0.336** |
| | (0.116) | (0.124) | (0.171) | (0.148) | (0.164) | (0.151) |
| **importdiv** | -0.363* | 6.637*** | 6.141*** | 4.669*** | 5.465** | -0.964 |
| | (0.190) | (2.141) | (2.130) | (1.744) | (2.390) | (2.403) |
| **importdiv*loggdp** | | -0.349*** | -0.321*** | -0.374*** | -0.284** | -0.303*** |
| | | (0.102) | (0.103) | (0.085) | (0.122) | (0.103) |
| **diff**$_r$ | | | | -3.464*** | | |
| | | | | (0.674) | | |
| **importdiv*diff**$_r$ | | | | 5.294*** | | |
| | | | | (1.253) | | |
| **diff**$_l$ | | | | | -0.453 | -4.972*** |
| | | | | | (0.917) | (1.221) |
| **importdiv*diff**$_l$ | | | | | | 8.348*** |
| | | | | | | (1.909) |
| loggdp | -0.267*** | -0.181*** | -0.256*** | -0.199** | -0.260*** | -0.243** |
| | (0.098) | (0.068) | (0.084) | (0.095) | (0.087) | (0.097) |
| logpop | 0.663*** | 0.687*** | 0.567*** | 0.382** | 0.535*** | 0.410** |
| | (0.169) | (0.174) | (0.167) | (0.180) | (0.173) | (0.187) |
| polity2 | 0.008*** | 0.008*** | 0.008*** | 0.008*** | 0.008*** | 0.008*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| depend | 0.133 | 0.158 | 0.171 | 0.228 | 0.187 | 0.206 |
| | (0.170) | (0.160) | (0.191) | (0.185) | (0.191) | (0.196) |
| lagopenness | | | -0.015 | -0.072 | -0.016 | -0.049 |
| | | | (0.063) | (0.062) | (0.065) | (0.061) |
| war | | | 0.000 | 0.004 | 0.001 | 0.006 |
| | | | (0.014) | (0.016) | (0.015) | (0.016) |
| urban | | | 0.008*** | 0.009*** | 0.008*** | 0.009*** |
| | | | (0.002) | (0.002) | (0.002) | (0.002) |
| Time Dummies | yes | yes | yes | yes | yes | yes |
| # Obs. | 98 | 98 | 98 | 98 | 98 | 98 |
| # countries | 26 | 26 | 26 | 26 | 26 | 26 |

Notes: Robust standard errors in parentheses.
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 14: Robustness: OECD, 1964-1983

| | alternative measure for importdiv | | | alternative measure for diff | yearly data | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| importdiv | 1.976*** | 1.684*** | 1.535*** | -3.510 | 6.645*** | 5.626*** | 2.190 |
| | (0.439) | (0.438) | (0.419) | (3.505) | (1.785) | (1.792) | (2.150) |
| importdiv*gdp | -0.103*** | -0.088*** | -0.082*** | -0.375*** | -0.351*** | -0.364*** | -0.353*** |
| | (0.023) | (0.023) | (0.022) | (0.142) | (0.089) | (0.093) | (0.083) |
| $diff_l$(lov) | | -1.538*** | | -53.529*** | | -1.782*** | |
| | | (0.470) | | (10.887) | | (0.527) | |
| importdiv*$diff_l$(lov) | | | | 77.595*** | | 2.742** | |
| | | | | (21.330) | | (1.181) | |
| $diff_l$ | | | -2.328*** | | | | -4.108*** |
| | | | (0.686) | | | | (0.987) |
| importdiv*$diff_l$ | | | | | | | 5.794*** |
| | | | | | | | (1.882) |
| loggdp | 0.523** | 0.471** | 0.411* | -0.124 | -0.245*** | -0.226*** | -0.238*** |
| | (0.227) | (0.214) | (0.207) | (0.122) | (0.059) | (0.063) | (0.061) |
| logpop | 0.405** | 0.369** | 0.380** | 0.261 | 0.654*** | 0.543*** | 0.500*** |
| | (0.170) | (0.165) | (0.168) | (0.195) | (0.092) | (0.098) | (0.098) |
| polity2 | 0.009*** | 0.009*** | 0.009*** | 0.008*** | 0.008*** | 0.008*** | 0.007*** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| depend | 0.414 | 0.386* | 0.358 | 0.308 | 0.249** | 0.270** | 0.313*** |
| | (0.253) | (0.220) | (0.215) | (0.215) | (0.102) | (0.109) | (0.107) |
| lagopenness | -0.214*** | -0.254*** | -0.238*** | -0.253*** | -0.241*** | -0.250*** | -0.250*** |
| | (0.050) | (0.038) | (0.037) | (0.041) | (0.031) | (0.030) | (0.029) |
| urban | 0.007** | 0.007*** | 0.007*** | 0.011*** | 0.010*** | 0.011*** | 0.011*** |
| | (0.003) | (0.003) | (0.003) | (0.002) | (0.001) | (0.001) | (0.001) |
| war | 0.039*** | 0.025** | 0.019* | -0.001 | -0.003 | -0.000 | -0.003 |
| | (0.012) | (0.010) | (0.011) | (0.021) | (0.009) | (0.009) | (0.009) |
| Time Dummies | yes | yes | yes | yes | yes | yes | yes |
| # Obs. | 124 | 124 | 124 | 124 | 544 | 544 | 544 |
| # countries | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| $R^2$ | 0.803 | 0.829 | 0.834 | 0.822 | 0.672 | 0.685 | 0.695 |

Notes: Robust standard errors in parentheses
*significant at 10%; ** significant at 5%; *** significant at 1%

# B Appendix

Table 15: Data and Sources

| Variable | Description | Source |
|---|---|---|
| $g$ | log-share of government consumption to real GDP (in %) from Penn World Tables 6.2 | http://pwt.econ.upenn.edu/ |
| *loggdp* | log real GDP (Laspeyeres method in 2000 prices) from Penn World Tables 6.2 | http://pwt.econ.upenn.edu/ |
| *logpop* | log of total population in thousands from Penn World Tables 6.2 | http://pwt.econ.upenn.edu/ |
| *importdiv* | number of different imported 4-digit products (Standard International trade classification, Rev. 2), normalized 0-1 | World Trade Data (Feenstra and Lipsey, 2005) http://cid.econ.ucdavis.edu/data/undata/undata.html |
| $diff_r$ | share of differentiated on total imported products | Rauch (1999) and World Trade Data (Feenstra and Lipsey, 2005) |
| $diff_l$ | share of differentiated plus share of reference priced on total imported products | Rauch (1999) and World Trade Data (Feenstra and Lipsey, 2005) |
| *polity*2 | Composite Polity index ranging from -10 (hereditary monarchy) to 10 (consolidated democracy) | http://www.systemicpeace.org/inscr/inscr.htm |
| *depend* | Dependency ratio is the share of population below 15 and beyond 64 to the population between 15 and 64 from World Development Indicators | World Bank (2005) |
| *urban* | The share of total population living in urban areas from World Development Indicators | World Bank (2005) |
| *war* | ACTOTAL from Major Episodes of Political Violence (MEPV) and conflict regions, range from 0 (no violence) to 10 | http://www.systemicpeace.org/warlist.htm |
| *lagopenness* | log-share of export plus import to real GDP (in %) from Penn World Tables 6.2 | http://pwt.econ.upenn.edu/ |

Figure 4


Number of products traded in the world
4−digit products
700
750
800
850
900
950
1960
1970
1980
1990
2000
year

Table 16: List of Countries

| | | | |
|---|---|---|---|
| Afghanistan | Djibouti | Laos | Samoa |
| Albania | Dominican Republic | Latvia | Saudi Arabia |
| Algeria | Ecuador | Lebanon | Senegal |
| Angola | Egypt | Liberia | Seychelles |
| Argentina | El Salvador | Lithuania | Sierra Leone |
| Armenia | Equatorial Guinea | Macedonia | Singapore |
| Australia | Estonia | Madagascar | Slovak Republic |
| Austria | Ethiopia | Malawi | Slovenia |
| Azerbaijan | Fiji | Malaysia | Somalia |
| Bahamas | Finland | Mali | South Africa |
| Bahrain | France | Malta | Spain |
| Bangladesh | Gabon | Mauritania | Sri Lanka |
| Barbados | Gambia | Mauritius | St. Kitts and Nevis |
| Belarus | Georgia | Mexico | Sudan |
| Belgium | Germany | Mongolia | Suriname |
| Belize | Ghana | Morocco | Sweden |
| Benin | Greece | Mozambique | Switzerland |
| Bermuda | Guatemala | Nepal | Syria |
| Bolivia | Guinea | Netherlands | Taiwan |
| Bosnia and Herzegovina | Guinea-Bissau | Netherlands Antilles | Tajikistan |
| Brazil | Guyana | New Zealand | Tanzania |
| Burkina Faso | Haiti | Nicaragua | Thailand |
| Burundi | Honduras | Niger | Togo |
| Cambodia | Hungary | Nigeria | Trinidad and Tobago |
| Cameroon | Iceland | Norway | Tunisia |
| Canada | India | Oman | Turkey |
| Central African Republic | Indonesia | Pakistan | Turkmenistan |
| Chad | Iran | Panama | Uganda |
| Chile | Iraq | Papua New Guinea | Ukraine |
| China | Ireland | Paraguay | United Arab Emirates |
| Colombia | Israel | Peru | United Kingdom |
| Costa Rica | Italy | Philippines | United States |
| Cote d'Ivoire | Jamaica | Poland | Uruguay |
| Croatia | Japan | Portugal | Uzbekistan |
| Cuba | Jordan | Qatar | Venezuela |
| Cyprus | Kenya | Republic of Korea | Vietnam |
| Czech Republic | Kiribati | Romania | Yemen |
| Dem. Rep. Korea | Kuwait | Russia | Zambia |
| Denmark | Kyrgyzstan | Rwanda | Zimbabwe |

Table 17: OECD: Relative change in imported varieties

| Country | 6468-8083 | 8487-9600 |
|---|---|---|
| Australia | 0.170 | 0.020 |
| Austria | 0.010 | 0.005 |
| Belgium-Lux | -0.004 | -0.018 |
| Canada | 0.091 | 0.016 |
| Denmark | 0.028 | -0.028 |
| Finland | 0.014 | -0.002 |
| France | 0.018 | -0.017 |
| Germany | -0.002 | -0.016 |
| Greece | 0.046 | 0.027 |
| Hungary | -0.189 | 0.021 |
| Iceland | 0.054 | 0.089 |
| Ireland | 0.033 | 0.018 |
| Italy | 0.004 | -0.020 |
| Japan | 0.010 | -0.001 |
| Mexico | 0.516 | 0.101 |
| Netherlands | -0.005 | -0.036 |
| New Zealand | 0.047 | 0.013 |
| Norway | 0.008 | . |
| Poland | -0.217 | 0.127 |
| Portugal | 0.016 | 0.094 |
| Republic of Korea | 0.355 | 0.100 |
| Spain | 0.007 | 0.013 |
| Sweden | 0.003 | -0.029 |
| Switzerland | -0.052 | 0.065 |
| Turkey | 0.015 | 0.223 |
| United Kingdom | -0.002 | -0.022 |
| United States | 0.499 | 0.004 |
| Mean | 0.033 | 0.034 |

Table 18: Elasticity of substitution: sample means

| | Broda and Weinstein (2006)'s estimated elasticity of substitution | |
|---|---|---|
| Rauch's classification | 1972-1988 | 1990-2001 |
| differentiated goods | 5.2 | 4.7 |
| reference priced goods | 7.8 | 4.9 |
| goods on organized exchange | 15.3 | 11.6 |

Source: Broda and Weinstein (2006)