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HETEROGENEITY AND DEVELOPMENT: AN AGENDA

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Abstract

Countries are heterogeneous both internally and externally in many ways, as is widely accepted in the policy arena. The booming literature on firm heterogeneity remains under-developed regarding the degree of firm heterogeneity in developing countries and the relationship between firm heterogeneity and development. We sketch what we know today, discuss some recent contributions, and call for further research in this area.

Keywords: firm heterogeneity; development

JEL classification: F1; O1; O4

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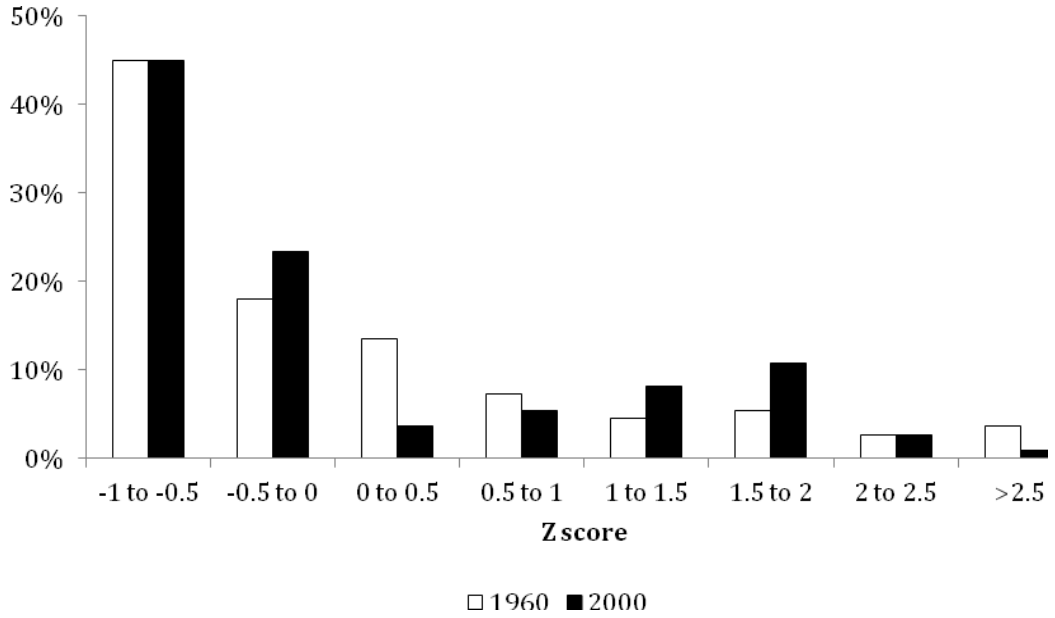
1 Heterogeneous countries

Countries can be heterogeneous in many different ways, for example with large variations in area, population, factor abundance, income, culture, geography, and climate. Countries can also be heterogeneous *internally*, for example with large differences between firms in productivity, size, international orientation, (human) capital intensity, etc. We discuss internal heterogeneity in the next section.

Heterogeneity and development are closely related. At the macroeconomic and geopolitical level it is, for example, increasingly being recognized that analyses and policies can no longer continue to treat developing countries as a homogeneous group. Indeed, UNCTAD, the IMF and the World Bank seem to be involved in an intellectual competition to find ever-new acronyms to re-classify and re-group the developing world. The existence of CITs, CAFS, LDCs, LICs, LICUS, HIPCs, SIDs and SWVSEs testifies of the substantial amount of macro and political heterogeneity that is characteristic of what once was perceived to be a more or less coherent group of Third World countries.[1] Policy makers *know* that the world is heterogeneous.

Economists recognize the 'macro' heterogeneity especially in differences in productivity levels across countries and the resultant distribution of *per capita* income levels. This distribution has changed a lot due to the process of globalization and because of differing national policies and circumstances in the context of this internationalization process. Clearly the distributions of national productivity levels has changed substantially over the past decades as illustrated in Figures 1 and 2.

Figure 1 Frequency distribution of labour productivity from the period average by z-scores for 1960 and 2000 (N = 111 countries)



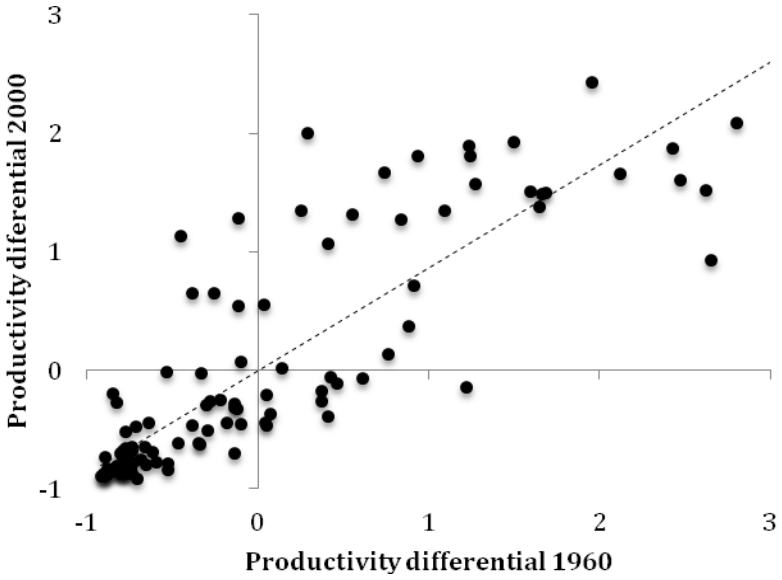
Source: Calculations based on Penn World Table 7.0, Heston et al. (2011), PPP Converted GDP Chain per worker at 2005 constant prices. Data refer to 111 countries for which estimates were reported in 1960 and 2000.

Figure 1 provides a comparison of the frequency distributions of national productivity levels for the years 1960 and 2000, respectively. Typically, the frequencies at the bottom (*z*-

[1] Respectively: Countries In Transition, Conflict Affected and Fragile States, Least Developed Countries, Low Income countries, Low Income Countries Under Stress, Heavily Indebted Poor Countries, Small Island Developing States and Structurally Weak, Vulnerable and Small Economies

score < 1/2) and at the very top (z-score > 2) of the two distributions do not show much dynamism, but in the medium range of the distribution substantial shifts do occur. These shifts away from the average at least technically increase the measured extent of country heterogeneity. This shift provides the empirical motivation for this special issue: What does the increase of country level heterogeneity imply for development?

Figure 2 Normalized labour productivity differentials (z-scores 1960 versus 2000)



Sources: see Figure 1

Figure 2 compares the z-scores of the productivity levels of the individual countries in the years 1960 and 2000 and thereby provides an alternative perspective on the same shift in the distributions. In particular, a remarkably large number of countries actually succeeded in breaking out of the below-average productivity trap. The most clear cut examples are Hong Kong, South Korea and Taiwan that moved from below average to above average territories (and likewise the largest losers are New Zealand and Venezuela).

2 Heterogeneous firms and development

Heterogeneity also refers to differences between firms within the same country. Even within the same sector of a particular country some firms are large while others are small, some firms export while others do not, some firms are more productive than other firms, some firms are foreign-owned while others are not, etc. The empirical and theoretical literature on firm heterogeneity has been booming for the past 15 years.[2] Two big questions still remain under-explored in the literature, namely (i) the degree of firm heterogeneity in developing countries and (ii) the relationship between firm heterogeneity and development.

About (i). Analyzing the degree of firm heterogeneity in a country requires access to detailed and at least somewhat reliable micro-economic data sets. These are hard to come by for most developing countries, which is the main reason why the literature focuses on high income countries with good data sets only, combined with a few exceptional developing countries for which more information is available (see below). This picture has only been changing fairly recently as more reliable data for a wide range of emerging and developing

[2] See the many references in the papers of this special issue.

countries became available as a result of large efforts and investments by the World Bank and the International Finance Corporation (Enterprise surveys data: www.enterprisesurveys.org).

About (ii). Analyzing the relationship between firm heterogeneity and development, either theoretically or empirically, is complicated by the lack of information on the characteristics of heterogeneity at different stages of development. This is not only because of the limited number of studies that we have for developing countries (point (i) above), but also because of the differences in underlying methodology. The latter makes international comparisons on firm heterogeneity a hazardous business. The exception to the rule is the ISGEP (2008) study, which provides comparable evidence on firm heterogeneity for 14 countries.

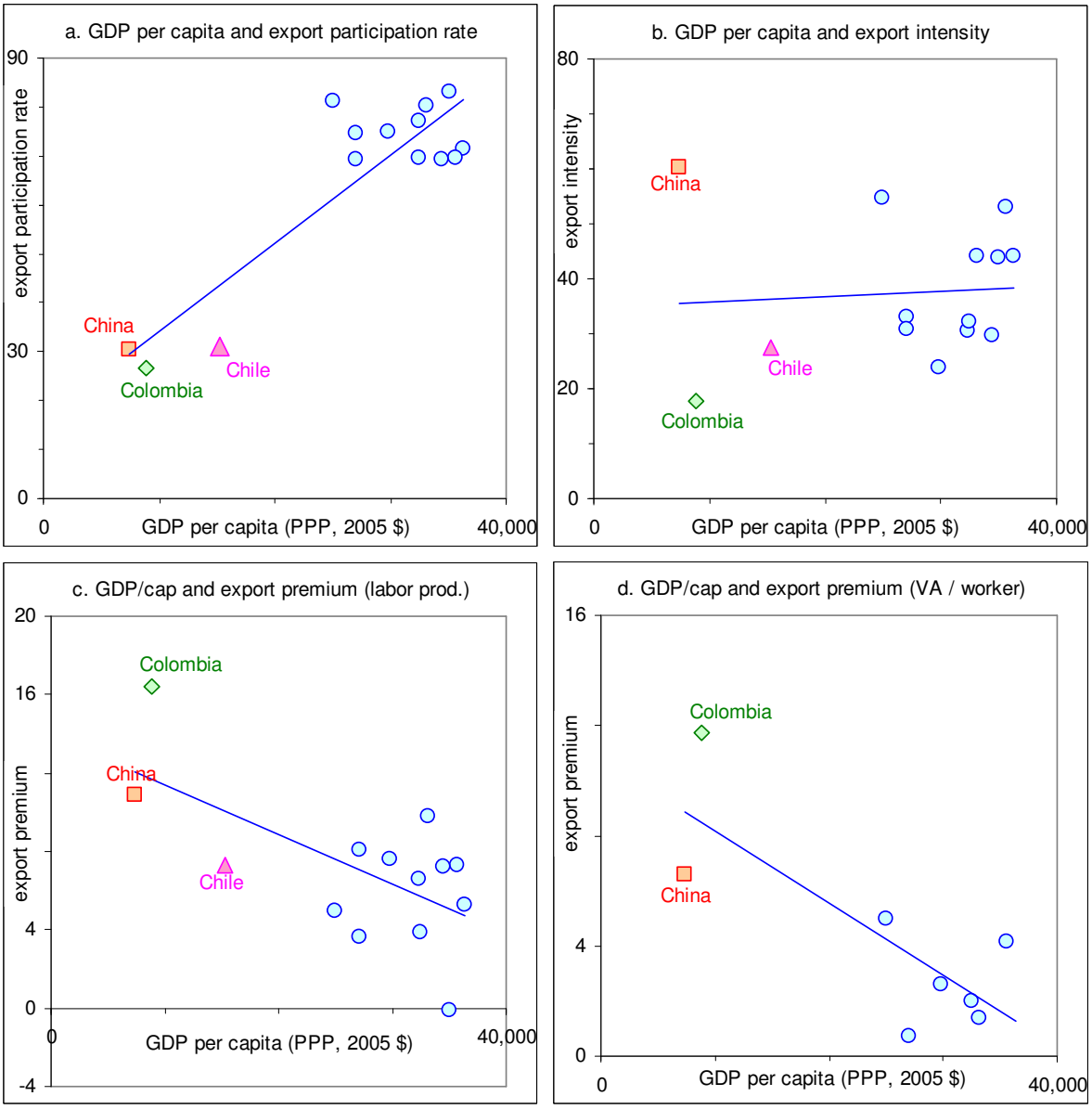
Figure 3 gives some of the main information we now have on the relationships between firm heterogeneity and development by combining ISGEP study information with income per capita levels (PPP corrected) as a proxy for development. Note that the ISGEP study focuses on medium- and large-sized firms only (20 employees or more), thus ignoring the large majority of small firms. Also note that the heterogeneity estimates for different countries are for different time periods which we illustrate for income levels in the year 2011.

Figure 3a shows the relationship between the export participation rate (the percentage of firms that are exporting) and development. The association seems to be positive: more firms engage in exporting activities as the level of development rises. The average participation rate is 65 percent, ranging from 27 percent for Colombia to 83 percent for Sweden.[3] Note that the positive association arises essentially from connecting two clusters, namely for the three developing countries and the 11 other countries. Its robustness is yet to be determined.

Figure 3b shows the relationship between export intensity (the average share of exports in total sales of exporting firms) and development. There seems to be no relationship.

[3] The high participation rates in Figure 3a arise from the focus on medium- and large firms.

Figure 3 Firm heterogeneity and development for medium- and large-sized firm



Sources: figures based on data from ISGEP (2008) and World Development Indicators online; see main text for definition of variables and discussion; control variables for export premia are the log of the number of employees and its squared value, the log of wages and salaries per employee, a full set of interaction terms of 4-digit industry dummies and year dummies, and firm fixed effects, see ISGEP Table 4 and Table 8.

Figures 3c and 3d provide information on the relationship between development and the export premium (the percentage higher productivity for exporting firms after controlling for other influences), focusing on labor productivity in panel *c* and value added per worker in panel *d*. In both cases the relationship is negative: more developed countries have a lower export premium. The average labor productivity export premium is 7.3 percent, ranging from -0.1 in Sweden to 16.4 in Colombia. The average value added per worker export premium is 4.3 percent, ranging from 0.7 in Italy to 11.7 in Colombia.

Clearly the empirical regularities above beg the question of why country experiences are so heterogeneous. This special issue focuses on the heterogeneity of a nation's firms, that is the extent to which the firms follow an internationalisation strategy, and in particular the distribution of firms at the national levels. Membrati and van Bergeijk (2013) point out that international orientation is stronger at higher levels of development, but at the same time the

extent of heterogeneity for (groups of) countries is striking, especially if differences within country groups at comparable levels of development are considered (see their Figure 2). Heterogeneity is thus a phenomenon that occurs across all levels of development, but while the mechanisms by which heterogeneity influences productivity are well understood at the level of the OECD countries (van Bergeijk et al. 2011), the literature that deals with developing countries is still quite limited.

3 Findings on firm heterogeneity

The contributors to this special issue are all inspired by the existing volume of empirical evidence on firm heterogeneity regarding size and organizational structure and how this heterogeneity results in significant productivity differences between firms that import, export invest abroad or are recipients of foreign investment and firms that do not internationalize (import, export, invest abroad or are invested in by foreign firms). Indeed, the seminal paper of Melitz (2003) provides a fascinating new framework for better understanding the implications of international trade and foreign direct investment flows in a Darwinian environment in which the least efficient firms contract or exit the market. As a consequence – in his framework – only the more productive firms expand production, engage in international trade, and are involved in foreign direct investment either as a recipient or as a sender. Most theoretical and empirical analyses, however, focus on high income and emerging countries and are thus relevant for the conditions of time and place that prevail in these countries. The general comments of Lin and Rosenblatt (2012, p. 35) would seem to be applicable here as well: "The economic theories that originate in developed countries attempt to explain and promote the growth in the developed countries; as such, they may not be relevant to developing countries because of the differences in the challenges and opportunities."

This special issue aims at filling a lacuna in our knowledge focussing on the under-investigated role of firm heterogeneity in the development process, bringing together a selection of six papers that were presented at the conference on 'Firm Heterogeneity and Development' organized at Utrecht University, The Netherlands, October 2011. The papers as a group cover four continents and many aspects of heterogeneity. In many cases the authors move beyond the traditional boundaries of economics by covering bibliometric analysis on (omitted) indicators of heterogeneity (Mebrati and van Bergeijk 2013), environmental heterogeneity of final and intermediate good production (Swart 2013) and heterogeneity with respect to ethnicity of ownership (Mebrati and Bedi 2013).

The first paper by Chang and van Marrewijk (2013) sets the stage for this special issue, analysing distributions for normalized productivity differences in a cross section for the year 2006 and 15 developing countries in Latin America.[4] Within this group of developing countries they uncover a positive bivariate relationship between firm productivity and the level of development. Heterogeneity of firm productivity appears to be strongest at the lowest GDP per capita level.[5] Next they link firm productivity to four archetypes: the national domestic firm that does not export, the nationally-owned exporter, the foreign-owned firm that does not export, and the foreign-owned exporting firm. Controlling for industry classification and other relevant factors, Chang and van Marrewijk confirm that in their sample of Latin American countries, exporting firms are more productive than domestic firms and foreign-owned firms are more productive than national firms. One important finding that

[4] The country coverage is: Argentina, Bolivia, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

[5] Membrati and van Bergeijk (2013) also find that heterogeneity (with respect to internationalisation) is highest at low GDP per capita levels.

robustly survives extensive sensitivity testing is the existence of a development productivity premium at the firm level that is particular strong in manufacturing, but less so in services.

The second paper by Mebrati and van Bergeijk (2013) provides a meta analysis of Foreign Direct Investment spillovers analysing econometric studies published over 1983-2010 and dealing with national studies in 30 developing countries and emerging markets.[6] The meta analysis allows to correct reported findings for differences in research design (including data characteristics, sample size and level of aggregation) and to investigate several sources of heterogeneity, including size (production share), internationalization (both exports and foreign ownership) and labour quality. They find that in their sample of academic papers only a subset of heterogeneity is being considered and that the studies tend to ignore both export and R&D heterogeneity. For two sources of firm heterogeneity, namely firm size and labour quality, Membrati and van Bergeijk show that considering (or ignoring) these kinds of heterogeneity will have a significant impact on the estimated FDI spillovers.

The next two papers deal with the same topic of spillovers from Foreign Direct investment but in different continents. Jordaan (2013) reports on field research in the manufacturing sector of Nuevo Leon, Mexico in 2000-2001 and Mebrati and Bedi (2013) analyse two-period (2003 and 2007) panel data from South Africa to determine the effect of foreign direct investment on the labour productivity of domestic firms.

Jordaan's paper focuses on the creation and impact of technology transfers from FDI to local suppliers in a developing country setting. He shows that FDI firms are significantly more involved in knowledge transfer activities than nationally owned firms. Ownership also determines the effect of the technology gap on technology transfers: foreign-owned FDI firms offer more technological support to their suppliers when the technology gap is large. It is, however, not only the heterogeneity of the producer firms that matters for the size of spillover effects, but also the heterogeneity of local suppliers as their absorptive capacity of local suppliers is a significant determinant of the impact of these technology transfers.

Mebrati and Bedi, in contrast, find no evidence of either positive or negative spillovers to domestically owned South African firms. Their results are robust to the use of different definitions of foreign presence. A novel aspect of this paper is that it also deals with a non-economic issue of heterogeneity: during the research period a key legal measure (the broad-based black economic empowerment act) introduced compliance issues for foreign investors that additionally were expected to purchase material inputs and services (preferential procurement) from black empowered companies. Mebrati and Bedi argue that the new institutional context may have a bearing both on foreign firm productivity and on spillover effects to domestic firms. Initial regressions seemed to confirm this hypothesis, but after controlling for firm fixed effects the result evaporates, suggesting that less productive foreign-owned firms are more likely to comply with the legal provisions, thus again illustrating the importance of considering firm heterogeneity in the context of development issues.

The theoretical paper by Swart (2013) on the environmental impact of intra-industry trade nicely illustrates how the literature is moving from a high level of aggregation towards a firm level analysis. Her paper starts by recognizing the increasing importance for developing countries of both intra-industry trade and South-South trade. Swart also brings in the level of development and environmental taxes as new elements in the Melitz model. Although the setting of the model only covers trade between countries of similar levels of development, two important conclusions emerge: (i) a developing country closed to trade faces lower final good

[6] The country coverage is: Argentina, Bangladesh, Brazil, Bulgaria, Cambodia, Chile, China, the Czech Republic, Estonia, Ghana, Hungary, India, Indonesia, Lithuania, Malaysia, Mexico, Morocco, Poland, Romania, Russia, Slovakia, Slovenia, Taiwan, Thailand, Turkey, Ukraine, Uruguay, Venezuela, Vietnam and Zambia.

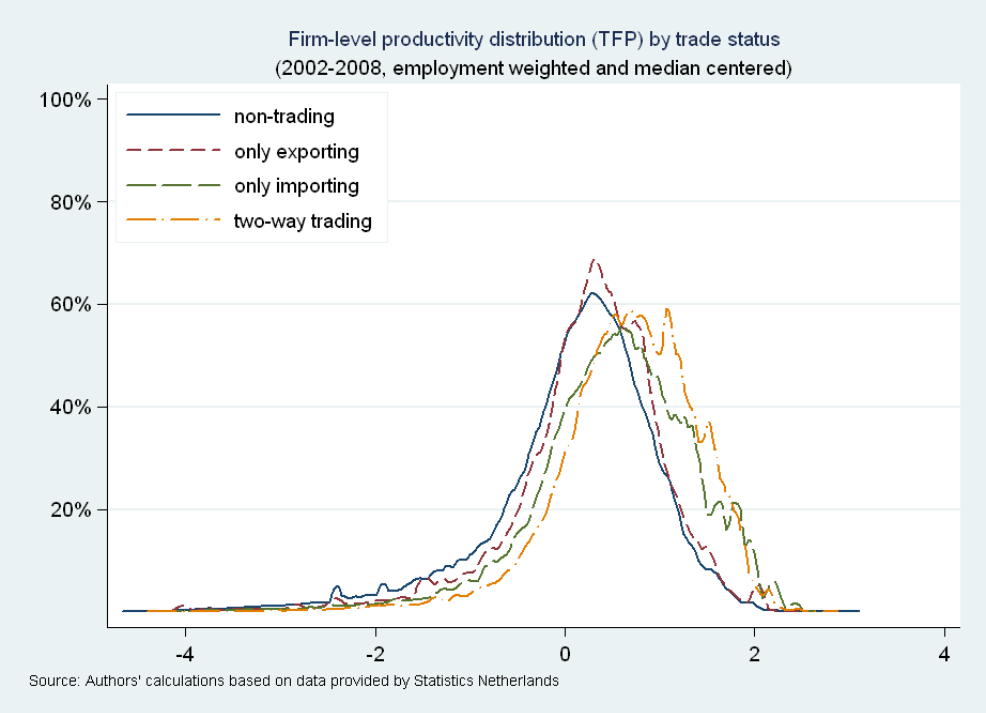
output and higher total pollution and is thus worse off than a developed country and (ii) countries are better off under trade than under autarky, regardless of their development level.

Finally, Tamminen and Chang (2013) challenge the homogeneous mark-up assumption that is customarily made in theoretical contributions. They show for Finland (an open and advanced economy) in the years 2005-2009 that substantial heterogeneity exists with respect to the mark-up of prices over (marginal) costs (both within sectors and regarding internationalisation and firm size). Tamminnen and Chang argue that this finding of mark-up heterogeneity a fortiori applies to developing countries, given that their economic environments (low export participation rates, restrictive trade policies, low GDP per capita levels, and ineffective regulatory environment) likely lead to high firm heterogeneity.

4 An agenda

The articles in this special issue discussed above provide some new information on the degree of firm heterogeneity in developing countries and on the relationship between firm heterogeneity and development. For a proper understanding of these issues, however, much more needs to be done. This requires access to fairly reliable and internationally comparable micro-economic data sets, particularly for firms, for a substantial range of developing countries. Work on building these datasets is on its way and involves significant investments from international organizations and development institutions. Academics around the world are ready to use such data for a better understanding of the links between heterogeneity and development. Questions to be addressed include, among others, the productivity rankings of different types of firms, variations in measures of the degree of heterogeneity, the relationship between international ownership and productivity, whether firms self-select in trade activity, if firms become more productive as a result of trade relations, and variations in the extent of international involvement. All of this information is necessary before we can develop theories to better understand the role of heterogeneity in development.

Figure 4 Importers, exporters, two-way traders, and productivity, the Netherlands



Source: van den Berg (2012).

A lacuna in the empirical literature on firm heterogeneity is the lack of an analysis of the role of imports on productivity in development. This is remarkable in view of the long tradition in the macroeconomic development literature of analyzing trade-related technology spillovers associated with importing machinery from countries with R&D activities, leading to increases in total factor productivity (see, for example, Schiff and Wang, 2008). There have been virtually no studies in this respect for developing countries, but an example for the Netherlands is provided in Figure 4, which distinguishes between four types of firms: (i) non-traders, (ii) only importers, (iii) only exporters, and (iv) two-way traders (firms that import *and* export). The figure illustrates the productivity density for the four types of firms, centered around the median per sector and employment-weighted. It suggests that the two-way traders are most productive, followed (in that order) by the importing firms, the exporting firms, and the non-traders.[7] The questions raised above on the relations between exports and development must also be answered for imports and development. Moreover, we need to get a better grip on the importance of imports versus exports for productivity.

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[7] Note, however, that the analysis in van den Berg (2012) reverses the ordering of exporters and importers.