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Cartels and their Consequences: Consumer Product Markets in Comparative Perspective

Abstract

The standard assumption in economics is that firms are price-takers, not price-makers. In many countries, that assumption appears to be wrong, dead wrong, in the case of Mexico, where many markets are cartelized. Using an original dataset covering consumer products in 45 countries, this paper begins to assess the extent, causes and consequences of imperfect competition. I also provide a more in-depth analysis of Mexico, where imperfect competition extends to manufacturing and key services. While this paper´s primary contribution at this point is data compilation (because none of the tests are sufficiently rigorous to reach any firm conclusions), a first-cut at the data suggests that higher concentration levels are positively associated with higher aggregate price levels and negatively associated with US patents issued. Should either of these findings hold-up, they will be important: Price levels are a prime determinant of real living standards; and US patents are a reasonable proxy for innovation.

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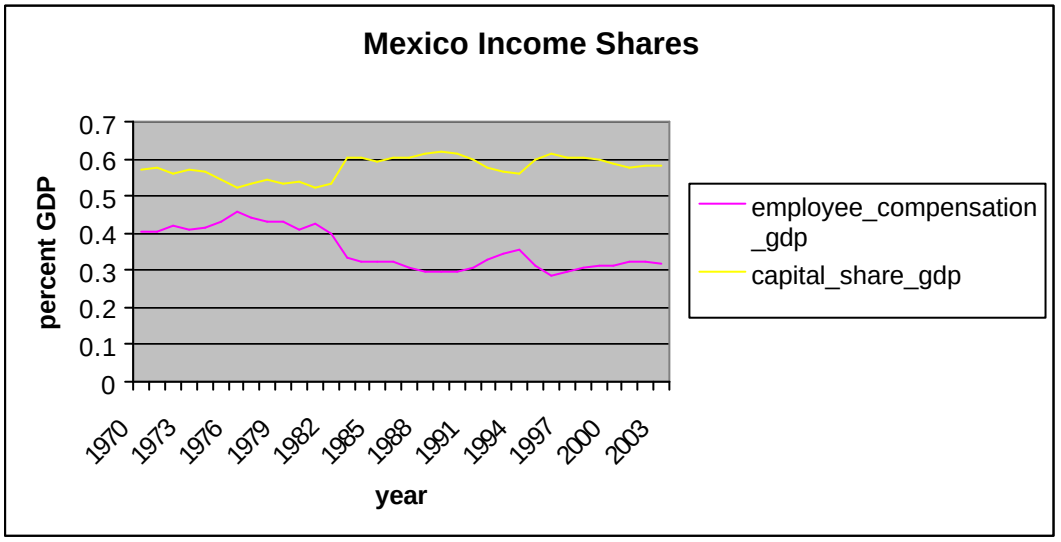
Introduction

One of the great lessons of the past two decades from Latin America is that macroeconomic stability is insufficient for growth. Despite near record low inflation, considerable fiscal discipline and relatively stable foreign exchange rates, Latin American countries averaged less than 1 percent annual per capita growth between 1990-2004.[1] Perhaps nowhere is this lackluster performance more evident than in Mexico where two decades of neo-liberal reforms have failed to deliver faster growth, higher productivity and lower inequality. The trend in inequality is particularly striking because most economists, building on the Stolper-Samuelson theorem, expected inequality to fall with liberalization. Instead, however, income inequality and the share of national income going to companies has remained relatively constant since liberalization began in 1985, shown in Figure 1.[2]

Figure 1: Mexican Income Shares



What has gone wrong? Perhaps a host of things, not least of which is our understanding of how markets work. Most models of growth and inequality hinge on several assumptions. First, that markets clear: specifically, there is sufficient competition to make firms price

[1] Not taking into account population changes, growth has been just less than 3 percent annually since 1990.
[2] Data taken from OECD national accounts database. Comparable data for altemative measures of inequality are not available for both before and after reform, which started roughly in 1986. Between 1992 and 2004, Mexico´s gini index fell a mere 0.01 percentage points (from 0.47 to 0.46), according to the national statistics office (INEGI).

takers not price makers. Second, that factors of production, notably labor, are mobile, allowing them to be reallocated costlessly across sectors.

The purpose of this paper is to empirically assess the validity of the perfect competition assumption, using an original dataset covering roughly 80 major consumer products for 45 countries. The data are compiled from Euromonitor International´s Global Market Information Database (GMID), which provide comparable sales and market share information around the world.[3] Consumer products are substantial components of national economies and important determinants of national price levels, yet no cross-country compilation of concentration levels exists. A first cut at the data shows that levels of competition in consumer products vary considerably across countries and far more than simple economic variables would predict;[4] furthermore, in many countries, concentration levels are sufficiently high to indicate that firms are price makers, not price takers.[5]

Second, I begin to link concentration with theories about its causes, notably the structure of the financial system (Cetorelli 2001; 2003), the nature of regulation (Djankov et. al. 2000) and type of electoral system (Rogowski and Kayser 2002), and its consequences, notably higher prices (Martins 1999), slower economic growth/innovation (Nickell 1996), and higher inequality (Powell 1987). While there are host of caveats about the quality of the data, the number of control variables, the sample size (N=28 to 45) and the inferences we can draw from the preliminary analysis, I find that the input linkages are relatively weak (specifically, it is hard to connect proportional representation, banking concentration or regulation to concentration in consumer products), while at least some of the output

[3] One of the next steps is to add industrial and manufacturing data from the United Nations´ UNIDO database, which provides comparative coverage for 57 countries. For evidence about the immobility of labor markets in Latin America, see Seddon and Warciarg (2001) and Heckman and Pages (2003).

[4] Simple economic variables, notably total market size and per capita GDP, have some relationship to concentration levels, but this relationship appears to be relatively weak (i.e., regressing concentration levels on national income, per capita income, land area, trade and other economic characteristics of countries gives an R-squared of 0.3 or lower). A more complex of the model of the economy (taking into account industry specific features, factor endowments, human capital and the like) might explain more of the variance.

[5] Theoretically, there is no exact cut-off point that distinguishes competitive from non-competitive markets. Empirically, however, there is a pattern. Markets in which the sales of the largest four companies (C4) exceed 45-59 percent of total sales (or in which the Herfindahl-Hirshman index exceed 1800) typically exemplify non-competitive behavior. The mean HH in my sample is 2077. See Scherer 1980 and the US Department of Justice webpage http://www.usdoj.gov/atr/public/testimony/hhi.htm.

linkages are plausible.[6] Higher concentration levels appear to have a modest association with higher aggregate price levels, higher capital shares, and lower US patents (though no relation to growth).[7]

Third, I show that concentration is particular pronounced in Mexico, which ranks anywhere from 6 to 20 (out of 45 countries) in terms of overall concentration levels in consumer products.[8] Furthermore, its concentration levels in many manufacturing and service industries are well above those considered representative of perfect competition. By focusing on Mexico, I am able to hone in on factors that may not be apparent in the first statistical cut because of data and time limitations.

This paper is divided into three sections. The first section explains how and why we study market structure, looking at the determinants of concentration and its hypothesized consequences. The second section presents comparable cross-country data about concentration, regulation and electoral systems, and presents some preliminary findings about the consequences of concentration. The third section focuses on Mexico.

Section I: The important of market structure

Decades of research by political economists has unequivocally shown that markets are invariably embedded in the broader social and political context. Understanding specifically how this context (and which elements of it) explain market structure is crucial because market structure itself, specifically the level of competition, has been linked to economic growth rates, price levels and inequality.

[6] Rogowski and Kayser´s (2002) original piece had an N of 22-24. Consumer product markets are less dependent on external finance and more dependent on advertising. Hence, it may be no surprise that banking concentration is not related to financial market structure.

[7] At this point, the statistics are too incomplete to draw any firm conclusions, in part because I cannot measure exactly what I want to measure. To take one example, the link between concentration and growth should be via innovation/productivity. Unfortunately, the best measure I have of innovation/productivity is US patents, making it impossible to rigorously test this conjecture.

[8] The variation reflects different measures of concentration.

The link between competition and growth is especially important, though not necessarily straightforward or linear.[9] According to the Schumpeterian school of thought, concentration generates rents; rents underwrite investments and entice entrepreneurs to take risks, propelling the pace of innovation. Hence, concentration is good for growth. According to the neoclassical tradition, competition forces companies to fight for their life. The threat of extinction drives companies to cut costs, innovate and improve their productivity. Hence, competition is good for growth.

While the theoretical prediction is ambiguous, the recent empirical literature is not; neoclassicals have been winning the battle hands down. A battery of micro-level studies at the firm, industry and national level from academic economists (Nickell 1996; Borsch-Supan and Romer 1998; Blundell, Griffith and Van Reenen 1999), the OECD (Pilat 1996), and consulting firms (KcKinsey 1995) have clearly linked competition to innovation and growth, especially productivity change. As McKinsey highlights from their report on Sweden: "Our report indicates that performance was strongly correlated with competitive intensity. Where competition thrived, Swedish industry was world class." Where competitive pressures were absent (roughly three-quarters the economy), Sweden´s productivity and job creation were below the European average (1995 p.1). According to McKinsey,"Improved product market competition represents the best opportunity for improved economic performance."[10] McKinsey´s conclusions have been echoed by academic economists: In a fairly rigorous panel study of over 147 manufacturing firms over 14 years, Nickell (1996) found that a 25 increase in market share among the largest three producers (C3) led to a 1 percent decrease in total factor productivity in the long-run.

The findings that competition drives productivity is important because productivity is the most important source of growth for most countries and the biggest reason for variations in cross-variation in national income (Hall and Jones 1999). The real problem in developing countries, particularly Latin America, has been the slow rate of productivity growth.

[9] Aghion et. al. (2001) suggest that the relationship between competition and innovation follows an inverted U, with innovation peaking at intermediate levels of competition. At this point, the data does not offer strong support for their conjecture.

[10] These quotes are taken from McKinsey´s website (http://www.mckinsey.com/mgi/publications/sweden.asp) describing the report, rather than the report itself, which has a surprising dearth of quotable quotes.

According to Fajnzylber and Lederman (ND), for example, Total Factor Productivity (TFP) grew at a meager 0.2 percent per year in Latin America between 1950-95.[11] While post reform data is admittedly scarce, early indications are that productivity has increased slightly, but remain well-below the levels experienced elsewhere. In Mexico, for example, TFP has been virtually stagnant since 1990, except in manufacturing, the one sector that has been intensely exposed to international competition (Feliz, ND). In other words, if markets in Latin America are relatively concentrated, there are good theoretical reasons to believe that this may help explain the relatively poor productivity performance.

The links between market structure and price levels follows from standard price theory. In competitive markets profits tend to zero as firms are forced to set prices equal to marginal costs. In monopolistic markets, firm are able to set prices equal to marginal revenue, extracting rents from consumers. There is a wealth of evidence showing that firms price above marginal costs in non-competitive markets, controlling for a variety of factors, ranging from barriers to entry, to trade flows, and unionization (see Martin 2002 p.141). Studies have also shown that the impact of market structure on prices varies by industry. It is most pronounced for differentiated consumer goods where firms face off against individuals consumers and less pronounced for producer goods, where firms face other firms (that is, where the buyers themselves sometimes have the power to influence prices). Martins and Scarpetta (1999), for example, found that standard mark-ups in manufacturing in the United States and the United Kingdom, for example, are approximately 10 percent higher than marginal costs in non-concentrated industries; in concentrated industries, average mark-ups are approximately 20 percent higher than marginal costs.

Most existing studies focus on the links between concentration and firm or industry level profitability, rather than linkages to aggregate indicators, such as price levels. By confining themselves to individual markets, these studies score high marks for rigor. Part of the purpose of this paper, however, is to consider whether concentration comes in packages. That is, are industries in some countries more concentrated than in others—due to, say, regulatory barriers, political factors, banking systems. Does concentration therefore have an

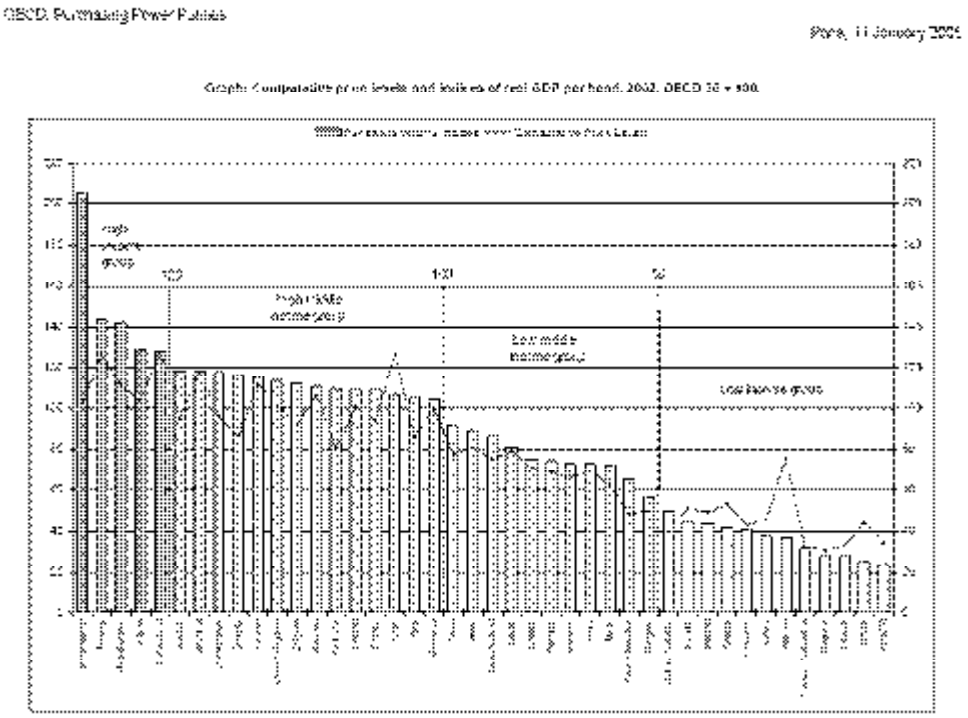
[11] For long-term studies of productivity in Latin America, see also Bruton (1967).

aggregate affect. If monopoly rents are confined to individual industries, the affect on aggregate prices will be small, but if monopoly rents are widespread, then the aggregate effects could be considerable. OECD data suggests that this conjecture is plausible.

Since the early 1990s, the OECD has put together the most comprehensive database about real purchasing power and aggregate price levels for member countries. Their work shows that there is considerable variation in real price levels, much of which can be explained by per capita income, reflecting what seems to be empirical law: real prices rise with income (shown in Figure 2, which graphs OECD calculated price levels vis-à-vis per capita incomes). Based on this law, we can predict countries expected price levels relative to their income. Doing this yields some surprising results, shown in Figure 3, which graphs the actual versus predicted price levels: Mexico´s aggregate price level, for example, is 20 percent higher than we would expect, given its income. Or, put the other way around, given its price level, Mexico´s per capita GDP should be about double what it is, roughly the equivalent of Greece, South Korea & Portugal.[12]

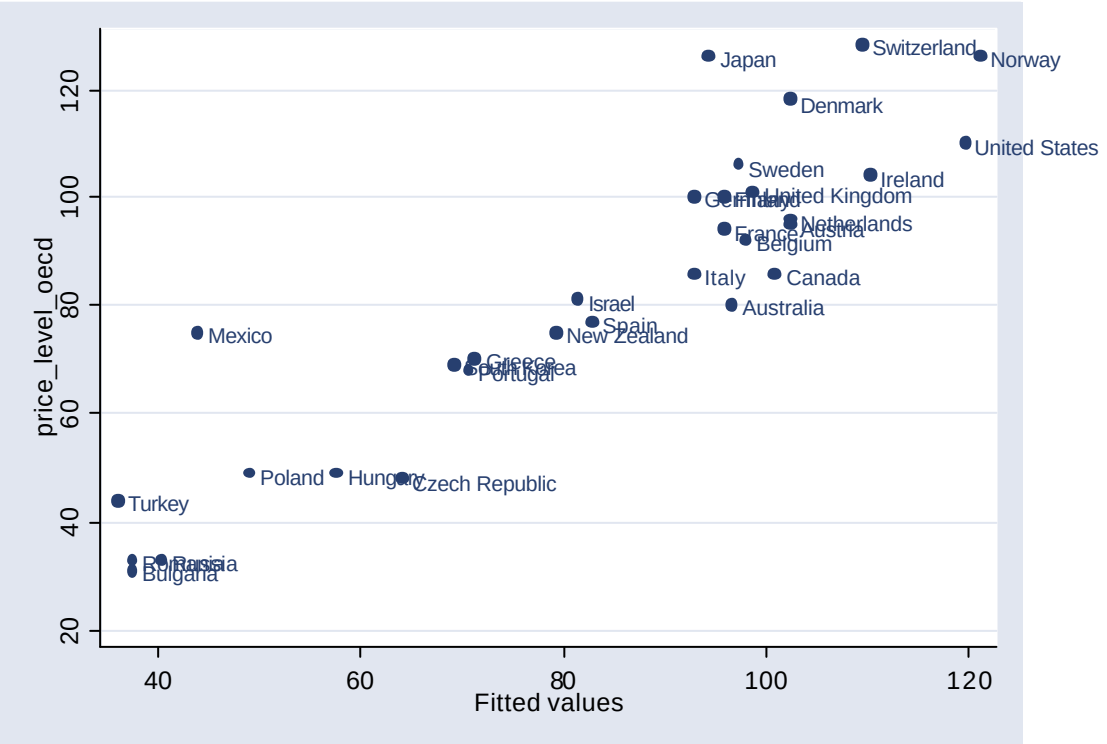
[12] Unfortunately, comparative purchasing power data is not available for other Latin American countries because they are not part of the OECD.

Figure 2: Price Levels and GDP per capita



Source: OECD 2005

Figure 3: Actual versus predicted price levels based on per capita GDP



The link to inequality hinges on the prevalence of imperfect competition across markets. In the standard market model, based on perfect information, perfect competition and complete markets, inequality is purely the result of the distribution of human capital and the supply and demand for factors broadly defined. In a world of imperfect competition across markets, however, monopolistic competition will tend to increase inequality both through the income and consumption side. On the income side, monopolistic rents will increase the returns to capital. Since shareholders are overwhelmingly concentrated among upper income groups, higher corporate profits disproportionately benefit them. On the consumption side, consumers must spend more to buy same basket, forcing them to consume less or save less. Since lower income groups already spend more of their income on consumption and save less, they will suffer disproportionately from market concentration (unless the rich´s purchasing basket is disproportionately comprised of goods from concentrated industries). Absent some compensating mechanism, such as taxes and transfers, one consequence will be increased inequality.

In an innovative paper, Powell (1987) models these dynamics and attempts to estimate the consequences of concentration in manufacturing for inequality in the United States. Using data for 1963 (a benchmark year in the industrial organization literature), she shows that if the concentration level of the largest four producers in manufacturing were reduced from above 0.5 (imperfect competition) to 0.0 (perfect competition), families earning $3,000 or less would have experienced a 3.2 percent increase in their incomes, while those earning above $15,000 would have experienced a 6.13 percent decline in their income.[13] Powell´s paper suggests that the absence of competitive markets may be sufficient to offset any Stolper-Samuelson affects from trade liberalization in developing countries.[14]

[13] Powell´s study covered 284 industries at the 4-digit classification level. Unfortunately, her data does not reveal the actual concentration levels of different industries.

[14] There are a variety of possible explanations for the failure of liberalization to reduce inequality per the Stolper-Samuelson theorem. One possibility is that Stolper-Samuelson is working, but we are not observing it because we are using aggregate data, rather than sub-national data. That is, within countries, regions more intertwined with the global economy are experiencing rising demand for labor and inequality is falling, but because these regions are growing faster than regions that are less intertwined with the global economy, aggregate inequality is increasing.

Understanding market structure

There are a variety of approaches to studying market structure. The first approach, pioneered by Sutton (1991) and Schmalensee (1992), focuses on the economic characteristics of industries. According to the pure economics view, some industries have relatively high "natural" barriers to entry, stemming from a variety of factors, notably capital intensity (high fixed costs), technological complexity, product differentiation and advertising costs. Industries characterized by high natural barriers are called "segmented" industries because the natural tendency is to see a few players dominant. Absent these characteristics, industries tend to "fragment;" in the absence of some other "artificial" barrier, such as government regulation, market shares should be widely dispersed. For consumer products the main barrier to entry are thought to be advertising costs and product differentiation; in industrial markets capital intensity and technological complexity tend to dominate (Buxton, Davies and Lyons 1984).

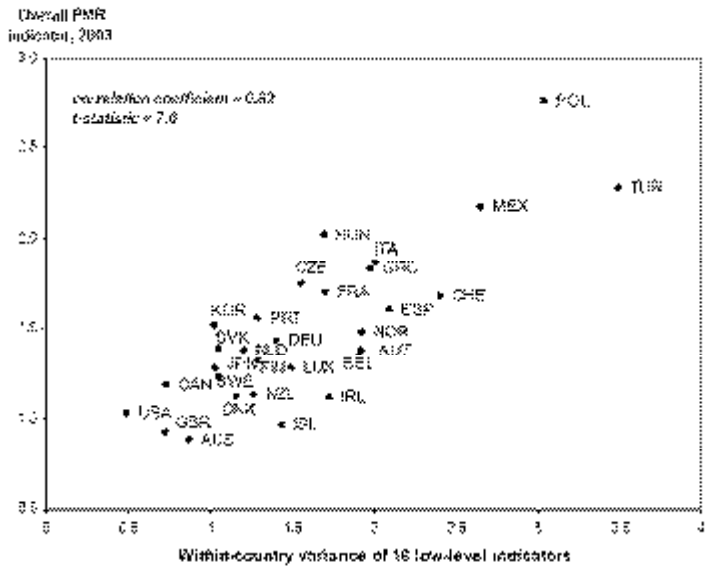
Political economists have identified three possible explanations for cross-country variations in market structure above and beyond the economic characteristics of industries. The first is banking/financial systems. In a series of papers, Cetorelli (2001; 2003) clearly shows that banking concentration causes concentration in industrial markets, especially in industries characterized by high external financing needs. The reason bank concentration raises industrial concentration is because banks are able to charge higher spreads, raising the costs of finance for new firms (existing firms can use retained earnings to offset the higher costs). Whether this will carry over to consumer products is debatable since firms are less dependent on external financing.

Other political economists, by contrast, have focused on the political barriers to entry, notably regulation. Concentration is not the result of some unhappy accident, but direct government action. In a highly influential cross-country study, Djankov, La Porta, Lopes-de-Silanes, and Shliefer (2000) show that the regulation of entry varies enormously across countries and that the regulation of entry correlates with a variety of outcomes, including corruption.

Building on Djankov. et. al. framework, Fisman and Sarria-Allende (2004) show that higher regulatory barriers to entry are strongly correlated with concentration levels in manufacturing, and that operating margins are relatively high in low barrier industries in high entry regulation countries. In other words, regulation is related to concentration and concentration is related to prices/profits. Fisman and Sarria-Allende´s study does not control for financial struc ture, nor does it consider the knock-on effects of concentration.

Djankov et. al.´s approach to quantifying regulation and its costs have been advanced by the OECD, which has also put together a comprehensive compendium of regulation for member nations. The OECD´s work strongly indicates regulation comes in packages, suggesting that it is driven by the same underlying causes. Figure 4 graphs the variance between the OECD´s composite indicator of regulation and the 16 sub-indicators which are used to create the aggregate indicator (OECD 2005b). Note that Mexico´s regulation score is roughly double the OECD average, indicating greater restrictions on competition.

Figure 4: OECD´s overall measure of regulation vs. the sub-indices



1. The scale of the indicator is 0=0 most least to most restrictive of competition.

The underlying cause of the within country correlation between regulatory structures is the subject of much debate. Some people have linked regulation, especially of labor markets, to legal systems. While the theoretical link between legal systems and regulation is shaky, there is a strong contemporary empirical relationship between labor market regulation and legal systems: countries with French legal system have more onerous labor regulations than countries with other legal systems.[15] (While I can find no statistical relationship between legal origins and concentration, the case study of Mexico suggests that elements of the legal system are important. In particularly, anti-trust regulation is regularly foiled by the relative ease of obtaining injunctions).

In one of the more innovative lines of research in political science, Rogowski and Kayser (2002) argue that the structure of regulation follows from the electoral system. Building on the neo-classical theory of regulation, they show that the trade-off between votes and campaign contributions faced a by politicians is a function of the seat-vote calculus. The larger the number of votes necessary to capture a seat, the more politicians weigh votes over campaign contributions, raising the cost of capture by industries. Hence, they predict that single-member districts, which require a larger share of votes per seat, will be more consumer friendly than proportional representation. They test this proposition by mapping electoral system onto price levels and find that countries with single member districts have lower aggregate price levels. Ho (2003) has shown that Rogowski and Kaysers results are partly driven by sample bias, rather than the properties of electoral systems per se. [16]

For the most part, Djankov et. al. and Rogowski et. al. black-box the actual operation of markets: Djankov go directly from regulation to social outomes; Rogowski, by contrast, goes directly from electoral systems to prices levels. Like the aforementioned paper by

[15] Note, there is a time consistency problem with the legal systems explanations. While it is true, for example, that Latin American countries have among the most regulated labor markets in the world today, they had almost no labor market regulation in the late 19th century. It is hard to believe that the French legal system can be the cause of this variation since it is constant across time.

[16] Economic, regulatory and political variables are not the conceivable sources of market structure variation. Dobbins (1994) argues that market structure is a reflection of cultural beliefs about the appropriate role of government. France has regulated industry the way it does since the time of Colbert because they are French, not because they have proportional representation.

Fisman, this paper focus on the intermediate steps, notably the level of concentration. Mapping electoral systems and regulation onto market structure is an essential step towards a fuller understanding of the relationship between states and markets. Furthermore, it is an essential step toward showing that none of the existing results are spurious.

Section II: Concentration in Consumer Product markets

There are a variety of ways of measuring market structure. Most analysts focus on producer and/or sales concentration, which is thought to be a guide to firm behavior. Perhaps the best measure of concentration is the Herfindahl-Hirschman Index, which is the sum of market shares of every producer squared. The HH index ranges from 0-10,000. While there is no theoretical cut-off that distinguishes between perfect and imperfect competition, empirical studies suggest that values below 1,000 are sufficient to approximate perfect competition, while values above 1,800 are indicative of imperfect competition. There is no ex-ante expectation for values between 1,000-1,800, which are typically analyzed on a case-by-case basis.[17] Because calculating the HH requires data on every producer in the market, most analysts focus on the share of sales (or production) of the largest producers in the market, relative to total sales (or production). The C4, for example, represents the share of the largest 4 producers. Empirical studies suggest that C4´s below 0.45 are sufficient to approximate perfect competition, while values ranging from 45 to 59 begin to exhibit imperfect competition and those above 0.59 almost uniformly indicate imperfect competition (Scherer 1980).

Consumer product market data

The data about consumer market concentration is taken from Euromonitor International´s Global Market Information Database (GMID). The database provides comparable market share and sales information (in US dollars) for approximately 80 products in more than 45 countries. The database contains information for multiple years, but I have only had a chance to put together a complete list for 2002 (a preliminary analysis of 2003 data suggests that market shares are relatively stable from year to year). The list of products includes beer, tobacco, toilet paper, dishwashing liquid, refrigerators, televisions and much

[17] See the US Department of Justice´s website. http://www.usdoj.gov/atr/public/testimony/hhi.htm

more.[18] Since the market shares of even relatively small producers are included in the database, it is possible to calculate a crude HH index as well as the C3 and C4. The different indices (C3, C4 and HH) are fairly highly correlated, though there are some differences in the rank order of countries. For most part, I focus on the HH index since it is considered the best overall measure of concentration.[19]

Since the number of product categories for which data is available varies by country (from 86 in Japan and Spain to 55 in Egypt) and the sales of each product vary by country, I created two weighted indices. The aggregate index is composed of larger product categories (e.g., confectionary), while the disaggregated index is composed of smaller product categories (e.g., chocolate confectionary; sugar confectionary). The disaggregated index contains concentration data for more sectors, but less data about sales; the aggregated index contains fewer sectors, but more data about sales. In principle, the latter has fewer missing observations. In practice, however, the number of observations is nearly identical with the two indices once control variables are included. Both indices include national and global brands. Furthermore, it turns out that in practice, the indices are virtual substitutes for each other since they are correlated at 0.98.

For the indices, each product is weighted by the dollar value its sales relative to the dollar value of total sales for each country. This weighting should give a more appropriate sense of the consequences of concentration since some products are more important in terms of GDP, but the weighting is not without its problems: First, weights are endogenous since concentration influences prices and prices influence purchases. Second, perhaps more importantly, missing data will spuriously lead to different weights for different products in different countries.[20]

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[18] A complete list of products and countries will be available with the next draft; unfortunately, I have not a chance to translate everything from Spanish to English..

[19] All of the indices may understate concentration because they focus on product shares not firm shares. The GMID database typically includes producers accounting for at least 90 percent of total sales. Because not every seller is accounted for, the HH will be slightly biased downward.

[20] Since I am interested in aggregate effects of concentration, it makes no sense to weigh relatively small categories (like dog food) the same as relatively large categories (like beer); presumably, concentration in beer, which accounts for 0.41 percent of GDP in Mexico, will have a greater affect on aggregate prices than concentration in dog food.

The focus on consumer products is unusual since similar studies (of which there are still relatively few) have focused on manufacturing (Pryor 1972; Fisman and Sarria-Allende 2004).[21] Consumer products are not the building blocks of the economy, but they still account for a sizable portion of the economy and are important in determining aggregate price levels. In order to get a sense of just how much weight they have relative to the total economy, I tried to match my product list to the basket used to calculate the consumer price index (CPI) in Mexico. While it proved impossible to exactly match these products to the CPI because many categories do not align perfectly, a crude (and conservative) estimate is that they account for 16.5% of the CPI in Mexico. In short, while my data by no means captures aggregate concentration levels across the economy, it still reveals important details about significant part of the economy.

One of the next steps is to add industrial and manufacturing data from the United Nations´ UNIDO database, which provides comparative coverage for 57 countries. The advantage of the UNIDO data is that is available for multiple years and multiple industries, greatly expanding sample size; the disadvantage is that data is collected at the plant level, rather than the firm level, which could seriously undercount the level of concentration in some industries and countries.

Table 1 shows the consumer product market concentration indices (C4 and HH), along with the associated number of product categories (N) and the rank order of countries in terms of concentration. With the disaggregated index, which tracks individual products at the most disaggregated level, the average HH is 2077; with the aggregated index, the HH is 1665. Both indicate that many countries are characterized by concentration levels well above those exemplified by perfect competition. None of the four Latin American countries in the sample stand out as having particularly competitive consumer product markets. All, in fact, are characterized by cartel-like structures with the disaggregated indices, with HH´s ranging from 2608 in Venezuela to 2260 in Colombia.

[21] Manufacturing data should be available by the next draft of this paper.

Statistical analysis

The statistical analysis tries to uncover the causes and consequences of aggregate concentration. Since I have not had a chance to disaggregate the data into segmented and fragmented industries based on ex-ante characteristics, the working assumption I make is that any natural barriers to entry should be relatively industry specific and invariant across countries. That is, segmented industries should be segmented everywhere, while fragmented industries should be fragmented everywhere. Hence, if there is across country variation by industry, the default explanation is that it is related to some other characteristic, such as those noted below.

The specification for regressions about the causes of concentration is follows:

Concentration = a + b1 (market characteristics) + b2 (political characteristics) + e,

where market characteristics and political characteristics are vectors. Market characteristics include demographic and economic variables that should capture at least some of the differences in demand and production costs across countries. There are no specific predictions associated with these variables since there are a variety of stories that one could associate with each one. They include total GDP (logged), GDP Per capita (logged), total population (logged or in millions), population density, urban population, land area (logged), trade as a percentage of GDP, taxes on consumption and fuel imports.[22] Unfortunately, while the list of market variables is substantial, there is no explicit measure of factor endowments, which should shape production costs. These data are taken from the World Bank´s World Development Indicators (2004)

Political characteristics are the aforementioned variables that should explain the variation in concentration levels above and beyond those captured by the economy. They include regulation, banking, electoral systems and legal systems.

[22] Because of the small sample problem, most of the regressions include only a few control variables at any one time. I used 2002 data when available. In a few case, I had to use 2001 data because the former was not available.

Regulation: Regulation should increase barriers to entry and, hence, increase concentration levels. Measures of regulation have proliferated over the past decade. The most common sets of measures are those compiled by the OECD and Djankov et. al. The OECD provides 16 individual measures of various types of regulation, ranging from labor markets to the size and scope of state-owned industries. The Djankov measures cover more countries and more dimensions of regulation, though the construction is probably less rigorous. Absent some specific measure of regulation for consumer products, there is perhaps no ex-ante theoretical reason to believe that one measure will have a stronger relationship than another. I tried the aggregate measures of regulation from the OECD and Djankov et. al. as well of the sub-indices and few but the choice of measure makes little difference since neither the aggregate or sub-indices—except barriers to anti-trust regulation—are strongly correlated with my concentration indices.

Financial system: Based on Cetorelli´s analysis, higher levels of bank concentration should be associated with higher levels of product concentration since it will raise the barriers to entry for new firms. Measures of the financial system have also proliferated over the past decades. From the long list of possibilities, I have chosen the **spread** between lending and deposit rate as my measure of concentration. Spread (also known as "net interest margin") indirectly captures concentration because with perfect competition the spread should tend to zero. I would like to add a direct measure of concentration, such as the C3, but unfortunately such measures appear to be unavailable for a broad sample of countries after 1997. The spread data are taken from the World Bank and are generally for 2002.

Electoral Systems: According to Rogowski et. al., single member districts should be associated with lower levels of concentration, while proportional representation should be associated with higher levels of concentration. Using the Database of Political Institutions (Beck et. al. 2001/2003), I create a series of 0/1 dummies for proportional representation, single member districts and mixed member systems.

Legal systems: Previous research suggests that countries with French legal systems will have relatively high levels of concentration, while those with English legal systems will

have relatively low levels of concentration. Based on La Porta et. al.´s (1998) classification system, I create a series of 0/1 dummy variables for the world´s major legal systems: French, English, Scandanavian, German and Socialist.

Consequences of concentration

Specifications about the causes of concentration are follows:

DV = a + b1 (market characteristics) + b2 (market structure) + e, where the dependent variables are price levels, inequality, growth/innovation. Market characteristics include the variables listed above. It should be noted that some important control variables are conspicuously absent at this point, notably factor prices (the costs of capital and labor), exchange rates and changes in the exchange rate. These omissions are unfortunate since factor prices and exchange rates will influence price levels, especially in countries with high levels of trade.

Price levels: According to my analysis, increased concentration should be associated with higher price levels. There are several sources of data about price levels. The most rigorous measure of price levels are compiled by the OECD, which has data about price levels for as many as 42 countries for 2002 and 2004. Alternative measures of price levels can be constructed from the Penn World Tables by dividing purchasing price parity (PPP) by the foreign exchange rate. The Penn World Tables data ends in 2000, so there is a mismatch between the year of concentration and the year.

Inequality: According to my analysis, higher levels of concentration should be associated with greater inequality. Unfortunately, I could find no direct measure of inequality for 2002-2003. In lieu of data about inequality, I use the shares of national income for capital (gross operating surplus) and labor, taken from the OECD.

Productivity: According to my analysis, higher concentration levels should inhibit growth/productivity. Putting together rigorous cross-country measures of productivity is devilishly difficult. For now, I use two imperfect measures: Average GDP per capita growth from 2000 to 2004 and average US patents issued from 2000-2004 (logged).

For now the tests (perhaps probes is more accurate) are conducted with OLS, which demonstrate the robustness of the correlations between variables.[23]

Results

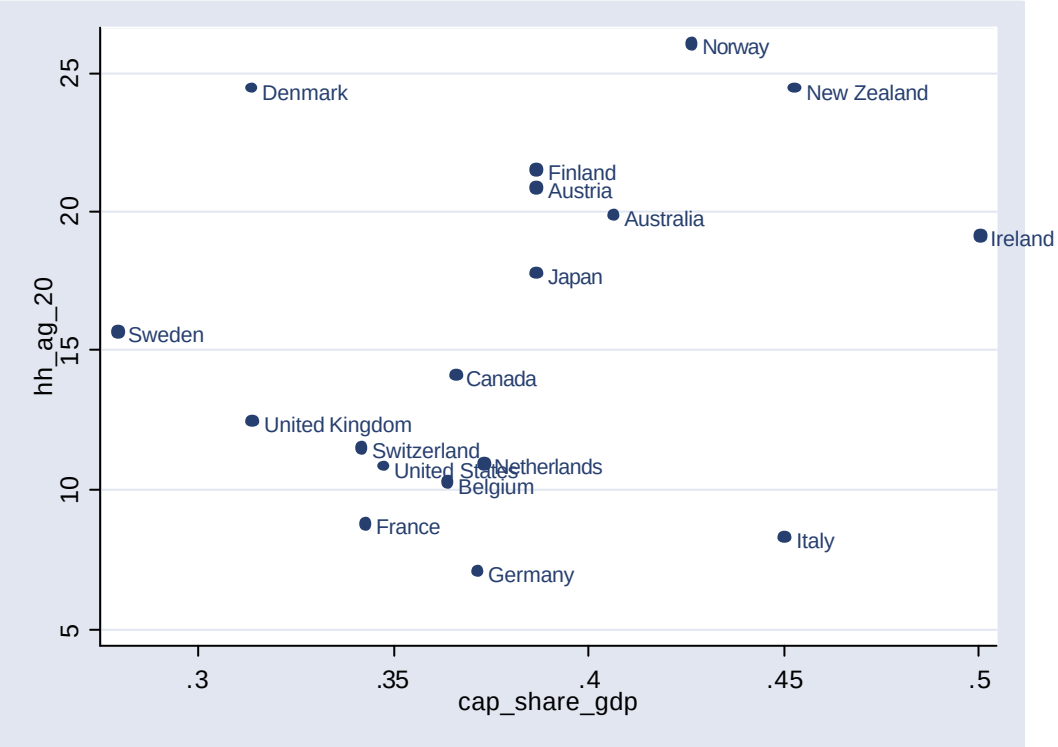
Table 2 presents results about the causes of concentration, using just the aggregate index (the results are essentially the same with the disaggregated index). Surprisingly, perhaps, none of the political characteristics have a robust association with concentration. Spread (shown in model 3) is typically negative with concentration, contrary to what one would expect, but it is not significant at conventional levels with most specifications.[24] Contrary to the Rogowskian hypothesis, single-member districts (shown in model 4) are positive relative to proportional representation systems (the excluded category), rather than negative. By and large, the legal system dummies are distinguishable from each other, except for Socialists systems, which have the lowest levels of concentration (model 5).[25] Among the various indicators of regulation from the OECD and Djankov et. al. datasets, only barriers to anti-trust enforcement (model 6) is consistently positive and significant. The OECD aggregate indicator (model 7) is negative with most specifications as are most of the other regulation variables (not shown).

Table 3 presents the price level results with just the OECD data. Both the aggregate (shown) and disaggregated concentration (not shown) indices are consistently positive with price levels. They are significant at conventional levels with many of the specifications, though not with all of the control variables. Because many of the control variables (such as taxes on goods) themselves are not significant, Model 2 is the preferred specification.

[23] The results include no correction for heteroskedasticity because robust standard errors have poor small sample properties and because regression diagnostics typically indicate that they are not needed.
[24] Alternative specifications are not shown since they do not lead to substantially different conclusions. Changing the sample (e.g., excluding Indonesia, where the spread was negative) has no substantial consequence for the conclusions.
[25] F-tests, for example, show that the legal systems (e.g., French and English) are generally indistinguishable from each other. In general, countries with Scandinavian systems have higher concentration levels, which may reflect country size, more than legal systems.

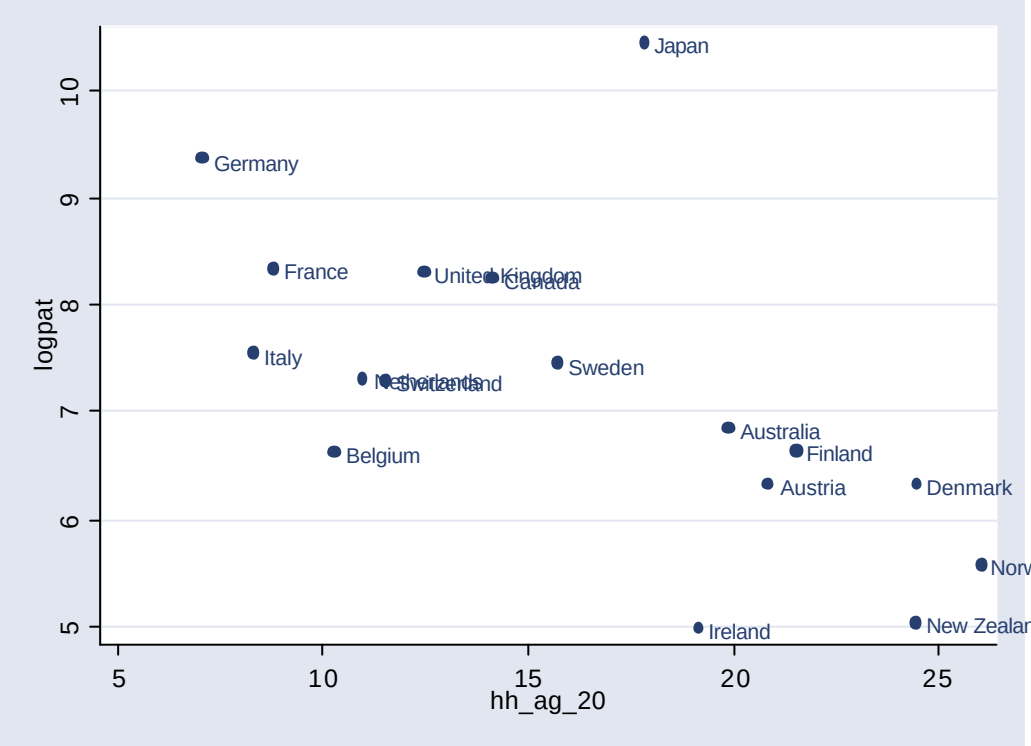
In results not shown, I can find no statistically robust results linking concentration levels with income shares, growth or patents across the entire sample, although they are modestly correlated, especially within the OECD.[26] Figure 5 graphs the HH aggregate index against capital´s share of national income for OECD countries. The correlation is 0.29; excluding Denmark and Sweden, two countries with long histories of left rule and pro-labor policies, the correlation is 0.45. Figure 6 graphs the number of US patents (logged) versus aggregate market concentration in the OECD (correlation=-0.60, excluding Japan –0.78). Both graphs indicate that the hypothesized links between concentration and innovation and inequality are plausible.

Figure 5: HH aggregate index vs. Capital´s Share of Income



[26] Excluding Japan, the patent results are fairly robust within the OECD, especially with the disaggregated index.

Figure 6: US Patents (logged) vs. HH aggregate



Section 3: Mexican Markets a more in-depth look

In consumer products, Mexico´s HH ranges from 2225 for the disaggregated index to 1792 for the aggregate index. For the 111 sectors tracked by the A.C. Nielsen corporation, which offers a broader sample of products, but less details about concentration, the average C3 is 78.9, shown in Table 4. But concentration extends beyond consumer products.

Mexico´s industrial census classifies manufacturing into 298 sectors, which together accounted for 19.5% of GDP in 2000. Of those sectors, 137 had a C4 below 45 percent, indicating relatively high levels of competition. 36 had C4 between 45-55 percent, indicating only modest levels of competition, and 125 had C4s above 55%, indicating imperfect competition. The average level of concentration was 50.0. These figures actually

understate the degree of concentration because they are calculated at the firm level, rather than company level.

The service sector: Banking accounts for 4.15% of GDP. Roughly 70% of assets are in the hands of 4 banks. Banks in Mexico have relatively large spreads, averaging 5 percent between 1995-2002, make relatively few loans, have high commissions, and are highly profitable, with profits reaching US$4.5B in 2005. Domestic finance to the private sector accounts for less than 20% of GDP, for example, compared to 60% in Chile. Commissions are estimated to be 10 times as high as in the United States and Europe, and account for over 20 percent of profits (Mexico Watch 2006).[27] Sector specific regulation helps explain why banking in Mexico is so concentrated. Would be entrants in the banking sector need US$20M of paid capital, compared to only US$5M in the United States. Furthermore, every new financial institution needs the personal approval of the finance minister, which is by no means easy to come by (9 applications have been approved since 1994?).

Telecom account for 3.84% of GDP. One company (Telmex and its affiliates) accounts for virtually the entire sector.[28] Telecom prices in Mexico are high by international standards (commercial rates are 109 percent higher than the OECD average; residential rates are 60 percent higher than the OECD average) and Telmex is exceptionally profitable (see Tovar 2004). Like the banks, Telmex is protected by a variety of sector specific regulations, which effectively enshrine Telmex as a monopsony at the wholesale level and a monopoly at the retail level. To take some examples, to operate, install or exploit telecom service, companies need to obtain a concession from the federal government, which is timely and costly (and by no means guaranteed). (How many approvals to date?). Furthermore, firms that operate private telephone networks must sell spare capacity to Telmex, which can refuse to buy. Because private telecom operators cannot sell to third parties, there is almost no incentive to establish new firms.

[27] Data about commissions in Mexico are taken from the March 24 2006 edition of Mexico Watch, which obtained its data from the Mexican Ministry of Finance.
[28] Technically, Telmex has been independent of the largest cel-phone operator, American Movil, since 2000, but controlling ownership in both is held by the same conglomerate (Grupo Carso). Obtaining details about Telmex´s share of telecoms is difficult. Media reports suggest that Telmex accounts for 90 percent of revenues.

Similar stories can be told about hydrocarbons (1.32 percent of GDP), electricity production (1.39 percent of GDP), television (0.32 of GDP) and cement (0.12 percent of GDP). Hydrocarbons and electricity production are state monopolies, enshrined in the Constitution. Mexico´s television market is also highly concentrated, with Televisa holding 70 percent of the market and TV Azteca holding another 25 percent. The high level of concentration almost certainly reflects the historical fact that TV concessions could only be handed out (and withdrawn) by the president. In the cement market, CEMEX holds a commanding 70 percent share.

Why are Mexican markets so concentrated?

Several factors stand out as likely possibilities. One possibility is the overall cost of regulation. As shown in figure 4, Mexico stands out in terms of overall measures of regulation. (Although the statistical analysis revealed no systematic relationship between regulation and concentration, I suspect that my measures of are too crude to capture this relationship). Instead of focusing on aggregate measures of regulation, we need sector specific data. More than anything, I suspect that sector specific regulation explains Telmex´s and Televisa´s towering positions.

The politics of sector specific regulation may be understood in classic collective action terms. In concentrated sectors, firms have incentive to lobby for sector specific benefits because they obtain the bulk of the benefits; that is, there are no free-riders. In non-concentrated sectors, by contrast, no firm has as incentive to lobby for protection because everyone else in the sector can free-ride off them (See Holmes and Schmidtz 1995 for a formal model). A recent revision of Mexico´s broadcasting laws (2006) seem to bear this out: The draft of the law was written by Televisa´s lawyers and then approved without amendment by the Congress, despite vociferous objections by major newspapers, civil society and anti-trust authorities. Among other things, the law allow existing concession holders to offer news services (such as internet or telephone) without obtaining a new concession. All other entrants, must enter into a competitive bidding process. The biggest beneficiaries of the new law are expected to be the very companies that wrote it.

Second, as already mentioned, the banking sector is highly concentrated, meaning that financing are high, prohibitively high in many cases. Seventy-five percent of companies sampled by the Banco de Mexico do not use credit from commercial banks, in part because of the high cost of finance.[29]

Third, Mexican regulators have only modest powers and somewhat conflicted goals. Regulators seem unsure of their mandate—is it to protect consumers or bolster national champions? The federal competition law (1994) mandates consumer protection, but Congress seems to favor national champions. As a result, regulators have relatively few resources, limited investigative powers, and limited capacity to sanction (see OECD 2004b). Their capacity to sanction is furthermore weakened by the judicial system. Companies that are actually investigated and/or sanctioned by the federal competition commission (CFC) can appeal to the judicial system (via injunctions, *amparo* in Spanish) at virtually every step, making it very costly for the regulatory agency to actually go after and defeat companies with deep-pockets. In the first ten years of the federal regulatory commission´s existence, for example, only around 10% of the fines assessed were paid, in part because companies were successfully able to obtain amparos. Furthermore, since there are no specialized courts for anti-trust matters, judges are often unqualified to assess the economic aspects of the case (OECD 2004b).

Conclusions

This paper has begun to explore the extent, causes and consequences of market concentration, based on the premise that market structure matters for price levels, inequality and growth/innovation. While the preliminary results fall far short of the ambitions set forth at the outset, they are suggestive in a number of ways. First, in many countries, concentration levels in consumer products are far above those exemplary of perfect competition. To wit: the average HH in the disaggregate index covering roughly 45 countries was above 2000. And if concentration levels found in consumer products are representative of the larger economy, then it makes little sense to base our models of

[29] See the Banco de Mexico´s website, http://www.banxico.org.mx/eInfoFinanciera/FSinfoFinanciera.html.

growth and inequality on perfect competition, especially in Latin America, where HH indices ranged from 2260 to 2608.

Second, surprisingly perhaps, the first statistical cut found that none of the input linkages seemed to be systematically linked with concentration. There are a variety of possible explanations for the non-finding. The simplest, of course, is that these hypothesized relationships do not exist. More likely, however, the absence of a relationship could be a function of the measures and data employed herein. While my measures of electoral systems and perhaps banking systems are reasonable, my measures of regulation are relatively crude and my measure of concentration is limited to consumer product markets. Sector specific regulation is probably a better candidate for explaining concentration.

Third, at least some of the hypothesized consequences of concentration seem plausible. At a minimum, there is a modest relationship between concentration levels and price levels. Within the OECD, there is also fairly modest (inverted) relationship between concentration and patents and a modest positive relationship between concentration and corporate profits as a percentage of GDP.

To sum up: This paper has sketched out some plausible hypothesis for recent economic trends in Latin America, particularly the failure of reform to produce the expected results. While none of the tests were adequate to reach any firm conclusions, it is a start. The real challenge will be to put together the data required to rigorously test the propositions offered herein.

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Table 1: Consumer Product Concentration Indices

Country	CR4 dis	N 87	Rank	HH dis	N 87	Rank	CR4 agg	N 37	Rank	HH agg	N 37	Rank
Morocco	78.29	57	1	3779	60	1	71.80	20	1	2997	22	1
Chile	64.67	73	20	3109	83	2	63.20	33	12	2617	36	2
South Africa	75.19	67	3	3067	71	3	68.54	32	3	2487	35	4
Norway	70.26	59	10	2965	69	4	66.08	24	7	2598	26	3
New Zealand	74.81	54	5	2937	68	5	66.14	23	6	2442	26	6
Thailand	73.79	63	7	2921	68	6	64.71	25	10	2429	26	7
Portugal	64.47	72	21	2806	76	7	54.47	34	23	2266	37	10
Philippines	76.76	67	2	2792	69	8	68.72	25	2	2126	26	12
Denmark	61.22	65	25	2686	69	9	54.90	24	22	2443	26	5
South Korea	72.39	63	8	2671	71	10	65.94	25	8	2274	26	9
Venezuela	**65.15**	**54**	**18**	**2608**	**60**	**11**	**58.31**	**22**	**16**	**2118**	**26**	**13**
Bulgaria	57.63	67	33	2601	67	12	52.16	25	30	2321	25	8
Australia	72.15	71	9	2538	85	13	65.87	31	9	1986	37	15
Mexico	**73.88**	**78**	**6**	**2517**	**85**	**14**	**57.78**	**33**	**18**	**1792**	**36**	**20**
Israel	69.52	60	12	2471	66	15	64.13	25	11	1856	25	18
Austria	52.74	66	38	2470	69	16	45.28	25	41	2084	26	14
Finland	69.62	62	11	2427	68	17	66.29	24	5	2149	25	11
Ireland	74.83	65	4	2426	71	18	67.91	26	4	1912	27	16
Colombia	**64.28**	**60**	**22**	**2407**	**65**	**19**	**59.86**	**25**	**14**	**1877**	**26**	**17**
Argentina	**58.29**	**70**	**32**	**2260**	**82**	**20**	**54.11**	**32**	**26**	**1613**	**36**	**25**
India	66.49	59	15	2121	76	21	57.42	29	19	1675	34	23
Malaysia	58.54	71	30	2048	74	22	50.73	27	33	1692	28	22
Czech Republic	64.78	74	19	2021	76	23	56.59	30	20	1649	31	24
Egypt	35.83	51	47	2007	55	24	32.62	21	47	1806	23	19
Japan	50.82	85	41	1982	86	25	46.48	37	39	1781	37	21
Sweden	66.79	76	14	1928	85	26	61.47	34	13	1570	37	26
Hong Kong	67.85	57	13	1866	61	27	58.31	26	17	1264	26	32
Indonesia	61.46	61	23	1854	62	28	54.28	25	25	1214	25	35
Canada	60.81	76	28	1815	84	29	53.29	35	28	1414	36	28
China	50.16	77	42	1773	79	30	43.78	30	42	1553	32	27
Brazil	45.77	61	45	1763	75	31	39.87	29	45	1335	36	30
Hungary	66.36	78	16	1741	83	32	59.45	34	15	1376	37	29
Singapore	65.49	59	17	1651	68	33	56.24	27	21	1278	28	31
United Kingdom	61.09	72	27	1634	77	34	53.39	37	27	1246	37	33
Taiwan	61.21	63	26	1572	66	35	52.96	24	29	1216	24	34
Spain	58.56	79	29	1521	86	36	50.79	34	32	1122	37	37
Greece	56.12	77	35	1515	82	37	48.66	34	35	1050	35	41
Switzerland	61.30	65	24	1507	69	38	54.41	25	24	1152	26	36
United States	56.62	72	34	1450	74	39	48.63	33	36	1085	34	39
Netherlands	54.77	64	36	1390	72	40	48.92	34	34	1097	35	38
Poland	58.47	80	31	1359	83	41	51.57	34	31	1064	36	40
Belgium	52.03	75	39	1303	81	42	46.57	33	38	1027	35	42
Romania	51.31	54	40	1214	58	43	48.42	23	37	995	26	43
France	52.91	71	37	1202	76	44	45.82	36	40	881	37	44
Italy	46.28	77	44	1136	83	45	41.00	36	44	831	36	45
Germany	46.80	80	43	965	85	46	39.53	36	46	708	37	47
Ukraine	44.54	55	46	845	55	47	41.67	24	43	766	24	46
Average	**61.56**	**67**		**2077**	**73**		**54.87**	**28.9**		**1665**	**30.7**	
Standard Dev.	**9.73**	**8.5**		**65**	**8.8**		**9.1**	**4.9**		**5.7**	**5.3**	

Table 2: Causes of concentration HH aggregate index

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Total GDP (log)	-2.972***	-3.1083***	-3.3367***	-2.8540***	-3.1026***	-3.8507***	-3.2082***
	(0.8455)	(0.8518)	(0.9413)	(0.8709)	(0.8169)	(0.8845)	(1.0508)
GDP per capital (log)	1.4191	2.0559*	1.6634	1.9530*	0.5376	4.7336**	1.8608
	(0.8586)	(1.0289)	(1.1787)	(1.0217)	(1.0582)	(1.4725)	(2.2504)
Land area (log)	1.1327*	1.1267*	1.2351**	1.0112	0.8821	0.9150	0.9676
	(0.5760)	(0.5743)	(0.6030)	(0.5749)	(0.5315)	(0.6808)	(0.7725)
urban population		-0.0659	-0.0371	-0.0544	-0.0228	-0.0211	-0.0570
		(0.0590)	(0.0652)	(0.0587)	(0.0540)	(0.0892)	(0.1055)
Spread			-0.1010				
			(0.0932)				
Mixed member				-1.8418			
				(1.8421)			
Single Member				1.9663			
				(2.1970)			
Proportional Rep.				excluded			
english					2.0868		
					(1.7931)		
german					1.6213		
					(1.9686)		
scandanavian					5.1295*		
					(2.9274)		
socialialist					-9.9485**		
					(3.0074)		
french					excluded		
Barriers to antitrust_OECD						2.4818**	
						(1.1523)	
Product Regulation_OECD							-4.5096
							(3.5857)
Constant	62.0665***	64.6040***	71.0008***	60.3506***	78.6521***	55.9367***	76.9397***
	(15.441)	(15.562)	(17.637)	(16.030)	(14.427)	(17.522)	(26.724)
Observations	45	45	41	45	45	25	25
R-squared	0.246	0.268	0.315	0.322	0.503	0.558	0.492

Table 3: Concentration and Price Levels

	Model 1	Model 2	Model 3	Model 4	Model 5
GDP per capita (log)	22.0995***	18.3700***	18.4733***	18.4617***	19.1080***
	(3.3540)	(3.6200)	(3.6934)	(3.7321)	(4.2510)
Total GDP (log)	4.0299*	7.2450**	6.7474**	7.0540**	4.6691
	(2.7179)	(2.9811)	(3.2222)	(3.2045)	(4.3295)
Land area (log)	-0.9530	-2.3628	-2.6441	-2.4673	-0.9488
	(1.6578)	(1.6945)	(1.8304)	(1.8151)	(2.4950)
pop_urban	-0.1939	-0.2272	-0.2106	-0.2208	-0.1506
	(0.2149)	(0.2017)	(0.2086)	(0.2089)	(0.2474)
hh_ag	**0.6582**	**0.9786****	**0.9433***	**0.9665***	**0.3887**
	(0.4522)	**(0.4506)**	**(0.4653)**	**(0.4651)**	**(0.7285)**
Fuel imports		-1.2375*	-1.3042**	-1.2558*	-2.1286
		(0.5987)	(0.6267)	(0.6195)	(1.4403)
Imports % gdp			-0.0870		
			(0.1887)		
Trade % gdp				-0.0161	
				(0.0832)	
Taxes on Goods % gdp					0.3300
					(0.9974)
Constant	-214.0815	-233.8640	-214.0339	-226.9140	-192.3742
	(45.3147)**	(43.4661)**	(61.7279)**	(57.1548)**	(85.9720)*
Observations	29	29	29	29	23
R-squared	0.855	0.879	0.880	0.879	0.884

Table 4: Consumer Product Concentration in Mexico (C3 value)

Product	C3	Product	C3	Product	C3
Aguardiente and mezcal	19.7	Tuna	75.8	Milk modifiers	85.7
Packaged chorizo	29.6	Jellies and prepared deserts	76.1	Canned chili	89.6
Analgesics	31.1	Lip balm	52.9	Vodka	85.1
Cough remedies	40.8	Liquid cleaners	79.4	Fabric softener	89.2
Liquid and powdered seasonings	42.0	Ham	77.2	Rum	83.2
Hair modelling	48.5	Muscle ointment	78.2	Prepared mole	90.3
Eyes medication	54.0	Vegetable juice	72.4	RTE cereals	89.3
Snack sauce	54.1	Honey and Syrup	78.9	Contact lens solution	91.7
Bottled water	55.0	Packaged tortillas	79.2	Air freshener	91.3
Chocolate	55.3	Batteries	76.7	Sanitary protection	86.3
Tequila	55.8	Snack peanuts	78.7	Mustard	92.3
Roasted Coffee	56.8	Home style sauce	83.6	Nutrition Bars	92.3
Flu remedies	57.5	Paper napkins	76.9	Insecticide	88.9
Spirits (special liquors)	60.2	Car wax	69.5	Chewing gum	88.0
Hair conditioner	60.3	Shoe polish	83.2	Powdered Drinks	92.4
Edible oil	61.4	Packaged sausage	79.7	Cloth detergents	93.5
Skin cream	61.7	Incontinence diapers	77.0	Drain cleaner	89.6
Scourers	62.6	Hair removers	78.8	Instant Coffee	91.3
Cosmetics	62.6	Beverages with alcohol	78.7	Brandy	94.6
Marmalade	62.8	Bathroom soap	78.4	Vermouth	88.8
Deodorant	64.6	Toilet paper	81.3	Snack food	93.0
Fruit juices	64.9	Mayonnaise	82.0	Toothpaste	95.7
Canned vegetables	65.6	Toothbrush	77.8	Consommé	89.2
Prepared flour	65.7	Baby diapers	80.1	Instant Formula	95.9
Flavored Milk	67.5	Glass cleaners	80.8	Dish detergent	95.5
Edible salt	68.7	Hair dye	86.5	Shaving cream	90.2
Processed soup	69.4	Suntan lotion	83.3	Facial tissues	93.9
Shampoo	70.5	Cognac	86.4	Isotonic Bev	94.6
Butter	72.5	Packaged deserts	85.1	Bitumen	95.9
Yoghurt	72.7	Pet food	72.1	Bread	97.3
Mouthwash	72.9	Tomato puré	87.6	Corn starch	97.8
Cider	73.0	Processed beans	86.0	Hair dye	99.3
Tomato sauce (ketchup)	73.1	Whisky	80.0	Powdered Milk	99.4
Liquid bleach	73.9	Razor blades	80.5	Baby cereals	99.2
Salad Dressing	74.2	Condoms	84.8	Cigarettes	99.9
Multivitamins	75.0	Margarine	84.5	Baby food	100.0
Toilet cleaners	75.2	Cookies	86.3	**Average**	**78.9**
Antacids	75.4	Oats	83.9		

Source: AC Nielsen 200x