ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Rodriguez-Pose, Andres; Gill, Nicholas

Conference Paper

How does trade affect regional inequalities?

44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal

Provided in Cooperation with:
European Regional Science Association (ERSA)

Suggested Citation: Rodriguez-Pose, Andres; Gill, Nicholas (2004) : How does trade affect regional inequalities?, 44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:
https://hdl.handle.net/10419/117187

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

How does trade affect regional inequalities?[*]

by

Andrés Rodríguez-Pose[φ]

and

Nicholas Gill[σ]

Paper submitted to the 44th Congress of the European Regional Science Association
Porto, 25-29 August 2004

*Andrés Rodríguez-Pose gratefully acknowledges the financial support of the Royal Society-Wolfson Research Merit Award and of the Philip Leverhulme Prize during this research. The usual disclaimer applies.

[φ] Department of Geography and Environment, London School of Economics, Houghton St,
London WC2A 2AE. e-mail: A.Rodriguez-Pose@lse.ac.uk.

[σ] School of Geographical Sciences, University of Bristol, University Road, Bristol BS8 1SS. E-mail: ng3399@bristol.ac.uk

Abstract

As part of the ongoing globalisation of the world economy, the past twenty-five years have witnessed a steep rise in the amount of trade between nations, as well as changes in the composition of trade. This has been linked to economic growth, with most literature on the subject highlighting the benefits of greater openness. Concurrently, however, regional spatial inequalities within nations have also tended to increase steadily. In this paper we explore to what extent there is a link between the phenomena of increased trade flows and regional inequalities. We present a preliminary empirical evaluation based on eight major world economies, and ground these results in the theoretical literature. It emerges that the link between trade and regional inequalities is evidenced most strongly when sectoral shifts in the composition of trade are accounted for. Specifically, we find that as trade in primary sector goods loses importance in the composition of total trade, regional inequalities are likely to increase. Such an impact of changes in the composition of trade on regional inequalities is likely to have a greater negative impact on developing than on developed countries for two reasons. First, because the dimension of intra-national disparities tends to be greater in the developing than in the developed world. Second, because the share of agricultural trade in developing countries has traditionally been higher and has been declining at a much faster rate in recent decades.

Introduction

The relationship between trade and economic growth has spawned a large theoretical and empirical body of literature. Free trade is generally acknowledged to increase economic performance and national welfare in all but a handful of cases (Sachs and Warner, 1995; Pugel and Lindert, 2000; Fischer, 2003). Nevertheless, despite the existence of a relatively wide consensus among economists (see, however, Rodrik, 2003), there exist wide areas of debate about the general implications of trade. Perhaps one of the most obvious examples is the relation between trade and regional inequalities. While both topics have received ample treatment in recent years, and while mainstream trade theory holds basic and fundamental implications for income inequalities *per se*, the relation between trade and spatial income disparities within trading countries has remained under-explored.

What is more, those few scholars who have addressed the issue in one way or another have tended to disagree. Within the new economic geography school, discussion over how falling transport costs affect the wealth of different regions is central to the entire approach (see Krugman, 1991). Nevertheless, the differences in outcomes precipitated by relatively minor adjustments about the role of trade are considerable (contrast Krugman and Livas (1996) with Paluzie (2001)). And outside new economic geography, the traditional Heckscher-Ohlin (H-O) based models of trade might well lead, on the one hand, to declining inequalities as trade evolves, if capital and investment look for the areas with the lowest cost base and labour migrates to higher salary zones. Another possible outcome, on the other hand, is rising inequalities, since the owners of abundant factors in trading countries will profit and scarce resource

owners experience falling returns, at least in the medium term. The admittedly scant empirical research into the issue reflects these disagreements. Within the European Union, European integration is deemed to have contributed to a reduction of international inequalities, while intranational inequalities have, in contrast, widened (Esteban, 1994; Puga, 2002). For the US, Silva and Leichenko (2004) report that increases in trade seem to be associated with a growth of inter- and intrastate inequality, but that this outcome is far from straight forward. Poorer rural areas and states generally benefit from cheaper exports, but are particularly hurt by cheaper imports. Richer urban areas and states, in contrast, benefit overall from cheaper exports and cheaper imports are associated with a rise in employment, but not in earnings (Silva and Leichenko, 2004; Leichenko and Silva, 2004). Empirical studies of the opening of the Mexican economy to trade have come out with similar results. For example, Hanson's (1992) study showed how a shift away from import substitution in Mexico precipitated a dispersion of manufacturing industry from Mexico city, conditions in principle conducive to a reduction in regional disparities. Yet the outcome has been the concentration of the country's most dynamic manufacturing industry along the US border (Hanson, 1996 or 1998) and greater divergence since the opening of the country to trade (Sánchez-Reaza and Rodríguez-Pose, 2002).

It is into these seeming conundrums that this paper is pitched. As globalisation has been associated with a significant increase in trade across the world, understanding the interaction between trade and regional inequalities has become particularly important, in order to be able to assess and address development problems in many areas of the world. Following a brief exposition of the major theoretical strands

dealing with trade and their territorial implications, we focus in sections two and three on the trends under discussion for eight major world economies – increasing trade flows in section two, and the evolution of intranational regional inequalities in section three. In section four we go on to examine the relationship between these two phenomena. We find evidence that changes in the composition of trade tend to precede changes in regional inequalities. Specifically, as trade in primary sector goods has declined as a proportion of total trade, regional inequalities have tended to increase concurrently or soon afterwards in the majority of our case countries. We go on to discuss the possible implications of this link between changes in trade composition and regional inequalities for developed and developing economies. Section five concludes.

1. The spatial implications of trade theories

Trade theorists have never been particularly concerned with the evolution of regional inequalities within nations. Other factors such as the impact of trade on overall economic performance or the diffusion (or lack) of welfare provision have taken precedence over regional disparities. However, trade theories are by no means spatially neutral and implications for changes in the location of economic activity within nations can be, and have been, extracted from them.

This is, for example, the case of the New Economic Geography approach. In '*Trade Policy and the Third World Metropolis*', Krugman and Livas (1996) explore the relationship between trade and regional inequalities by outlining two sets of forces acting upon agglomerations in autarky. The first set refers to repellent forces created

by urban diseconomies such as crime, congestion, pollution and, importantly, high land costs in major cities. These forces act to repel industry from major conurbations and, by extension, to reduce regional inequalities by spreading industry across more regions in the country[1]. On the other hand, they also outline two centripetal forces that attract firms, industries and workers together and form the basis of major (third world) conurbations. The first is forward linkages – the attraction of proximity to markets, be they other firms for input suppliers or the population in the cities for final goods producers. The second is backward linkages – the attraction of proximity to supplies of inputs and factors, such as labour, that are abundant in the cities. Moreover, these centripetal forces are self-reinforcing, ensuring that as a city grows, its attraction also increases as markets of suppliers and consumers swell even further, giving rise to the large metropoli that are so dominant in the third world.

However, when countries open to trade (or switch from import substituting models of development towards more export orientated approaches, as was the case of Mexico and other Latin American economies from the 1980s onwards) the situation changes. As progressively more supplies are sourced from abroad, and more output is sold abroad, the attraction of forward and backward linkages is gradually diluted. Since it is costly to locate in urban areas due to continuing urban diseconomies of scale, the opening of trade therefore may result in a dispersal of manufacturing industry across the country, and, by extension, a reduction in regional disparities. From a different

[1] The assumption that manufacturing industry pays higher wages than agricultural industry is necessary here, an assertion that is clearly substantiated in developing country contexts where the wage differential engenders huge migration flows to urban areas, where most industry is located. Unskilled fulltime nominal urban wages are about 41% higher than farm wages in the Third World although this reduces when the cost of living is accounted for (Squire, 1981; Hatton and Williamson; 1991a). Moreover, evidence from the USA also confirms the assumption. In 2000 in Washington State, average agricultural earnings stood at $20,229 while earnings for all private sector employees was $37,070 - over 80% higher (Wallace, 2001). Seasonal variability in working hours was cited as the major cause of this discrepancy.

perspective Storper, Chen and de Paolis (2001) reach similar results. When analysing the impact of growing trade in the EU, they find that locational concentration appears not to have increased, with a rise in output in locationally spread sectors and a decline in concentrated industries (2001, p. 93)[2]. Hence, under a new economic geography framework, increases in manufacturing trade could well be associated with a decline in regional inequalities.

Starting from a similar new economic geography approach, however, Paluzie (2001) reaches different conclusions about the implications of trade for regional inequalities. While her assumptions are very similar to those of Krugman and Livas (two regions, two sectors and an emphasis on the impact of trade policies on manufacturing location), Paluzie predicts that as trade in manufacturing increases, regional inequalities will also generally rise. The main difference between Paluzie's conclusions with respect to those of Krugman and Livas lies in Paluzie's development of the agricultural sector and rural markets. She assumes that agriculture itself is tied to the land, by recognising the immobility of agricultural inputs in comparison to those of manufacturing. And secondly, she substitutes the centrifugal force of high land costs and rents for the pull of the market potential of the dispersed agricultural population. The result is that, when the country opens to trade, imports and exports to and from the major cities expand the hinterland of these conurbations. No longer are firms and industries subject to the maximum size constraint imposed by the limited demand of domestic rural markets - they can sustain growth, and agglomeration, by servicing foreign demand, and making use of cheaper foreign inputs. The incentive to

[2] Although they also acknowledge that "if agglomeration is principally relevant at the regional or metropolitan scale, then it could well be possible that nations could retain roughly similar shares of world trade in a given industry, while simultaneously experiencing significant locational concentration within the national territory" (Storper, Chen and de Paolis, 2001, p. 74).

agglomerate therefore increases alongside the increased market potential that cities have access to through the opening of export and import markets. As a result, opening to manufacturing trade tends to increase the incentives for firms, and workers, to concentrate in large cities, thereby increasing regional disparities[3].

The different territorial implications of new economic geography school approaches are therefore sourced from differences in the assumptions surrounding the agricultural sector. Paluzie found that an increase in manufacturing trade would exacerbate regional inequalities in a world where agriculture, and agricultural workers, were relatively immobile in relation to manufacturing. Although H-O approaches make no particular prediction about the evolution of regional inequalities, some territorial implications can be extracted if we borrow some of Paluzie's assumptions. If agriculture is again tied to the land, while manufacturing is more mobile and subject to agglomerative forces, and assuming that the labour force is immobile and the cost of land remains stable, the distribution of these sectors is likely to be very uneven across a country from the outset. Moreover, trade in manufacturing in the H-O model benefits manufacturing workers, at least in the medium term, because their labour becomes relatively scarce and therefore more expensive. Since manufacturing workers are more concentrated that agricultural workers under our assumptions, this leads to an increase in regional inequalities. It is the unequally distributed manufacturing sector that benefits, while the regional inequality-reducing effect of a geographically dispersed agricultural sector is progressively undermined – leading to rising regional income differentials. Conversely, if agricultural trade develops at the expense of manufacturing trade, then it is the agricultural workers who benefit, while

[3] Assuming again that manufacturing yields higher returns to factor owners than agriculture does.

manufacturing workers become relatively poorer. As trade favours agricultural workers and the owners of land, and they are more equally geographically distributed than manufacturing workers, the increase in income they enjoy acts to reduce regional income disparities. Concurrently, the contraction of the manufacturing sector, which is concentrated in richer regions, brings these more prosperous regions closer to the regional income average – again reducing regional disparities. With the augmentation of some simple assumptions surrounding the agricultural sector, therefore, the H-O model predicts a rise in regional income inequalities as the ratio of manufacturing to agricultural trade rises, in line with Paluzie's assumptions (albeit through very different lines of reasoning).

If, in contrast, the assumption of the lack of mobility of labour is relaxed, the outcome could be significantly different. A rise in manufacturing trade would indeed, in the first instance, benefit manufacturing workers, but would at the same time entice agricultural workers to move to manufacturing areas and become employed in manufacturing. Given relatively low barriers to entry, this would in the medium term generate a relative drop in manufacturing wages. At the same time, congestion in urban manufacturing areas, and lower land and labour costs in rural areas, is likely to lure manufacturing firms into more distant locations, contributing to a factor-price equalisation process, whose ultimate outcome is likely to be a reduction in regional disparities.

Admittedly, the theoretical literature on trade offers only patchy and inconsistent inferences about the impact of trade on regional inequalities. There are some common denominators, however. Most importantly, both the new economic geography school

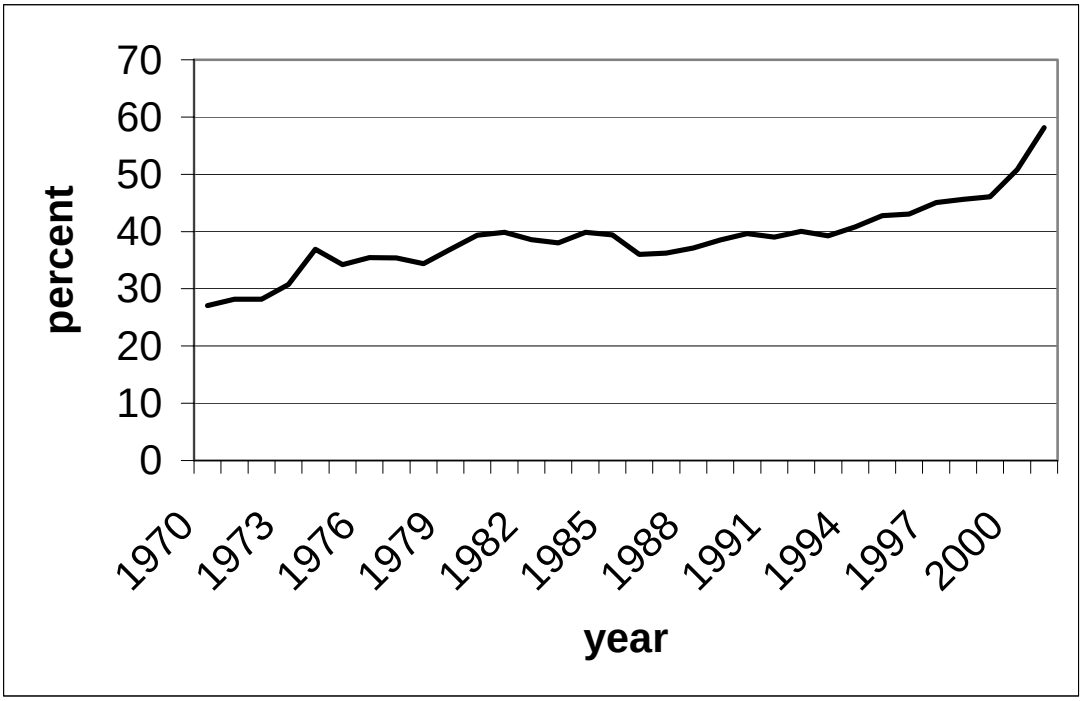
and our extended H-O model emphasise the effect of trade *composition* on regional inequalities, rather than trade *per se*. From this point onwards, it seems to be the assumptions that surround the relationship between trade in agriculture and trade in manufacturing that may hold a greater sway over the evolution of regional disparities. If agricultural production and workers are assumed to be less mobile than those of manufacturing, then Paluzie (2001) and the H-O model we have discussed first, might predict rising inequalities as manufacturing trade increases. On the other hand, if the lack of mobility assumptions in the primary sector are relaxed, new economic geography models à la Krugman and Livas (1996) and some H-O analyses could result in falling inequalities as manufacturing trade develops. Clearly, there is a need for some empirical investigation. The following two sections of this paper set out the trends under discussion – increasing trade flows (and their composition) in section two and rising regional inequalities in section three. Section four then examines how these trends interact, and the implications for developed and developing countries.

2. Increasing Trade Flows

By any number of measures, the increase in trade flows over the last twenty-five years has been dramatic and pervasive. Trade in manufacturing, as well as trade in services, both exports and imports and merchandise trade as well as foreign direct investment, have all shown remarkable acceleration since at least the start of the 1980s. Importantly, trade has not only increased, but also begun to account for an increasing proportion of production. Increasing trade has led to a dilution of the traditional three-centred pattern of international trade, drawing increasingly far-flung countries into the mainstream trading community. This can be seen especially clearly in the case of the

emerging East Asian Economies in the mid to late 1990s. But a similar reorientation to the world economy has occurred across Latin America as import-substituting models of development were abandoned in favour of more export-orientated ones over the period. Hence Argentina, Brazil, Chile, Mexico and Peru have all entered into far closer trading relationships than before the 1980s, when import-substitution prevailed. Moreover, both China and India have explicitly attempted to open their economies since 1978 and 1991 respectively – with all the implications that the opening of such huge countries entails. Alongside this, the transition of Eastern Europe and the demise of the former USSR has also contributed to rising trade flows. And, within Europe, on-going economic and social integration has propelled trade both between the European partners and outside the European region.

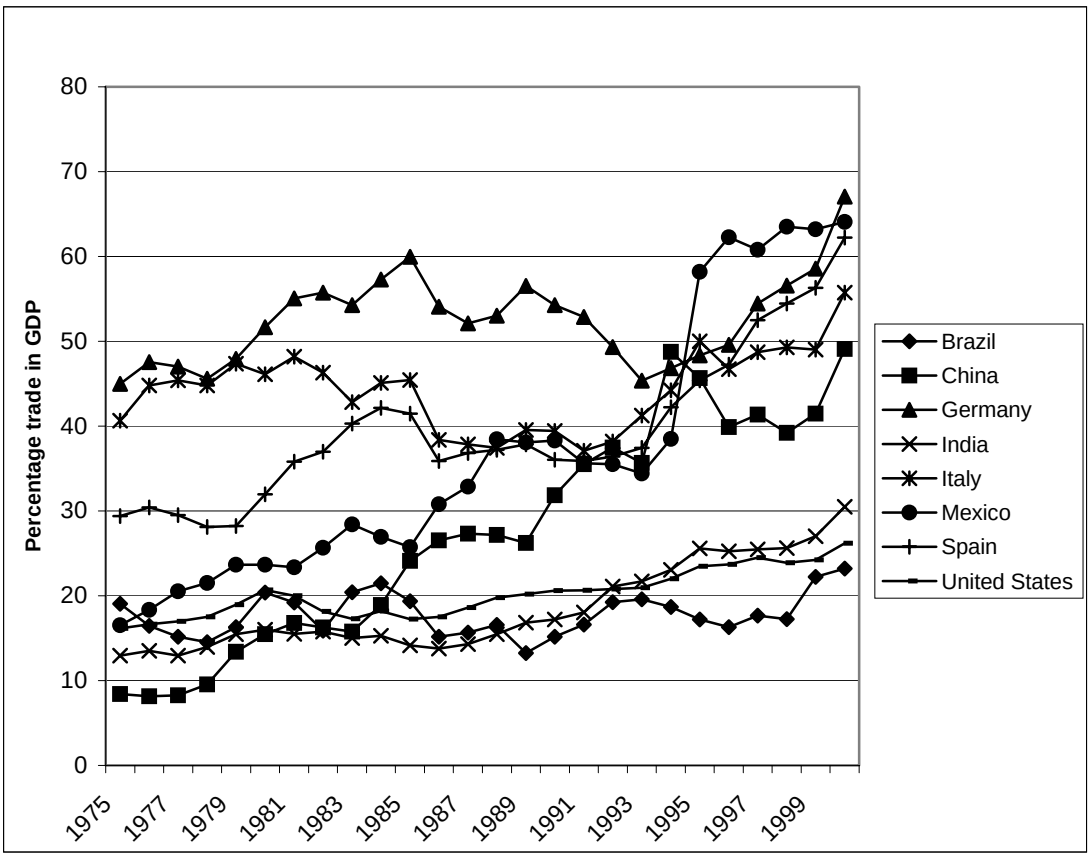
Figure 1. Trade as a percentage of world output



Source: World Bank, World Development Indicators

Taken together it is no surprise that these developments have caused trade to rise dramatically in recent years. Figure 1 shows the rise in trade as a percentage of world GDP. From 1970 to 2001 the percentage of world output that was traded between nations rose from 27% to just under 60%, an effective doubling over just thirty years, with the biggest increase taking place during the 1990s.

Figure 2. Proportion of output traded for our chosen countries



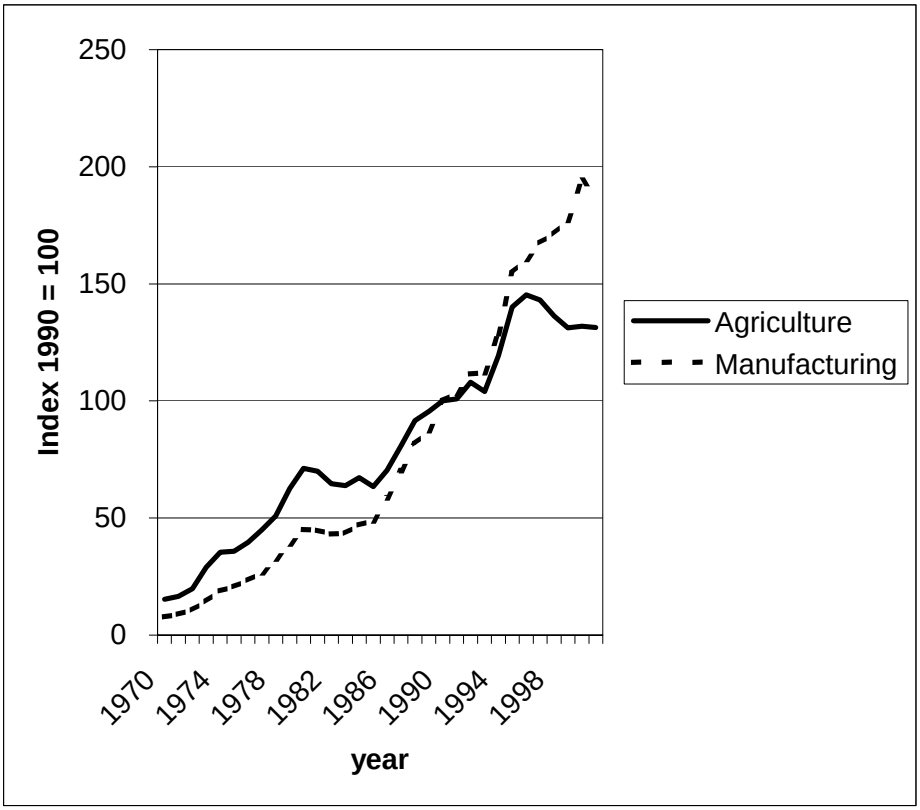
Source: World Bank, World Development Indicators

Figure 2 shows the proportion of output traded by the eight countries that form the basis of this paper. Again there is a consistent increase across the period. The average proportion of output traded in our sample rose from 23.5% in 1975 to 47% in 2000 – once again a doubling over the period. Our chosen countries might be expected to

show smaller trade shares than the world in general, simply because they are relatively large economies with large internal markets, so, in the case of the United States, for example, only one quarter of its output is traded externally because so many needs are meet within its national boundaries. Nevertheless, our group of countries mirrors the world trend towards increasing trade flows. In some cases, like that of China, Mexico and Spain, the growth of trade as a percentage of national GDP well exceeds the world average. In other cases, such as Brazil, India, Italy, Germany or the US, the expansion of trade is more moderate, although key political decisions such as the single European Market contributed to boost trade in the 1990s in the cases of Germany and Italy, while economic reform in 1991 had a similar effect for India.

Moreover, not only has the volume of trade increased, but its composition has also shifted – a feature that takes on considerable significance in the light of the theoretical discussion in section one. Figure 3 shows the growth in agricultural and manufacturing trade in the world economy since 1970. Although both sectors started from different positions, agricultural trade expanded alongside manufacturing trade for most of the period. This despite the ongoing trade liberalisation of manufactures while agricultural products remained largely protected. Nevertheless, by the mid 1990s agricultural trade could not keep pace with manufacturing, partially as a result of the sectorally biased nature of trade liberalisation initiatives. Consequently, agricultural trade began to contract, while manufacturing continued to expand.

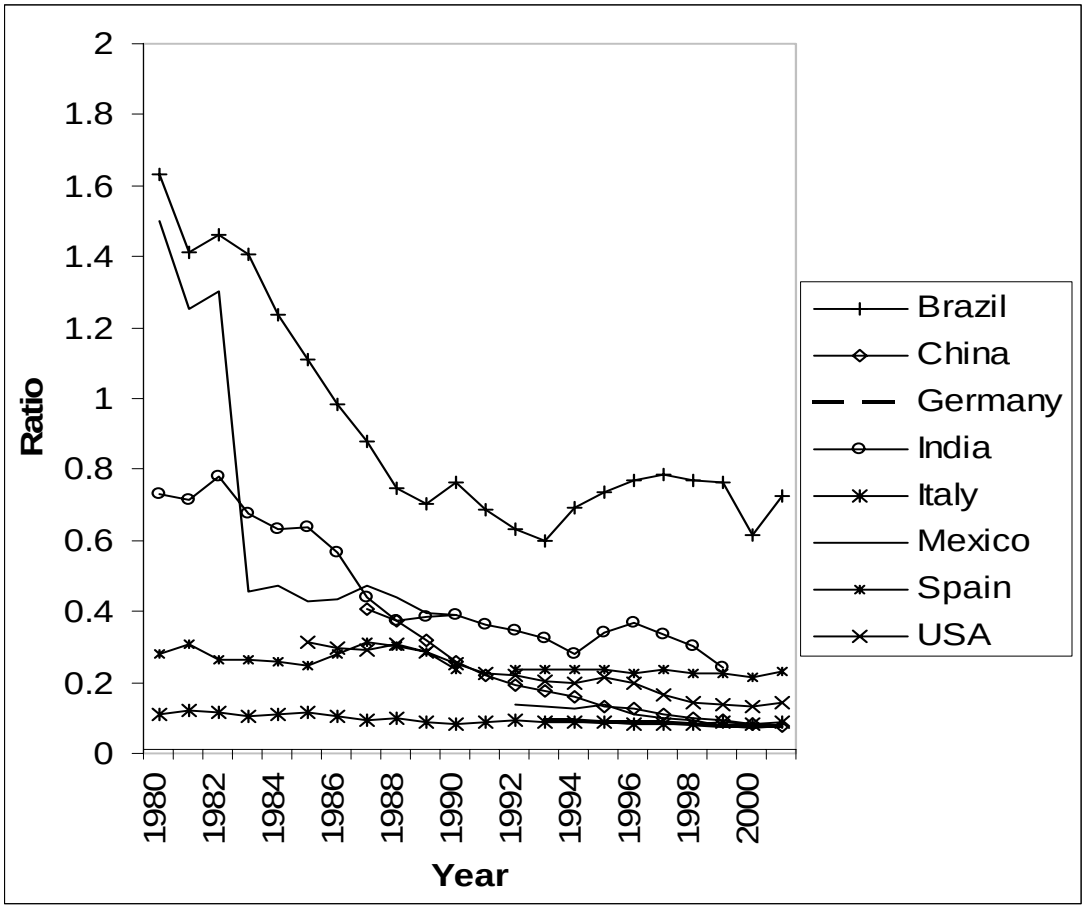
Figure 3. Evolution of world trade in agricultural and manufacturing products



Source: World Trade Organisation, 2001

Figure 4: Agricultural to Manufacturing Export Ratios For our Eight Case Countries

Source: Comtrade, United Nations Statistics Division



In terms of their relative weights in world trade, agricultural trade has therefore been progressively undermined by the importance of manufacturing, and later, services. Figure 4 shows the evolution of the ratio of agricultural to manufacturing exports for each of our eight chosen countries[4]. As is readily apparent, the proportion of agriculture to manufacturing has fallen steadily since 1980 on average. For example, Brazil's ratio fell from 1.6 in 1980 to below parity in 1985 and now stands at just over 0.7 (Figure 4). So for every unit of manufactures exported from Brazil, under half the value of agricultural products were exported in 2001 as in 1980. China experienced similar declines, from 0.75 in 1980 to over 0.4 in 1987 to just 0.08 in 2001. The most spectacular change, however, has taken place in Mexico, where the agricultural to manufacturing trade ratio fell from 1.49 in 1980 to 0.07 in 2001. On a less pronounced scale, the developed countries underwent similar changes, although for them, the ratio of agricultural to manufacturing exports was already so small as to make further reductions less likely. Hence, between 1980 and 2001 Italy saw its ratio of agricultural to manufacturing exports fall from 0.11 to 0.085, and Spain also experienced a steady decline, from 0.28 to 0.23. Indeed, in every case, our chosen countries exhibited some reduction of the ratio of their agricultural to manufacturing export values as manufacturing trade experienced liberalisation while agricultural products remained highly protected (see Pugel and Lindert, 2000).

To summarise the above discussion, two major points of interest can be drawn out that will be useful for our analysis in section four. The first is that trade in general increased dramatically since 1980, and that this increase was sourced from a variety

[4] Agricultural exports are defined here, as they are throughout the paper's discussion of statistics, as the sum of exports classified under SITC one digit codes 0,1 and 2 as defined by the United Nations Statistics Division. Manufacturing trade is similarly defined as the sum of SITC codes 6,7 and 8. See http://unstats.un.org/unsd/comtrade.

of areas of the world, with few exceptions. Relative to production, trade doubled since 1970 and without considering production, the absolute value of trade increased fourteen-fold since 1950. And the second notable feature of the trends outlined is that agricultural trade did not increase to the extent that manufacturing trade did. This may largely be a result of the biased trade liberalisation initiatives that the WTO (formerly GATT) has implemented over the period. Again, this is a pervasive trend on the evidence of our case countries, and has led to a lessening of the relative importance of agricultural exports.

3. The Increase in Regional Inequalities

While the trend towards increasing trade flows is well-known, the trend toward increasing regional inequalities is less well documented, and yet almost equally as pervasive. Regional inequalities in most countries are either stable or increasing with remarkably few exceptions (Rodríguez-Pose and Gill, 2004). Table 1 documents this phenomenon for our case countries. The evolution of the variance of the natural logarithm of regional GDP per capita is charted for each of them.

Table 1

Variance of the Log of Regional GDP per Capita						
	Year			**% change**		
Developing Countries						
	1980	**1990**	**2000**	**1980-90**	**1990-2000**	**1980-2000**
China	0.578	0.483	0.581[a]	-16.31	20.20	0.60
India	0.273[b]	0.312	0.385[a]	14.00	23.52	40.81
Mexico	0.376	0.388	0.432[a]	3.28	11.18	14.82
Brazil	0.601	0.556	0.553[a]	-7.56	-0.46	-7.98

Developed Countries						
	1980	**1990**	**2000**	**1980-90**	**1990-2000**	**1980-2000**
US	0.143[c]	0.175	0.165	22.19	-6.03	14.83
Germany	0.094	0.096	0.088[d]	2.03	-8.43	-6.57
Italy	0.265	0.269	0.268	1.48	-0.23	1.25
Spain	0.207	0.199	0.219[d]	-3.87	9.82	5.58

The analysis is conducted for only the 14 most populous states in India, for the Länder of the former Federal Republic of Germany and Berlin West in Germany, for the 48 contiguous continental states in the US, excluding Alaska, Hawaii and the District of Columbia, and without the North African enclaves of Ceuta and Melilla in the case of Spain.

[a] 1999

[b] 1981

[c] 1977

[d] 2001 .

Several important factors emerge from the results of Table 1. First is the different dimension of regional inequalities in developing and in developed countries. Regional inequalities are considerably larger in the four developing countries included in our sample. In the US and especially in Western Germany, in contrast, intra-regional differences in wealth are much less noteworthy. Italy and Spain belong to an intermediate category. Nevertheless, internal imbalances in Italy in 2000 – the developed country with the highest intra-national wealth gap among our cases – are close to 50% lower than those found in India, and less than half those of Brazil or China.

The second factor worth highlighting is the general tendency towards increases in the variation between regional GDPs within countries. Regional inequalities have risen in all our case countries since 1980, with the exception of Brazil and Germany. The strength of the trend varies substantially, with India, the US and Mexico displaying the greatest rates of divergence, with disparities increasing by 40.8, 15.4 and 14.9% respectively over the period between 1980 and 2000. At the other extreme, China shows the weakest increase – only a 0.6% change – largely resulting from a strong

decline in disparities during the 1980s, when her log variance of regional GDPs fell from 0.578 to 0.483, which was completely reversed in the following decade. Moderate increases are observed in the cases of Italy and Spain.

The only exceptions to the general rule of rising inequalities are Brazil and Germany. In Germany the reduction of regional inequalities during the 1990s represents a reversal of its moderately divergent trend between 1980 and 1990 and can be almost entirely attributed to German reunification. Reunification led to a sharp drop in inequalities between the Länder of the former Federal Republic of Germany between 1990 and 1991. Since then, regional inequalities among western regions of the country have followed a rising trend (see Figure 5). Brazil, despite the notorious relative power of its state governments (Rodden, 2003), is a more genuine case of reduction in regional disparities. Its internal differences in 1980 made Brazil the most unequal country in the world. A sharp decline in regional disparities followed between 1980 and 1982 and since then the evolution of inequalities has fluctuated erratically, with a tendency for inequalities to increase until 1994, and a decline in the last five years of the century.

The timing of increases in regional disparities also varies between developed and developing countries. The greatest increase in Germany, Italy and the US took place during the 1980s, with the 1990s displaying moderate declines in all three countries. Spain is the only developed exception, as regional disparities increased considerably in the 1990s. Among the four developing countries included in our sample, however, the trend has been towards an acceleration of the growth of regional disparities in the 1990s with respect to the 1980s, coinciding also with a greater openness of these

countries to trade. In Brazil the trend has been towards a deceleration of the regional convergence process.

One further observation relating to table one is worth noting. While trade as a percentage of GDP increased for all our eight case countries without showing a marked pattern between developed and developing countries (see Figure 2), it is the sectoral trade ratio charted in Figure 4 that seems to exhibit some temporal coincidence with rising regional inequalities. Specifically, all four developing countries in Figure 4, as well as the USA, experienced sharp declines in their agricultural to manufacturing export ratios, in part because their agricultural exports were more significant initially. It is our intention in this paper to explore the link between changes in agriculture to manufacturing export ratios and the evolution of regional disparities more closely.

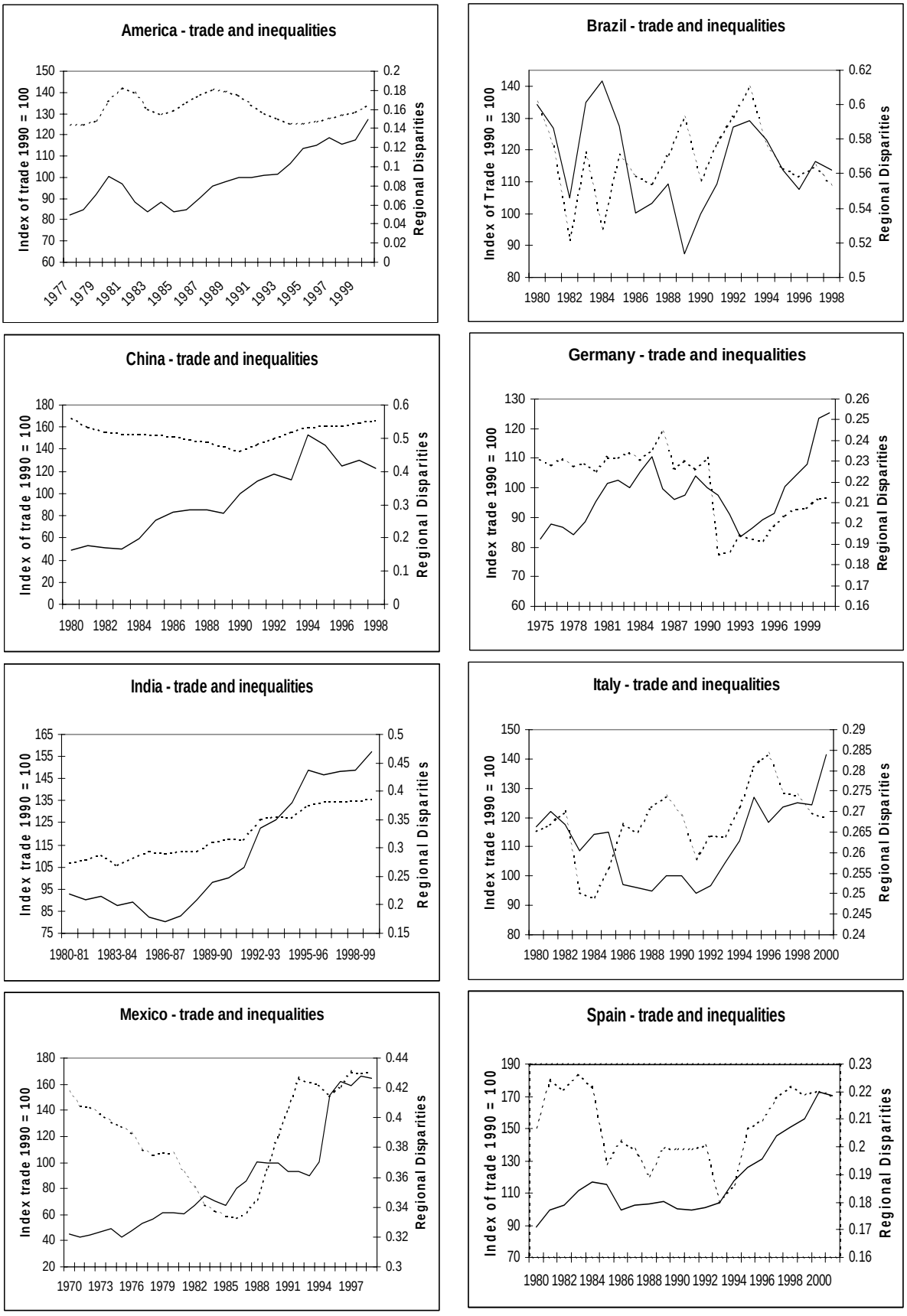
In short, this section has established a common and general trend towards divergence, or at least a discontinuity of convergence, across our case countries. Numerous factors may affect the evolution of regional inequalities, including the global trend towards devolution (Rodríguez-Pose and Gill, 2003), factor trading and nationally based policies. It is our aim in the next section to establish whether trade and trade composition also play some part in determining spatial disparities.

4. A Relationship Between Trade and Regional Inequalities?

Trade and inequalities

In this section we examine to what extent there is a link between trade and regional inequalities and attempt to establish the direction of that relationship. Firstly, we analyse the relationship between the volume of trade a country conducts and its level of spatial disparities. Following this, we examine the relationship between the composition of trade and regional inequalities, run some basic tests concerning the robustness of our findings, and finally discuss these results at the end of the section. Figure 5 documents the correlation between the evolution of the coefficient of variation of the natural logarithm of regional GDPs and that of the percentage of output traded for our eight case countries. The dashed line represents the evolution of regional disparities, whose scale is depicted on the right-y axis. The continuous line represents a trade index where 1990 trade levels are set to 100. The scale is represented on the left-y axis.

Figure 5. The evolution of trade and inequalities.



While, at first sight, there seems to be some evidence of a relationship between trade and regional inequalities in a few of the cases – such as in Italy, India and perhaps Brazil – the majority of countries display no such correlation. In the US, disparities vary only slightly, while trade increases throughout the period, and in China disparities fall and then increase as trade increases. Mexico and Spain follow a similar pattern to China, with falling and then rising disparities as trade increases. And in Germany, there is little sign of any association between the increase in trade from 1975 to 1989 and the evolution of regional inequalities, although after the exogenous shocks resulting from reunification during the late 1980s and early 1990s some positive correlation between the two variables is evident. In general, then, there seems to be no consistent evidence of a relationship between trade and regional inequalities, and no agreement, where a relationship is suggested, over its direction.

In terms of the theoretical discussion of section one the lack of a consistent relationship between regional disparities and trade should come as no surprise. All the theories and ideas that were discussed had the common feature of emphasising the sectoral composition of trade as a determinant of regional inequalities. Most theories that link trade and inequality assume two sectors and make predictions, either implicitly or explicitly, based on relative trade shares between manufacturing and agricultural imports and exports. As seen in section two, the amount of agricultural trade grew parallel to that of manufacturing until the mid-1990s, and, as recently as the mid 1980s, agriculture dominated the exports of some of our case countries. Even as recently as 2001, agriculture played a large part in their export mixes when the ratio of agricultural to manufacturing exports stood, on average, at over 0.2. Clearly, the importance of recognising the differences between these two sectors has not

diminished. It is vital, therefore, to test not only the evolution of trade flows, but also the evolution of the composition of trade. Only when these two factors are taken together is the theory given a fair chance.

Trade Composition and Regional Inequalities

The question we now address is whether or not trade composition has any effect on regional disparities. The first point to note is that trade composition cannot have an effect on regional disparities if there is no trade. Hence, in order to answer our question, we have to take into account the degree to which a country is involved in trade. If there is little involvement, then trade composition cannot be expected to be important to domestic economics, and therefore have an influence on determining regional inequalities. In order to assess the impact of trade composition on regional inequalities, an index of trade composition, *weighted* by the degree to which a country trades, is proposed.

For our measure of trade composition, we focus on the ratio of primary to secondary exports. Exports are more useful than imports for our purposes, since all the theories and ideas discussed in section one are essentially supply-side arguments and it is exports that are sourced from domestic industry. We define primary and secondary traded commodities using the United Nations' Standard Industrial Trade Classifications (SITCs), which work on a similar, numeric-nested, principle to standard industrial classifications. Hence, primary sector exports are defined as the sum of SITCs 1 - food and live animals; 2 – beverages and tobacco; and 3 – mineral fuels, lubricants and related materials. Secondary sector exports are made up of SITCs

6 – manufactured goods classified chiefly by material; 7 – machinery and transport equipment; and 8 – miscellaneous manufactured articles. The missing SITCs that do not enter into the calculations cover products that are difficult to fit into the conceptual model of primary and secondary industries, as well as those that could only be classed under tertiary or quaternary activities. By dividing the change in the share of primary exports by the change in the share of secondary exports and weighing the result by the percentage of GDP traded by each of our case countries during the period taken into consideration, a simple index of the agricultural to manufacturing export ratio is obtained. This trade composition index captures the basic aspects of the models and ideas discussed in section one, and by plotting the change in the index against regional inequalities we obtain some notion of how relevant – and in what ways – the evolution of the size and the composition of trade is for determining inequalities.

The index is constructed in the following way:

$$TCI_{t-0} = \left[1 - \frac{AE_t / ME_t}{AE_0 / ME_0}\right] \bullet \left[\frac{[(T_0 / GDP_0) \bullet 100] + [(T_t / GDP_t) \bullet 100]}{2}\right]$$

Where:

TCI is the trade composition index,

AE denotes agricultural exports,

ME denotes manufacturing exports,

T represents total trade,

GDP the total GDP of a country,

and 0 and *t* represent the beginning and the end of the period of analysis respectively

The first half of the index captures the changing export composition in each of the eight countries included in the analysis. If the agricultural to manufacturing export ratio increases, the index falls, since this term will be negative. If, on the other hand, there is a decline in the ratio of agricultural exports to manufacturing exports, then the index rises. The second half of the index represents the average proportion of GDP traded during the period of analysis. The higher the level of trade, the greater the dimension of the index in absolute numbers.

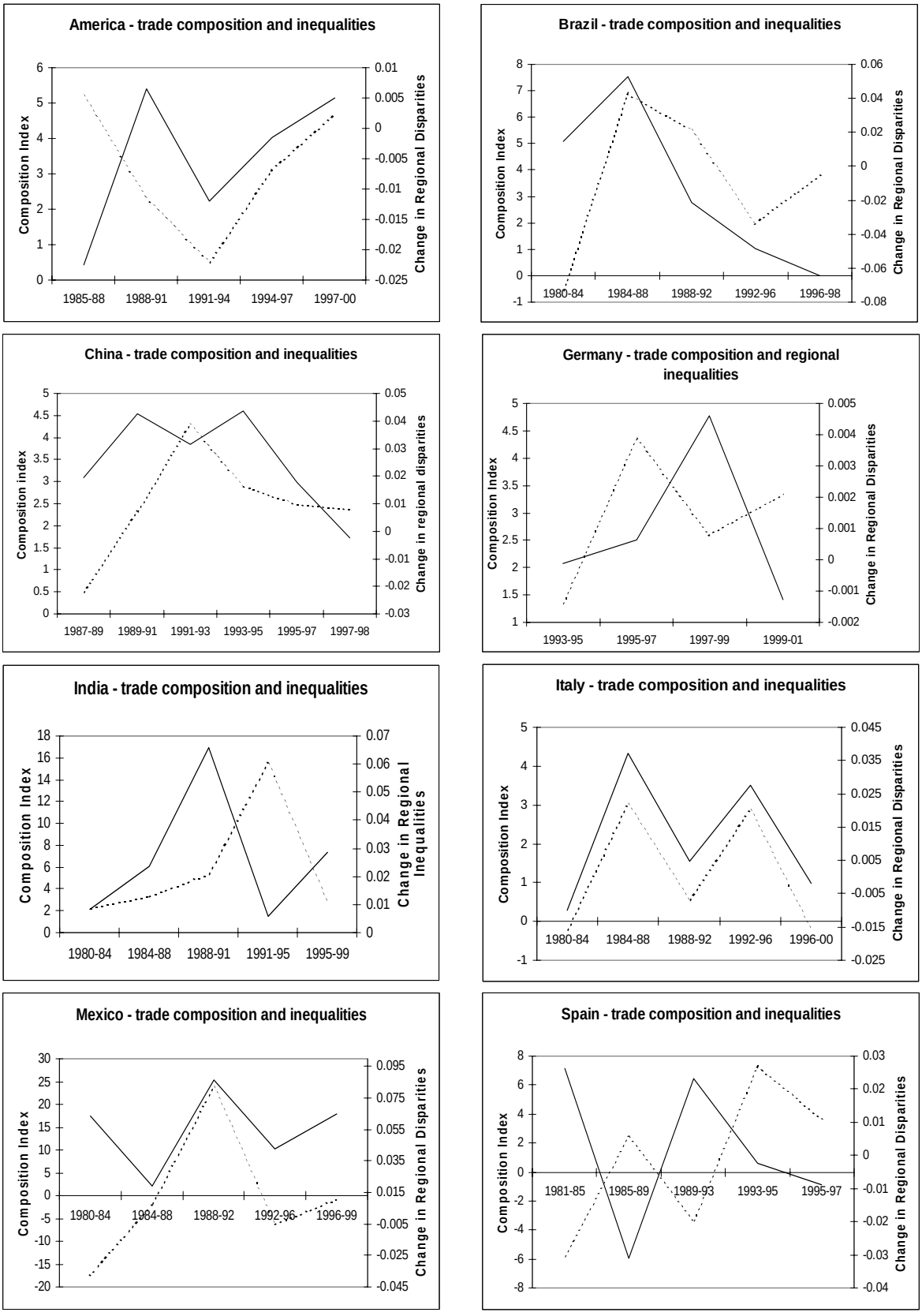
The results of the trade composition index for three to four year periods are plotted against the evolution of regional inequalities in each of our case countries in Figure 6. If the theories that suggest that trade composition is one of the determinants of regional inequalities are correct, then changes in the index will precede changes in the level of regional inequalities in a fairly systematic way. Moreover, if there is a negative relationship then this can be taken as support for different ideas and theories discussed in section one than if the relationship turns out to be positive. We are therefore looking for three things.

Firstly, if there is no correlation between regional inequalities and the index, then trade composition may not have an influence in determining spatial disparities (null hypothesis). Secondly, if there is a negative correlation between the evolution of the trade composition index and that of regional disparities, this would indicate that as the agricultural to manufacturing export ratio fell, regional inequalities also tended to fall (hypothesis one). This finding would be consistent with Krugman and Livas' (1996) and some H-O arguments. And third, if there is a positive relationship – inequalities

rise as the trade composition index rises – this would mean that a fall in agricultural relative to manufacturing exports is associated with a rise in regional inequalities (hypothesis two). This could be taken as support for both Paluzie's (2001) ideas as well as some of the simple extensions of the H-O theory set out in section one. This relationship is charted in Figure 6, where the change in regional inequalities is represented by a dashed line (with values plotted on the right hand side y-axis), and the trade composition index by a solid line in each of the following graphs (with values plotted on the left hand side y-axis)[5].

[5] Data from the early 1980s for China was unavailable, and in the German case, the period after reunification and its immediate aftermath forms the subject of analysis.

Figure 6. The link between change in trade composition and the evolution of inequalities



A visual inspection of the graphs in Figure 6 suggests a consistent relationship between regional inequalities and the trade composition index. In most cases changes in the index match and frequently precede changes in the evolution of regional disparities. That is the case, for example, in India, Italy and Spain, where regional disparities seem to follow the pattern traced out by the index across numerous pits and troughs. In Brazil and China, the index initially increases and then falls, and regional disparities mirror this trend after a certain lag. In the US, after an early period where there is no clear connection, a falling index is accompanied by falling disparities during the late 1980s, and then rising disparities accompany a rising index thereafter. And in Mexico, since the opening of the country to trade in the mid 1980s, the evolution of regional disparities follow a similar pattern to that of the index. Germany displays the weakest association between changes in the trade composition index and the evolution of regional inequalities, with the index seemingly following trends in disparities, which runs counter to the causality that seems to emerge from other countries. Overall, it could be said that the graphs in Figure 6 are highly suggestive of our second hypothesis. Increases in trade, combined with a progressive shift from trade in agriculture, fisheries and raw materials to trade in manufacturing seem to precede a rise in regional disparities.

A reasonable objection to this sort of analysis is that of omitted variable bias, that is, both changes in the composition of trade and regional disparities may be driven by other factors, such as changes in GDP, especially given the seemingly cyclical nature of some of the fluctuations. However, having run visual comparisons of both the trade composition index to GDP (see Appendix 1) and regional inequalities to GDP (Appendix 2) for each country, such relation is much less evident than that between

changes in the composition of trade and regional inequalities. Only in the Mexican case was there a possibility that changes in GDP were driving both changes in the sectoral composition of trade and the evolution of regional disparities. In the cases of Brazil, Germany, India, Italy, Spain and the USA there was no consistent relationship between GDP and either of the variables, and in China, the changes in the index and regional inequalities appeared correlated but changes in the index came before the GDP changes.

As a result of this analysis, a relationship between trade composition and regional inequalities can be inferred. In six out of eight of our case countries, there appeared to be a positive relationship. In Mexico, the seventh, there was evidence of a correlation but also of the fact that the evolution of trade and regional inequalities may also be associated to changes in GDP. The only country that yielded no support for our second hypothesis was Germany. Hence it can be concluded that the ratio of agricultural to manufacturing exports is to some extent negatively related to regional inequalities. The remainder of this section goes on to discuss what the implications of these results may be for developed and developing countries.

Implications of the Results

What are the implications of the finding that the general rise in trade, coupled with a fall in the proportion of agricultural goods in the composition of that trade is connected to a rise in regional disparities in developing and developed countries? Our findings suggest that the recent expansion of manufacturing trade, in many cases at the expense of trade in agriculture and other primary sector goods, is likely to benefit

manufacturing workers and areas. As manufacturing areas frequently coincide with large urban concentrations and with relatively well-off territories, the increase in manufacturing trade relative to agricultural trade seems to be benefiting rich regions at the expense of less prosperous ones, thus increasing regional disparities (Leichenko and Silva, 2004). Other factors, such as the existence of nodal infrastructure systems, may have contributed to the rise of inequalities as trade increases. Transport costs can be expected to increase outwards from transport hubs, reflecting the declining density and efficiency of transport networks in more remote locations (see Button, 1993). Hence, with the opening to trade, core areas with better transport infrastructure endowments are likely to remain the easiest and cheapest locations from which to service national and international markets, as well as the cheapest destinations for imported inputs from trading countries.

The evidence of rising intra-national inequalities associated with growth in manufacturing trade is likely to have graver consequences for developing than for developed countries. The developed countries included in our sample are characterised for a very low (the US and the western Länder of Germany) or moderate (Italy and Spain) territorial inequalities. Most of their international trade is also in manufacturing goods, with a minimal volume of trade in primary products and goods in relative terms. Hence, any increase in trade is unlikely to accompany reductions in their meager agricultural to manufacturing trade ratios, and therefore any resulting increases in regional disparities are expected to be small. In developed countries, industry – as a consequence of its greater maturity – is also less concentrated in and around primal cities and core areas and more evenly spread across the country than in the developing world. The range of areas that may benefit from an expansion of trade

in manufacturing goods is thus larger than in most developing countries. Finally, given the relatively small dimension of regional disparities in developed countries, a moderate increase of territorial disparities as a result of increases in trade is unlikely to cause economic and/or social unrest and to jeopardize existing political systems.

The stakes for most developing countries are much higher. First, regional disparities within these countries are far greater, and are already at the root of political (as in the case of the Zapatista movement in Mexico) and social (as in the case of the North East of Brazil) discontent. The margin for an increase in intra-national disparities is therefore much tighter. Second, the relative volume of agricultural and other primary sector trade in countries such as Brazil or India is still significant, and the margin for a decline in this sort of trade is still important. Finally, there is a greater concentration of manufacturing activity in and around primal cities in most developing than in developed countries. Given the dimension of trade-distorting farm support measures, tariffs on farm goods and agricultural-export tariffs and the lack of agreement in WTO rounds over reform on agricultural subsidies, the scope for world-wide growth in agricultural trade is limited. This means that at least in the short-term countries such as Brazil or India, with a greater reliance on trade in agricultural or mineral goods, have a greater potential to see regional disparities grow, with grave economic, social and political consequences for these countries.

4. Conclusion

This paper set out to explore the link between trade and regional inequalities. On the empirical side, there is some evidence of a relationship between the two when trade

composition is accounted for – a result that is not surprising given that all the theory emphasises the role of sectoral distinctions in the impact of trade. Hence, in six, and possibly seven, of the eight case countries that formed the subject of our investigations, there was evidence that changes in trade composition preceded changes in regional disparities, given that trade itself was significant. Specifically, as agricultural exports became less important than manufacturing exports, regional disparities seemed to increase, whereas when agricultural exports became more important, disparities tended to decline.

This evidence fits into the global picture of trade, trade composition and regional inequalities well. The volume of trade as a proportion of production has increased dramatically since the 1970s, implying that trade composition has been taking on more significance in the determination of regional disparities. Concurrently, trade composition itself has evolved, seeing agricultural exports fall in importance relative to manufacturing exports. These trends have contributed to a rise of regional inequalities within countries – a fact that is congruent with the findings of this paper. It is our contention that, while numerous factors determine both the degree to which countries trade and the level of spatial income disparities within them, the changes in trade volume and composition witnessed over the past thirty years have contributed in some part to the rise in regional inequalities witnessed over the same period.

Developing countries face greater challenges as a result of this link between changes in the composition of trade and the rise of regional inequalities. Because of the greater dimension of their regional disparities, their larger reliance on primary sector trade, and the protection of agricultural markets across the world, any increase in

manufacturing trade will ultimately exacerbate the problem of internal inequalities and put economic, social and political systems under further strain.

References

Button, K. J., 1993, *Transport Economics*, 2nd edit., Aldershot: Edward Elgar.

Esteban, J. M., 1994, La desigualdad interregional en Europa y en España: descripción y análisis, *Crecimiento y convergencia regional en España y Europa.* Institut d'Anàlisi Econòmica

Fischer, M. J., 2003, The relative importance of income and race in determining residential outcomes in U.S. urban areas, 1970-2000, *Urban affairs review*, May Vol. 38, No. 5, pp. 669-696

Hanson, G., 1992, *Industry Agglomeration and Trade in Mexico*, MIT Ph.D. thesis.

Hanson, G., 1996, Economic Integration, Intraindustry Trade and Frontier Regions, *European Economic Review* 40, pp 941-950.

Hanson, G. (1998b) "North American Economic Integration and Industry Location", NBER Working Paper Series No. 6587.

Hatton, D.J., and J.G. Williamson, 1991a, Integrated and Segmented Labor Markets: Thinking in Two Sectors, *Journal of Economic History* 51(June): 413-25.

Krugman, P. and Livas Elizondo, R., 1996, Trade policy and the Third World Metropolis, *Journal of Development Economics*, 49: 137-150

Krugman, P., 1991, Increasing returns and economic geography, *Journal of Political Economy*, June

Leichenko, R and J. Silva, 2004, International trade, employment, and earnings: Evidence from rural counties. *Regional Studies*, Forthcoming.

Paluzie, E., 2001, Trade policy and regional inequalities, *Papers in regional science*, Jan Vol.80, No.1, pp.67-86

Puga, D., 2002, European regional policy in light of recent location theories. *Journal of Economic Geography* 2: 373-406.

Pugel, T., A. and Lindert, P., H., 2000, *International Economics*, 11th edit., Boston: McGraw-Hill.

Rodden, J. (2003) Federalism and bailout in Brazil, in Rodden J., Eskeland G.S. and Litvack J.I. (eds.) *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, pp. 213-248. MIT Press, Cambridge, Mass.

Rodríguez-Pose, A. and Gill, N., 2003, The global trend towards devolution and its implications. *Environment and Planning C: Government and Policy*, **21,** 3, 333-51.

Rodríguez-Pose, A. and Gill, N., 2004, Is there a global link between regional disparities and devolution? *Environment and Planning A*, **36**

Rodrik, D., 2003, Free trade optimism, *Foreign affairs*, May-Jun, Vol.82, No.3, pp.135-140

Sachs, J. D. and Warner, A., 1995, Economic reform and the process of global integration, *Brookings Papers on Economic Activity*, No. 1, pp1-118.

Sánchez-Reaza, J. and Rodríguez-Pose, A., 2002, The impact of trade liberalization on regional disparities in Mexico. *Growth and Change*, **33**, 1, 72-90.

Silva, J. and Leichenko, R., 2004, Regional income inequality and international trade. *Economic Geography*, forthcoming.

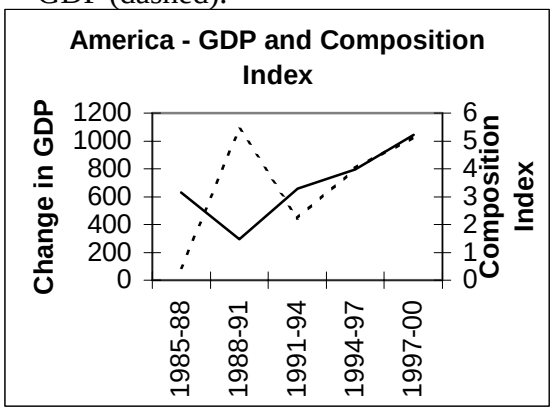
Squire, L., 1981, *Employment Policy in developing Countries*, Oxford: Oxford Univ. Press.

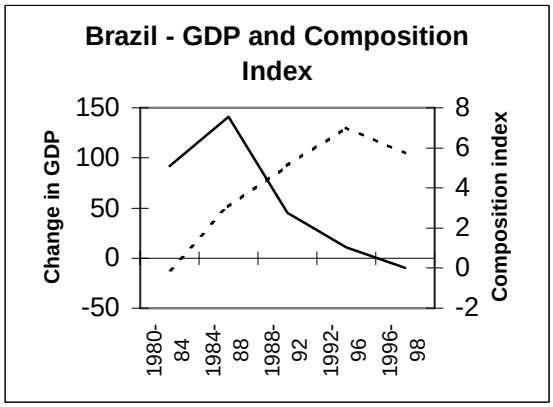
Storper, M., Chen, Y.C., and de Paolis, F., 2002, Trade and the location of industries in the OECD and the European Union, *Journal of Economic Geography* 2, pp. 73-107.

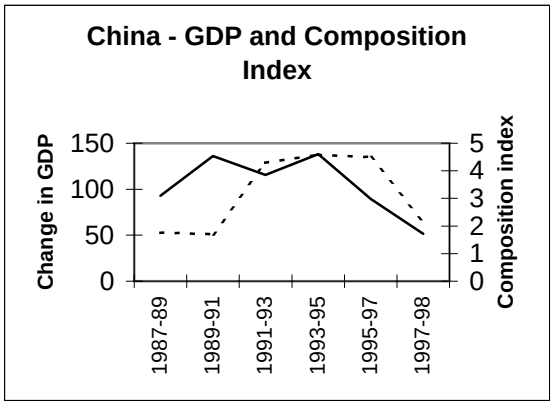
Wallace, D., 2002, *Agricultural Workforce in Washington State 2001*, Economic and Policy Analysis Unit, Washington State Employment Security Department

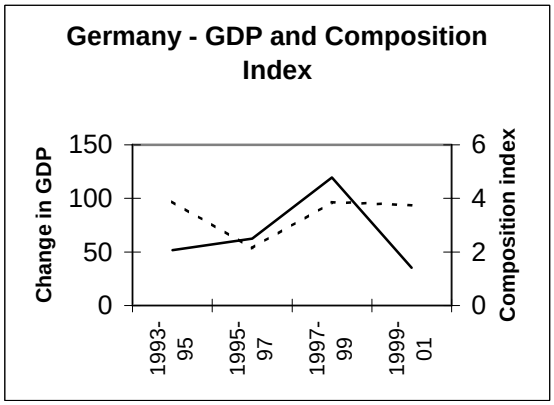
Appendix 1

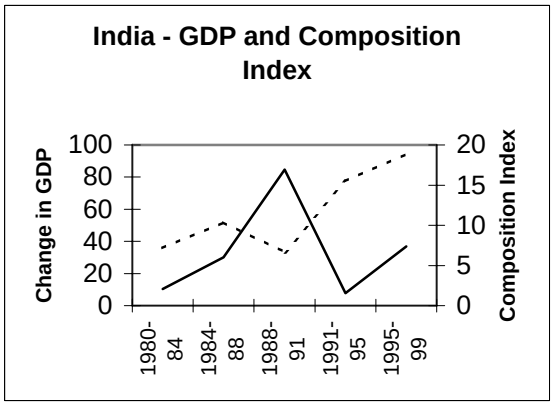
The relationship between changes in trade composition (solid) and changes in GDP (dashed).

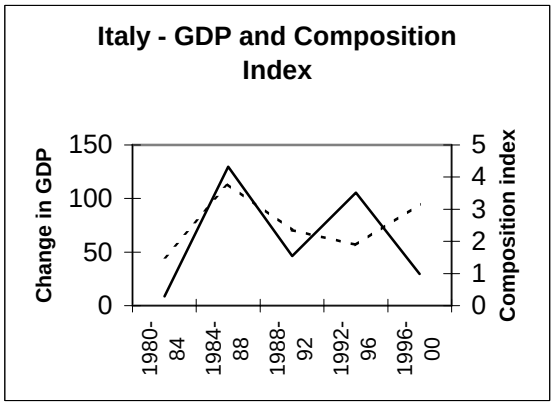


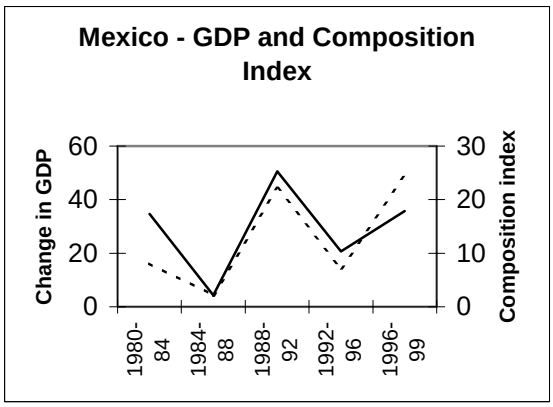


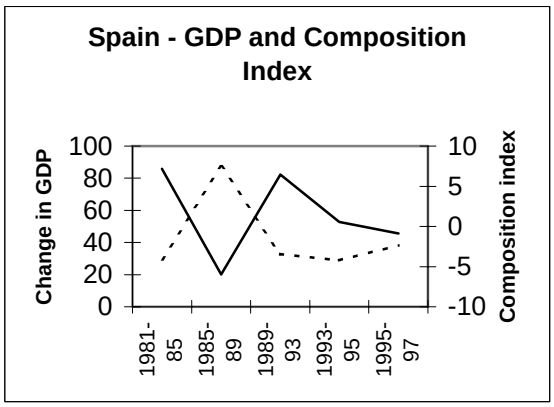








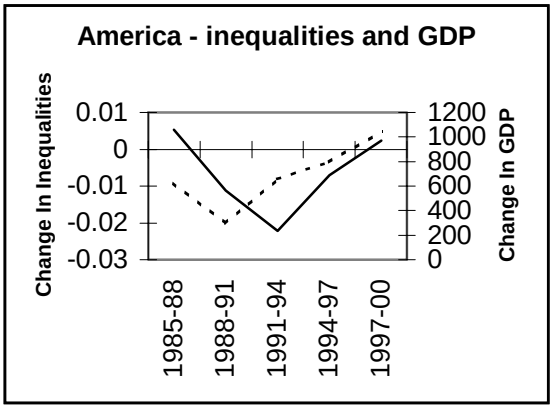


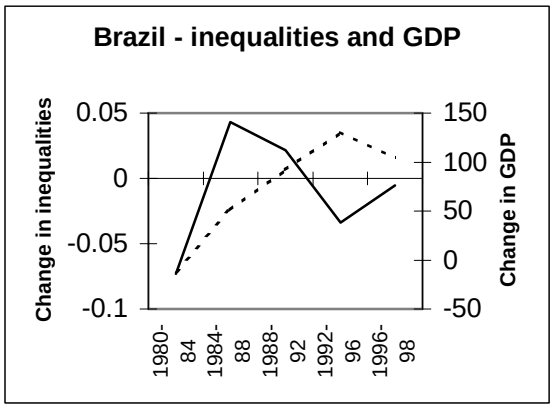


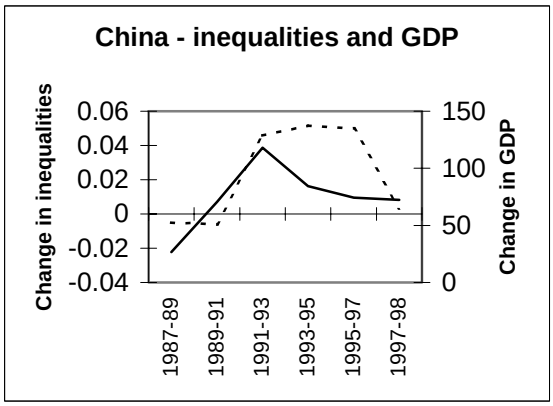
GDP figures all in million 1995 US$ (constant). Source: World Bank. Composition index various sources (see text).

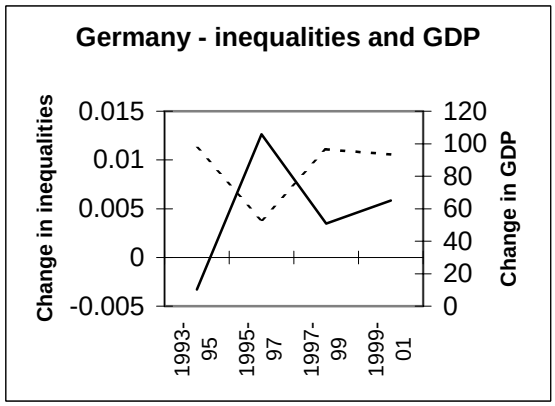
Appendix 2

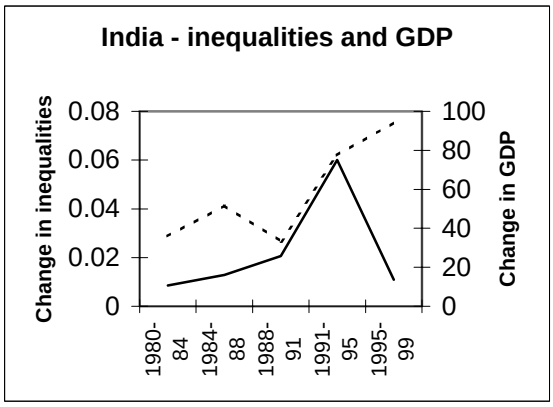
The relationship between the evolution of regional inequalities (solid) and changes in GDP (dashed).

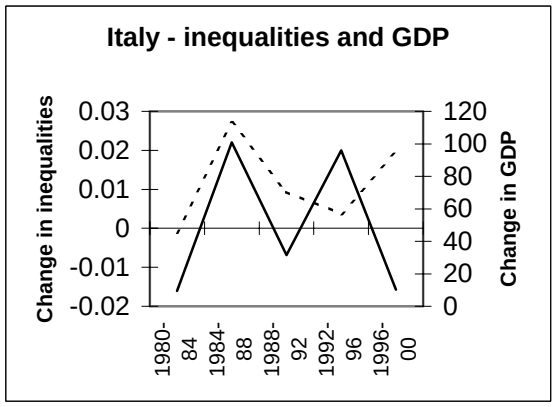


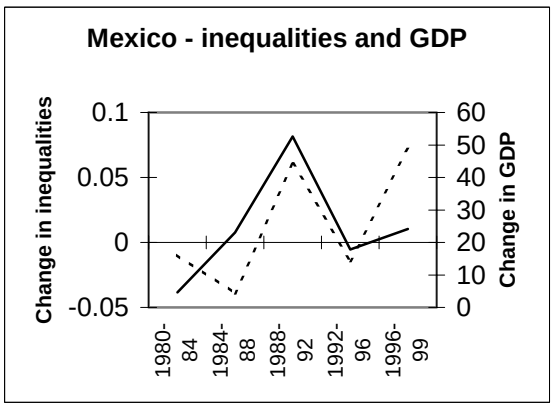


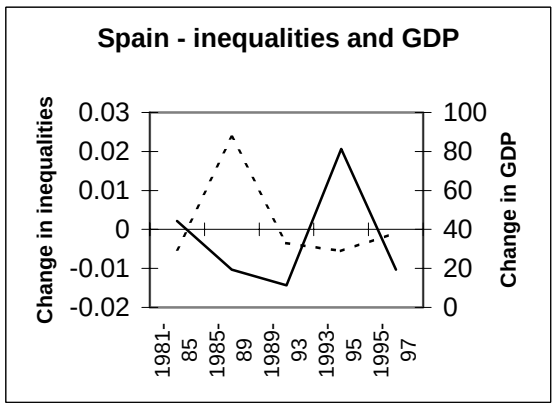












GDP figures all in million 1995 US$ (constant). Source: World Bank. Inequalities data various sources (see text).