TRADE AND CIRCUSES: EXPLAINING URBAN GIANTS*

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Using theory, case studies, and cross-country evidence, we investigate the factors behind the concentration of a nation's urban population in a single city. High tariffs, high costs of internal trade, and low levels of international trade increase the degree of concentration. Even more clearly, politics (such as the degree of instability) determines urban primacy. Dictatorships have central cities that are, on average, 50 percent larger than their democratic counterparts. Using information about the timing of city growth, and a series of instruments, we conclude that the predominant causality is from political factors to urban concentration, not from concentration to political change.

I. INTRODUCTION

Over 35 percent of Argentina's population is concentrated in Buenos Aires, a city of 12 million inhabitants. What is it about countries such as Argentina, Japan, and Mexico that justifies their urban concentration when the United States' largest city contains only 6 percent of its population? We investigate the causes of urban primacy using evidence from a cross section of 85 modern countries and five case studies (classical Rome, 1650 London, 1700 Edo, Buenos Aires in 1900, and Mexico City today). We find that concentration in the nation's largest city falls with total population and with the share of labor employed in agriculture. As predicted by Krugman and Livas [1992], countries with high shares of trade in GDP or low tariff barriers (even holding trade levels constant) rarely have their population concentrated in a single city. Urban centralization also falls with the development of transportation networks.

But political forces, even more than economic factors, drive urban centralization: dictatorships cause concentration in a single metropolis. Political instability also increases central city size. Figure I summarizes our findings that both political weakness and centralized power lead to centralized urban populations. One

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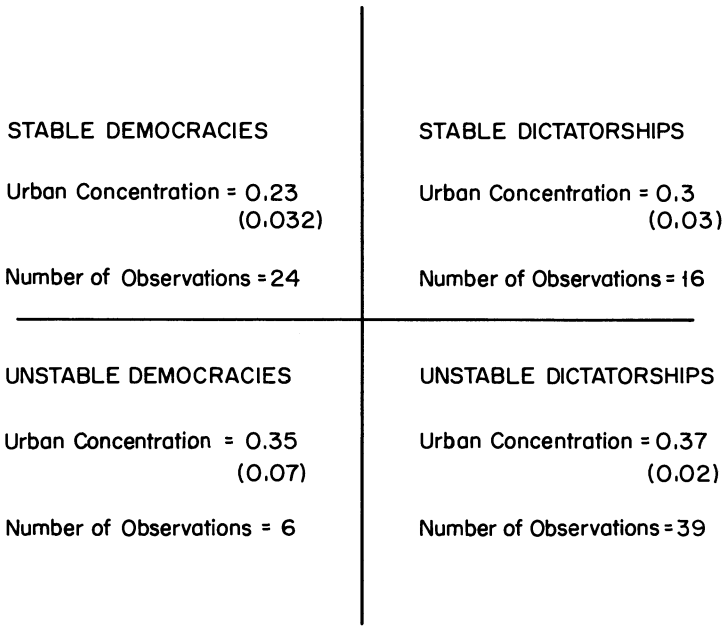

FIGURE I
Politics and Urban Concentration

Urban concentration is defined as the average share of urbanized population living in the main city from 1970 to 1985. Stable countries are defined as those whose average number of revolutions and coups is below the worldwide median. Dictatorships are countries whose average Gastil index for the period is higher than 3. Standard errors are in parentheses.

interpretation of these results is that unstable regimes must cater to mobs near the center of power and dictatorships freely exploit the wealth of the hinterland.

Our work has some significant predecessors: Wheaton and Shishido [1981] and Rosen and Resnick [1980] show that urban concentration is negatively associated with the country's population. They also find that concentration is first increasing and then decreasing in per capita GDP. Henderson [1986] and Wheaton and Shishido show across a small sample of countries that both concentration of government expenditures and nonfederalist governments lead to urban concentration.[1] Using data on Western

1. These three authors' evidence differs from ours because of the following: (1) their use of self-constructed political variables, (2) their emphasis on explicitly spatial government characteristics (i.e., degree of local spending or autonomy), and (3) their small sample size (less than 40) and restrictive time period (Henderson

European cities from 1000 to 1800 C.E., De Long and Shleifer [1993] demonstrate that urban growth (not urban concentration) is the product of nonabsolutist regimes that respect property rights. Our next section presents our basic hypotheses. Section III describes the data, and Section IV presents the results. Section V presents our case studies of megalopolises. Section VI concludes.

II. Alternative Theories of Urban Giants

In this section we discuss three forces driving the concentration of urban population in a single city: trade and commerce, industry, and government. We also set up our estimation strategy.

II.1. Trade and Commerce

Urban theorists from von Thünen [1826] to Krugman [1991] have argued that when transportation is expensive activities will group together to save on travel costs. This theory predicts that urban concentration will be higher when transportation is more costly.[2] Krugman and Livas [1992] use this idea to suggest a link between protectionism and the growth of Mexico City. In their model, international firms supply the main city and the hinterland equally well. Domestic firms pay lower transport costs when serving their own location. Thus, domestic prices, net of travel, are lower where domestic firms are concentrated.

When tariffs are low, imported goods are a large part of consumption. Imports are not cheaper in the central city, so workers spread over space to save on congestion costs. With protection, domestic suppliers take over the market. Prices, net of transport costs, are lower for domestic goods in the central city because firms are located in that city. Workers then come to the city to pay lower prices for domestic goods.[3] This theory predicts that protectionism generates larger central cities.

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uses only 1974–1976). In addition to this, endogeneity problems are much more serious for their political variables. As one measure of government centralization, these authors use the share of local governments in total government expenditures. This variable is clearly a function of the distribution of population in space. A further difference with our work is that we only look at the nation's largest city. This change was necessary to increase sample size.

2. The relationship between trade and concentration can be nonmonotonic. When foods deteriorate rapidly in transit, people must live near food supplies, as they did before the domestication of pack animals [Bairoch 1988].

3. Protectionist policies might also encourage urban concentration by promoting the growth of import-competing activities that are dependent on essential inputs found only in the capital; central cities might be good places for avoiding tariffs (New York City and Buenos Aires were both centers of smuggling). Proximity to central government might also be particularly important when exemptions to tariffs are being handed out or the spoils of protection are being distributed.

Of course, free trade does not always decrease urban concentration. Among our case studies, London and Buenos Aires are trade cities that grew through commerce. We can therefore test Krugman and Livas' hypothesis of a negative correlation between trade and concentration against an alternative hypothesis that central cities have a comparative advantage in commerce and grow with the volume of trade.

II.2. Industry

Activities such as agriculture, which depend on immobile natural resources, will not be able to relocate to reap the benefits from being in the capital. The extent to which an economy is agricultural thus limits the extent to which that economy can centralize in one location. This basic argument suggests that any movement away from agriculture will raise urban centralization.

Centralizing population lowers transport costs and raises effective aggregate demand for a fixed level of GDP. If the level of demand is important for the growth of industry (because of fixed costs in manufacturing), then urban centralization may be correlated with industrial expansion. Industrialization creates a further incentive for firms to congregate if industrialization increases the need for physical infrastructure and infrastructure costs can be shared by firms located in the same city. Manufacturing may also increase the need for intellectual spillovers that are only available in the central city (perhaps those caused by diversity as in Glaeser et al. [1992] or from access to the pool of international human capital). Large cities also allow firms to specialize in a thinner range of products, as they provide larger markets for these specialized products. We test the positive relationship between manufacturing and concentration predicted by the above theories against an alternative hypothesis in which manufacturing only affects urbanization and not concentration.

II.3. Government and Politics, Including a Model

Politics affects urban concentration because spatial proximity to power increases political influence. Political actors from revolutionaries in 1789 to lobbyists in 1994 have increased their clout by working in the capital. Distance can lessen influence in many ways: (1) when influence comes from the threat of violence, distance makes that violence less direct; (2) distance makes illegal political actions (e.g., bribes) harder to conceal; (3) political agents living in

the hinterland have less access to information; and (4) distance hurts communication between political agents and government. The political power of the capital's population should induce the government to transfer resources to the capital, and these transfers will attract migrants. Rent-seekers coming to the capital to renk-seek may also raise the city's population.[4] The political power of the capital's residents is most important when governments have the following characteristics: (1) they are weak and respond easily to local pressure; (2) they have large rents to dispense; and (3) they do not respect the political rights of the hinterland. Effect (1) predicts that instability will create urban concentration since buying off local agitators is most important in susceptible regimes. Instability may also create concentration if weak governments are unable or unwilling to protect life and property outside of the capital. Effects (2) and (3) suggest that dictatorships will have more concentration since they are willing to ignore the wishes of the politically weak hinterland. Dictators may also have more rents to dispense. We test the positive connection of dictatorship and instability with urban concentration against an alternative hypothesis where dictatorship and instability lead governments to protect themselves by moving the seat of power away from the central city (and thus lessening concentration), or by controlling migration (as in Stalinist Russia or Communist China) to disperse population across space.

The model of government and politics formally connects the type of political regime (dictatorships versus democracy) and the degree of political instability with the size of the central city. We examine the spatial structure of taxation chosen by a government facing legal political pressure from the electorate and revolutionary political pressure from mobs in the capital city. Our main results are that more dictatorial regimes have higher taxes in the hinterland (because dictators ignore the rights of the median voter who resides in the hinterland), and that more unstable regimes lower

4. Hoselitz [1955] argued that there were a class of "parasitic" cities involved in rent-seeking. Olson [1982] emphasizes the role of government distribution policies in determining the size of cities. He suggests that the capital will grow when transportation and communication networks are poorly developed in rural areas. This, he claims, "makes it more costly and difficult for those in rural areas to mobilize political power. . . ." Williamson [1991] gives an elegant description of the policies put in place for transferring resources from the hinterland to the capital. Technically, these theories are all about the nation's capital not the nation's largest city. Since the nation's largest city is its capital in more than 90 percent of the countries in our sample, we have decided to gloss over this distinction.

taxes in the capital (because unstable regimes are vulnerable to agitation by mobs near the seat of power).[5]

We divide each country into two locations: the main city and the hinterland. Migration between locations is assumed to be costless. Total population in the country is normalized to one. Wages in each location (including amenities, psychic income, and income from household production) are assumed to be locally declining in that location's population because of congestion. Taxes are lump sum and may vary across space.

The assumption of costless migration implies that after-tax wages will be equalized across locations, or

$$W_1(N) - \tau_1 = W_2(1 - N) - \tau_2, \tag{1}$$

where N is the population of the central city, τ_i is the tax level (net of benefits) in region i (for $i = 1,2$), where region 1 is the central city, and $W_i(.)$ are location-specific continuously differentiable wage functions, with $W_i' < 0$ due to congestion. Equation (1) defines a population function:

$$N = N(\tau_2 - \tau_1), \tag{2}$$

where $N'(.) < 0$, from $W_i'(.) < 0$. The population of the central city depends on the difference in the tax rates across space.

The government takes (2) as given, and chooses τ_1 and τ_2 to maximize

$$(1 - rR(\tau_1) - eE(\tau_2))V + \tau_1 N(\tau_2 - \tau_1) + \tau_2(1 - N(\tau_2 - \tau_1)), \tag{3}$$

where V is a parameter measuring the value of survival, and $1 - rR(\tau_1) - eE(\tau_2)$ describes the probability of surviving to the period. $rR(\tau_1)$ is the probability of a violent or illegal revolt, where r is a shift parameter capturing the propensity of the country to revolt or the level of instability. The probability of a revolt starting and succeeding is assumed to be a function of the degree of exploitation in the central city (τ_1), because we assume that only revolts in the capital can be successful.[6] $eE(\tau_2)$ is the probability of a successful legal or electoral change of government.[7] The election function is based on the taxes facing the median voter τ_2 (as long as

5. We would get identical results if the degree of dictatorship measured the size of the rents to be allocated and the degree of instability measured the ability of local political actors to access those rents.

6. Our results could be generalized to allow revolts starting in both areas as long as the capital has a comparative advantage in unseating the government.

7. Both probabilities are conditional on the other change of government not occurring.

we assume that at least 50 percent of the population lives in the hinterland). e is a shift parameter measuring the power of the electorate, with low e's indicating dictatorship. In equation (3) the government faces a trade-off between current rents and future survival when choosing the levels of taxes in each location.

The government maximizes (3) over τ_1 and τ_2 subject to (2). The first-order conditions (FOC) are given by

$$-Vr\frac{\partial R}{\partial \tau_1} + N(\tau_2 - \tau_1) + \frac{\partial N}{\partial(\tau_2 - \tau_1)}(\tau_2 - \tau_1) = 0 \tag{4}$$

and

$$-Ve\frac{\partial E}{\partial \tau_2} + 1 - N(\tau_2 - \tau_1) - \frac{\partial N}{\partial(\tau_2 - \tau_1)}(\tau_2 - \tau_1) = 0. \tag{5}$$

We assume that the second-order conditions hold. Our interest here is how the difference between the tax rates ($\tau_2 - \tau_1$, which determines N, the size of the central city) responds to democracy (e) and revolutionary instability (r).

Figure II shows the loci of city taxes and countryside taxes that satisfy each FOC. The City Tax schedule shows equation (4), the FOC with respect to τ_1. The Countryside Tax schedule shows equation (5), the FOC with respect to τ_2. We are using a linearized version of the model for which we have assumed that

$$N = \tfrac{1}{4} + \tfrac{1}{4}(\tau_2 - \tau_1) \tag{6}$$

and

$$1 - rR(\tau_1) - eE(\tau_2) = k - \frac{r\tau_1^2}{2} - \frac{e\tau_2^2}{2}. \tag{7}$$

The initial equilibrium is given at point A.

It is simple to show that the gap between the level of taxes in the countryside and those in the central city increases when the degree of democracy falls and the degree of instability rises. Indeed, Figure II shows that a fall in e (lower democracy) induces an upward shift in the Countryside Tax schedule; the tax schedule shifts up because the marginal cost of taxing the countryside, which comes from the ability of the countryside to hurt the government, has fallen. The new equilibrium is given by B, where while both city and country taxes are higher, countryside taxes have risen relatively more than city taxes. Taxing the hinterland is

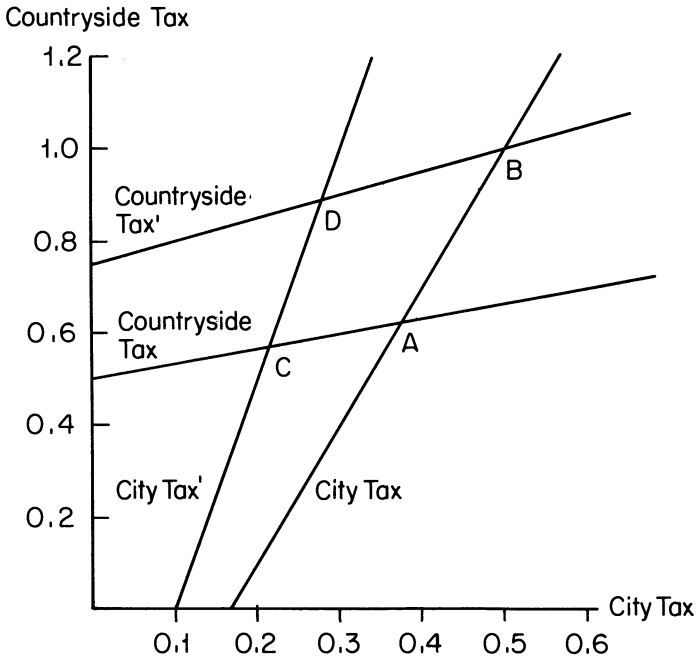

FIGURE II
Stability, Dictatorship, and Taxes across Space

a cheaper activity for the government when an absence of democratic representation leaves voters in the hinterland powerless.

Starting again from A, an increase in instability (a higher r) raises again the exploitation gap between the country and the central city. In Figure II this is shown by a shift to the left of the City Tax schedule that brings the economy to an equilibrium at C. While both tax rates fall, the reduction is more important for the City. Essentially, instability makes it more dangerous to tax the capital city, since the capital becomes more prone to violence. Since democracy and stability both lower the tax differences over space, they will also lower the central city's population. Point D shows the effect of both dictatorship and instability.

It is also straightforward to prove algebraically that instability is more important in democracies than in dictatorships (i.e., $d^2N/drde < 0$). The intuition for this effect is that there are two forces limiting taxation of the hinterland: democracy, and the movement of population in the hinterland to the capital. When

democracy is strong, the tax rate on the hinterland is initially low so new taxes on the hinterland (created by more instability) will have a smaller migration effect than they would if the tax rate on the hinterland were initially high.

II.4. Estimation Strategy

Our empirical strategy is basically an estimation of equation (1), the indifference relationship across locations. A larger urban population in a country will be our indicator that features of that country attract people to the central city. This inference requires that there be some freedom to migrate and that utility in each location is locally decreasing in the number of people in that location. Our regressions actually assume an indifference relationship across locations where congestion effects are power functions (i.e., wages in each location are a function of national characteristics times the population of that region raised to some power). We thus estimate

$$\ln (N_c) = \alpha + \beta_1 \ln (N_u) + \beta_2 \ln (N_h) + \sum_{j=1}^{j=n} \delta_j x_j, \tag{8}$$

where the x_j's are national characteristics that change the incentives to live in different locations. Equation (8) is justified by a model, but it also has intuitive appeal. This estimation can be interpreted as finding the factors determining the size of the main city holding the population of the other urbanized areas and the hinterland constant. By moving $\ln (N_u)$ or $\ln (N_h)$ over to the other side of (8), one can think of this equation as estimating the ratio of population in the central city to that of other urbanized areas, or the ratio of population in the central city to nonurbanized population.

III. The Data

III.1. Construction of the Data Set

We collected the 1970, 1975, 1980, and 1985 observations for 85 countries to make our data set. The list of countries included in this sample is shown in the Appendix. The data on urbanization and population in the main urban agglomeration come from the 1988 edition of the *Prospects of World Urbanization,* which has data for countries or areas with two million or more inhabitants in

1985.[8] We used the country's largest city, not its capital, as the capital city is *only* appropriate for testing political theories. Our choice is irrelevant, since 77 of the 85 large cities in our sample are capitals and no results change if we drop the noncapital cities. The data on each country's land area were taken from the 1986 edition of the *FAO Production Yearbook*. Data on the share of the labor force outside of agriculture, nominal GDP measured in units of national currency, and merchandise imports and exports are from the World Bank's *World Tables*. The share of the labor force outside of agriculture is defined as the percentage of the labor force not in farming, forestry, hunting, and fishing.

Data on total population, political rights, and instability are from the Barro and Wolf [1989] database. GDP numbers are compiled by Summers and Heston [1991]. The Gastil index of political rights annually ranks countries in seven categories according to a checklist of political rights. The data on political instability measure the number of revolutions, coups, or strikes per year in each country. The data on import duties and government expenditures on transportation and communications are from the IMF's *Government Finance Statistics*.

Our basic sample has 85 countries, but we lose several observations in dealing with import duties and government transportation expenditures. We used averages of the 1970, 1975, 1980, and 1985 observations when feasible except for the data directly taken from the Barro-Wolf data set.[9]

III.2. Description of the Data

The 1988 *Prospects of World Urbanization* reports 100 urban agglomerations with two million or more inhabitants in 1985 (compared with 62 in 1970). These cities account for 487 million inhabitants, which represents 10 percent of the world's total population and 24 percent of the world's urban population. Of those 100 largest urban agglomerations, 40 are in the more developed regions of the world. In 1985, 46 of them contained between 2 and 2.9 million persons; 24 contained between 3.0 and

8. An urban agglomeration is an area comprising a central city or cities surrounded by an urbanized area, and is close to the U. S. definition of "consolidated metropolitan statistical area."

9. Averages were used rather than running all four observations as a panel, primarily because appropriate panel techniques are only usable if we put some structure on how lagged values of country characteristics change current urban concentration. We were unwilling to make the assumptions needed for that structure.

4.9 million; and 30 had more than 5 million inhabitants. In this last group eleven agglomerations contained ten million or more persons, with seven of them in the less developed regions of the world. During the fifteen-year period of 1970–1985 that we analyze, agglomerations that in 1985 had two million or more inhabitants grew faster than the world's total population. While large agglomerations in the developed world grew at an average of 1.0 percent per year, their counterparts in the less developed world grew at an average rate of 3.3 percent per year.

Table I shows the five largest and five smallest main cities of the world first ranked by absolute population and then ranked by share of their country's population. Ranking by either measure, three of the five largest main cities in the world are in less developed countries. All of the smaller cities are in less developed countries. The correlation between absolute population and share of country's population is far from perfect. Shanghai is one of the world's most populated main cities when ranked by its raw population and one of the world's least populated main cities when ranked by its share of China's population. The southern cone of South America seems particularly prone to urban concentration; three of the five most concentrated countries in the world are there.

IV. Results

Table II gives the means and standard deviations for the sample that we use in our regressions. Table III shows the raw correlations of our variables. Higher levels of central city population were positively associated with larger and more populated countries, high levels of per capita GDP, and high shares of the labor force outside of agriculture. Central city population is negatively correlated with the presence of dictatorships, the share of trade in GDP, and the share of government transportation and communication expenditures in GDP. The growth rate of main city population is positively associated with dictatorships, revolutions and coups, and high tariff barriers. The raw data also show some correlation between trade and politics, suggesting that trade and political effects might be confused empirically.

We use the log of average population in the main city as the dependent variable in most of our regressions. All regressions include the same set of controls; a capital city dummy that takes a

TABLE I
DESCRIPTION OF THE DATA

City	Population	Share of country's population
	Five biggest main cities by 1985 population	
Tokyo, Japan	19,037,361	15.76%
Mexico City, Mexico	16,465,487	20.97%
New York, United States	15,627,553	6.53%
Sao Paulo, Brazil	15,538,682	11.46%
Shanghai, China	11,843,669	1.14%
	Five smallest main cities by 1985 population	
Pt. Moresby, Papua N.G.	156,850	4.47%
Porto Novo, Benin	182,653	4.52%
Kigali, Rwanda	198,915	3.30%
Bujumbura, Burundi	261,098	5.56%
Kathmandu, Nepal	277,539	1.66%
	Five biggest main cities by share of country's population in 1985	
Singapore, Singapore	2,558,000	100%
Hong Kong, Hong Kong	5,044,073	92.5%
Montevideo, Uruguay	1,157,450	39.36%
Buenos Aires, Argentina	10,759,291	35.47%
Santiago, Chile	4,227,049	34.87%
	Five smallest main cities by share of country's population in 1985	
Shanghai, China	11,843,669	1.14%
Calcutta, India	10,227,890	1.34%
Kathmandu, Nepal	277,539	1.66%
Kigali, Rwanda	198,915	3.30%
Sana, Yemen	284,561	3.57%

value of one if the main city in question is a capital city and zero otherwise, the log of average nonurbanized population, the log of average urbanized population outside of the main city, the log of average real per capita GDP, and the log of land area. Unless otherwise specified, all of our regressions report OLS results, with

TABLE II
SUMMARY STATISTICS

Variable	Obs	Mean	Std. dev.	Minimum	Maximum
Population	85	30,000,000	77,000,000	1,748,250	655,000,000
Main city size	85	2,489,953	3,511,807	120,404	16,900,000
Main city growth	85	0.039	0.028	−0.011	0.139
Land area	85	974	1,912	11	9,976
Per capita GDP in 1980 US$	85	3,005	3,122	287	10,898
Share of labor outside of agriculture	85	0.51	0.28	0.067	0.97
Share of trade in GDP	85	0.43	0.21	0.0	1.18
Dictatorship dummy	85	0.65	0.48	0	1
Revolution and coups	85	0.23	0.25	0	1.15
Import duties/imports	70	0.086	0.058	.0000267	0.297
Gov. transp. expenditure/GDP	50	0.02	0.01	.0000075	0.061

Note. All variables are averages of their 1970, 1975, 1980, and 1985 observations. The 1985 observation is missing for the Share of labor outside of agriculture. The 1970 observation is missing for Import duties and Government transportation and communication expenditures. The data on Land area is in thousands of hectares. The Dictatorship dummy takes a value of one for countries with an average Gastil index larger than three.

standard errors based on White's heteroskedasticity-consistent covariance matrix in parentheses.[10]

In Table IV regression (1) includes our standard set of controls and the share of the labor force outside of agriculture. The regression explains 81 percent of the total variation in the dependent variable. In regression (1) the capital city dummy is positive and significant. The coefficient on this variable indicates that main cities are, on average, 42 percent larger if they are also capital cities. This fact may mean that power attracts population, but it may also mean that capitals are located in larger cities. Both population controls also take positive values, but only the log of nonurbanized population is large and significant. This coefficient is typically well below one so that urban areas grow with their countries but less than proportionately. The coefficient on the log of land area is also positive and usually close to 0.12, implying that a 10 percent increase in the size of the country increases population in the main city by about 1.2 percent. An increase in the size of the

10. These standard errors do not differ greatly, however, from those obtained by OLS. We also tried running the regressions weighing them by population.

TABLE III
SAMPLE CORRELATIONS

	Population	Main city size	Main city growth	Land area	Per capita GDP	Non-agricultural labor share	Share of trade in GDP	Dictatorship dummy	Revolutions and coups	Import duties/imports	Govt. transp. exp./GDP
Population											
Main city size	0.537										
	(.000)										
Main city growth	−0.139	−0.290									
	(0.206)	(0.007)									
Land area	0.353	0.462	−0.098								
	(0.001)	(0.000)	(0.370)								
Per capita GDP (1980 US$)	0.045	0.334	−0.596	0.301							
	(0.684)	(0.002)	(0.000)	(0.005)							
Nonagricultural labor share	0.024	0.367	−0.697	0.200	0.849						
	(0.825)	(0.001)	(0.000)	(0.067)	(0.000)						
Share of trade in GDP	−0.313	−0.392	0.105	−0.269	0.065	0.118					
	(0.004)	(0.000)	(0.337)	(0.013)	(0.554)	(0.281)					
Dictatorship dummy	−0.192	−0.217	0.582	−0.107	−0.720	−0.691	−0.011				
	(0.077)	(0.046)	(0.000)	(0.328)	(0.000)	(0.000)	(0.919)				
Revolutions and coups	−0.071	−0.106	0.232	−0.064	−0.441	−0.358	−0.197	0.469			
	(0.517)	(0.334)	(0.033)	(0.561)	(0.000)	(0.001)	(0.071)	(0.000)			
Import duties/imports	0.309	−0.119	0.416	−0.100	−0.660	−0.567	−0.141	0.460	0.350		
	(0.009)	(0.327)	(0.000)	(0.408)	(0.000)	(0.000)	(0.245)	(0.000)	(0.003)		
Govt. transp. exp./GDP	−0.244	−0.353	0.252	−0.288	−0.119	−0.027	0.395	−0.016	−0.216	−0.008	
	(0.088)	(0.012)	(0.078)	(0.042)	(0.411)	(0.852)	(0.005)	(0.911)	(0.132)	(0.960)	

Note. Sample used is that of Table II. The significance probability of the correlation under the null hypothesis that the statistic is zero is shown in parentheses.

TABLE IV

Dependent variable: log of average population in main city (1970–1985)	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	1.136	2.014	1.156	0.651	0.808	0.297
	(0.878)	(0.934)	(0.942)	(1.109)	(1.082)	(1.063)
Capital city dummy	0.424	0.465	0.374	0.336	0.283	0.408
	(0.204)	(0.196)	(0.181)	(0.200)	(0.180)	(0.188)
Log of average nonurbanized population	0.595	0.553	0.583	0.640	0.623	0.641
	(0.068)	(0.066)	(0.063)	(0.073)	(0.072)	(0.071)
Log of average urbanized population outside the main city	0.059	0.066	0.063	0.058	0.054	0.045
	(0.050)	(0.045)	(0.042)	(0.042)	(0.040)	(0.038)
Log of land area	0.167	0.155	0.115	0.109	0.113	0.120
	(0.051)	(0.049)	(0.049)	(0.054)	(0.053)	(0.055)
Log of average real GDP per capita	0.034	0.058	0.165	0.193	0.149	0.166
	(0.129)	(0.131)	(0.127)	(0.146)	(0.149)	(0.148)
Average share of the labor force outside of agriculture	2.656	2.556	2.704	2.623	2.782	3.071
	(0.554)	(0.567)	(0.549)	(0.547)	(0.518)	(0.516)
Share of trade in GDP		−0.609	−0.676	−0.463	−0.404	−0.519
		(0.225)	(0.204)	(0.228)	(0.240)	(0.244)
Dictatorship dummy based on Gastil's index of political rights			0.444	0.324	0.442	0.705
			(0.154)	(0.156)	(0.148)	(0.181)
Africa dummy				0.160	0.127	0.172
				(0.263)	(0.260)	(0.257)
Latin America dummy				0.390	0.342	0.295
				(0.159)	(0.158)	(0.162)
New democracy					0.428	
					(0.177)	
Revolution and coups						2.372
						(0.772)
Dictatorship dummy × revolution and coups						−2.705
						(0.803)
Number of observations	85	85	85	85	85	85
Adjusted R^2	0.81	0.81	0.82	0.83	0.83	0.84

Note. All variables are averages of their 1970, 1975, 1980, and 1985 observations. The 1985 observation is missing for the Share of labor outside of agriculture. The Dictatorship dummy takes a value of one for countries with an average Gastil index larger than three. White-corrected standard errors in parentheses.

country (holding population constant) represents a decrease in population density, which might indicate an increase in the transportation costs of supplying the hinterland. This result thus provides our first support for the Krugman hypothesis.

Our income control usually takes positive values, but the coefficient loses size and significance whenever we also control for

the share of labor outside of agriculture. The share of labor outside agriculture is meant to capture the country's state of industrial development and the fraction of the population that is not tied to natural resources.[11] This last variable has a large and significant effect on the size of the main city. We find that a 1 percent increase in the share of the labor force outside of agriculture increases the size of the largest city by about 2.5 percent. Both the agriculture and GDP results suggest that large cities require some economic development.

Regression (2) adds the share of trade in GDP to our first regression. This variable is negatively related to the size of the largest city. An increase of 10 percent in the share of trade in GDP leads to a reduction of 6 percent in the size of the main city. Alternatively, a one-standard-deviation increase in the share of trade in GDP reduces the size of the main city by about 13 percent. This result supports Krugman and Livas' [1992] theory against the alternative hypothesis that big cities grow as a result of commerce and trade.

The third regression in Table IV shows our first political variable. This dictatorship dummy (based on Gastil's index of political rights) assigns a value of one to countries that do not protect political rights. Since our predictions about dictatorship occur because dictatorships ignore the political rights of their citizens, this measure is good for our purposes. Adding this dictatorship dummy to our list of controls, we find that dictatorships have main cities that are about 45 percent larger than main cities in countries with nondictatorial regimes.[12] We deal with the possible endogeneity of the trade and dictatorship variables in Tables VI and VII.

Region dummies are generally excluded from our regressions because we want to include the information contained in interregional variation, but to check robustness, we include region dummies in regression (4). Our three main variables of interest remain significant and large, although the coefficients on trade and

11. This variable was chosen instead of the share of the population in manufacturing to increase sample size. Using a pure manufacturing variable for a smaller subsample of countries did not change the results.

12. Our results are not particularly sensitive to the choice of the cutoff point in the Gastil index for deciding whether a country is a democracy or a dictatorship. More detailed examination of the data suggests a slightly nonlinear relationship between city size and political rights, where countries in the [4,5) interval have, other things equal, the largest central cities. While our results do not change if we use a nonlinear continuous dictatorship variable, we find our dummy variable easier to interpret. Our cutoff of three follows Perotti [1991].

politics fall by about a quarter. The coefficient on the Latin American dummy is positive and indicates that countries in this region have main cities that are 40 percent larger than those of other countries.

In regression (5) we add a second political variable to regression (4). The New democracy dummy was constructed using data from Banks [1973], which contains data for a wide cross-section of countries going back to 1815. This variable takes a value of one if the country in question did not have a well-functioning and efficient Parliament at the time it became independent, but was a democracy between 1970 and 1985.[13] This New democracy dummy is intended to capture the effect of political history on the size of the central city. Regression (5) shows that among the democracies in our sample, those that were dictatorships in the past have central cities that are 40 percent larger than those of countries that were always democracies.

The final regression in Table IV includes the average number of revolutions and coups as a regressor, and an interaction between this variable and the dictatorship dummy to the previous set of regressors. We find that political instability substantially increases city size in democracies. In those regimes one extra revolution or coup per year increases the average size of the central city by 2.4 percent. In dictatorial regimes political instability does not change the main city size.

The first three regressions in Table V examine the trade-city size connection more closely. Regression (7) includes a tariff variable: the ratio of import duties to total imports.[14] We find that imports duties do indeed expand the size of the primary city. A 1 percent increase in the ratio of import duties to imports raises the size of the central city by almost 3 percent. The import duty effect remains important when we control for the quantity of trade and dictatorship in regressions (8) and (9).

Regression (10) includes the share of government expenditures spent on transportation and communications for a small subset of our sample (50 countries). A 1 percent increase in the share of GDP spent on government transportation reduces main city size by 10 percent. This evidence supports Krugman [1991]:

13. For those countries that were never a colony or that became independent before 1815, we used the 1850 observation if available or the 1900 one.

14. We also used an alternative measure provided in Lee [1992], who uses the actual average tariff rate on imported inputs, intermediate, and capital goods in or around 1980. This variable (which was available for a subsample of 67 countries) also entered strongly positive and significant in our regressions.

TABLE V

Dependent variable: log of average population in main city (1970–1985)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	3.015	3.768	3.128	2.475	2.2792	1.752
	(0.927)	(1.059)	(0.992)	(0.823)	(0.8010)	(0.8224)
Dummy for capital city	0.445	0.460	0.375	0.566	0.5190	0.4592
	(0.214)	(0.209)	(0.180)	(0.244)	(0.2151)	(0.2146)
Log of average nonurbanized population	0.491	0.456	0.498	0.191	0.1547	0.2259
	(0.075)	(0.075)	(0.072)	(0.112)	(0.1160)	(0.1064)
Log of average urbanized population outside the main city	0.091	0.097	0.092	0.504	0.6071	0.5312
	(0.056)	(0.051)	(0.049)	(0.110)	(0.1228)	(0.1154)
Log of land area	0.176	0.162	0.124	0.115	0.0039	0.0228
	(0.063)	(0.060)	(0.061)	(0.070)	(0.0778)	(0.0734)
Log of average real GDP per capita	0.686	0.676	0.825	0.217	0.2478	0.4488
	(0.114)	(0.112)	(0.129)	(0.129)	(0.1342)	(0.1418)
Import duties/imports	2.942	2.909	2.733			
	(1.424)	(1.415)	(1.212)			
Share of trade in GDP		−0.535	−0.512			
		(0.342)	(0.303)			
Dictatorship dummy based on Gastil's index of political rights			0.444			0.4581
			(0.177)			(0.2206)
Share of government transportation and communication expenditures to GDP				−10.481	−10.320	−8.624
				(5.717)	(4.8250)	(4.293)
Roads density in 1970					−0.00036	−0.00023
					(0.00016)	(0.00015)
Number of observations	70	70	70	50	50	50
Adjusted R^2	0.77	0.78	0.79	0.84	0.85	0.86

Note. See Table IV. The 1970 observation is missing for Import duties and Government transportation and communication expenditures.

high internal transport costs create an incentive for the concentration of economic activity in space. Regression (11) further examines the role of transportation costs using the density of roads in 1970 (from Canning and Fay [1993]). The coefficient on the initial

density of roads in the country is negative (and the coefficient on government spending stays negative) further indicating that well-developed transport facilities lower the size of central cities. The last regression in Table V controls for possibly omitted political effects and shows that the transportation expenditures are robust to controlling for political effects.

Tests for Causality

Like most of our variables, transport spending is endogenous. Similar caveats apply to our trade and dictatorship variables. Concentration of population in a single city might give local firms a transport cost advantage over foreign suppliers and thus lower the amount of foreign trade. Dictators' coups might be easier in spatially concentrated countries.

To examine the results of Table IV more closely, Table VI reproduces regression (3) but allows for the possibility that trade and the dictatorship dummy are endogenously determined. We use three sets of instruments to examine how exogenous changes in the share of trade in GDP and the type of political regime alter the size of the main city.

(1) Regional Political Characteristics: following Ades and Chua [1993] we use the average number of revolutions and coups in neighboring countries, the average number of per capita political assassinations in neighboring countries, and a dummy variable that takes a value of one if the average Gastil index of political rights in neighboring countries is higher than three.

(2) Predetermined Political Characteristics: we use the 1960 value of an index of ethnolinguistic fractionalization in the country (from Taylor and Hudson [1972]), and a dummy variable that takes a value of one if the country became independent after the end of World War II.

(3) Regional Infrastructure: we use the average road density in neighboring countries (from Canning and Fay [1993]).

Our identifying assumptions are that these variables affect politics and trade but do not change urban structure directly. We test these assumptions using a Wu-Hausman test of the overidentifying restrictions for the system of equations and find that our assumptions pass these tests.

Regression (13) repeats regression (3) using our instrumental-variables approach. The coefficient on the dictatorship dummy remains significant and large. A 1 percent increase in the probability of having a dictatorship increases the size of the central city by about 1.8 percent. The coefficient on the share of trade in GDP is

TABLE VI

Dependent variable: log of average population in main city (1970–1985)	(13) 2SLS	(14) 2SLS
Intercept	−0.738	1.919
	(2.607)	(1.512)
Dummy for capital city	0.065	0.383
	(0.366)	(0.233)
Log of average nonurbanized population	0.710	0.565
	(0.146)	(0.086)
Log of average urbanized population outside the main city	0.047	0.066
	(0.056)	(0.042)
Log of land area	0.003	0.051
	(0.103)	(0.031)
Log of average real GDP per capita	0.472	0.194
	(0.289)	(0.175)
Share of labor outside of agriculture	3.240	2.672
	(0.909)	(0.638)
Share of trade in GDP	−0.361	−1.017
	(1.197)	(0.857)
Dictatorship dummy based on Gastil's index of political rights	1.788	0.511
	(0.901)	(0.291)
Number of observations	85	85
Adjusted R^2	0.69	0.82
R^2 of regression of residuals on instruments	+0.063	+0.02
p-value of restrictions	0.75	0.75

Note. See Table IV. In regressions (13) and (14) the Dictatorship dummy and the Share of trade in GDP are treated as endogenous. The instruments that we used are the average number of revolutions and coups in neighboring countries, the average number of per capita political assassinations in neighboring countries, a dummy variable that takes a value of one if the average Gastil index of political rights in neighboring countries is higher than three and zero otherwise, the 1960 value of the ethnic heterogeneity index, a dummy variable that takes a value of one if the country became independent after the end of World War II and zero otherwise, and the average road density in neighboring countries. In regression (14) we add two generated instruments to our list of controls: these are the fitted values obtained from running a PROBIT for the Dictatorship dummy and a TOBIT for the Share of trade on all the exogenous variables in the system. The p-values for the test of the overidentifying restrictions are obtained by running the residuals from the second stage regression on all the instruments. The obtained R^2 multiplied by the number of observations is distributed as a $\times^2$ with j degrees of freedom, where j is the number of instruments minus the number of instrumented variables.

negative and smaller than the estimates obtained with OLS. Regression (14) adds to our list of instruments the fitted values obtained from running a PROBIT for the Dictatorship Dummy and a TOBIT for the Share of Trade on all the exogenous variables in the system. This specification improves the precision of the first stage regression by improving the functional form. The coefficient on the dictatorship dummy now falls to a level consistent with our previous OLS estimates. The coefficient on trade, while negative and large, is still not estimated precisely.

Instrumental variables provide one approach to causality. Timing provides another approach. The first three regressions in Table VII examine causality using the correlation of initial variables with later changes. This test for causality is imperfect, but at

TABLE VII

	Change in the share of trade to GDP 1970–1985	Dictatorship dummy in 1985 (PROBIT)	Growth of population in main city 1970–1985	Per capita GDP growth 1970–1985
Dependent variable:	(15)	(16)	(17)	(18)
Intercept	0.380	−0.532	0.0687	−0.046
	(0.292)	(3.496)	(0.0293)	(0.042)
Log of population in main city in 1970	−0.012	0.310	−0.008	
	(0.025)	(0.373)	(0.005)	
Log of nonurbanized population in 1970	−0.007	−0.275	0.0059	
	(0.025)	(0.317)	(0.0036)	
Log of urbanized population outside the main city in 1970	−0.001	−0.0007	−0.0004	
	(0.007)	(0.116)	(0.0006)	
Log real per capita GDP in 1970	−0.054	−1.178	0.0060	−0.005
	(0.052)	(0.481)	(0.0057)	(0.006)
Share of the labor force outside of agriculture in 1970	0.306	−0.545	−0.044	0.071
	(0.174)	(1.910)	(0.025)	(0.028)
Dictatorship dummy in 1970	−0.009	1.103	0.0133	0.004
	(0.046)	(0.436)	(0.0051)	(0.005)
Share of trade in GDP in 1970	−0.425	1.599	0.0615	−0.0137
	(0.205)	(1.397)	(0.0140)	(0.014)
Growth of urbanized population outside of main city 1970–1985			0.035	
			(0.093)	
Share of total population in main city in 1970				−0.083
				(0.034)
Urbanization outside main city in 1970				−0.055
				(0.023)
Log of total population in 1970				0.003
				(0.002)
Secondary school enrollment in 1970				0.028
				(0.015)
Number of observations	85	85	85	85
Adjusted R^2	0.10	0.49	0.55	0.23

Note. White-corrected standard errors are in parentheses.

least we can see whether large central cities push countries into dictatorship or whether dictatorships expand central cities. The timing of the relationship between country variables and urban concentration shows what predates what (if not what causes what).

Regression (15) looks at the effect of the spatial distribution of population on the change in the share of trade in GDP. We find no effect of main city size on trade growth. In regression (16) the dependent variable is the dictatorship dummy for 1985, controlling for the dictatorship dummy in 1970. This regression captures the effect of initial urban concentration on the probability of being a dictatorship in 1985, conditional on being a dictatorship in 1970. We find no evidence for large central cities causing a switch to dictatorship or preventing a switch away from dictatorship. Regression (17) makes the growth rate of population in the main city between 1970 and 1985 the dependent variable. The role of dictatorships here is critical: the presence of a dictatorship increased the growth rate of population in the main city by 1.3 percent a year. Trade has a weak or nonexistent effect.

Regression (18) suggests that concentration in a single city also has strong effects on growth. A 1 percent increase in the share of total population living in the central city reduces the growth rate by 0.08 percent per year. Large cities generate rent-seeking and instability, not long-term economic growth.

The results of this section support the idea that dictatorship causes urban centralization. Tests based on both instrumental variables and the timing of growth indicate that dictatorship influences urban development. Our evidence does not confirm any causal relationship between trade and city size.

V. Short Case Studies

V.1. Rome, 50 B.C.E.

At its height, Rome's population probably stood at over 1,000,000 inhabitants, or approximately 2 percent of the empire's population. Earlier cities had been large, but none had never grown to one half that size.[15] While there is dispute over Rome's popula-

15. Ur reached a population of approximately 24,000 around 2800 B.C. Babylon may have had as many as 300,000 inhabitants under Hammurabi in 1700 B.C. According to Bairoch [1988], Alexandria (the largest Hellenic city) never exceeded a population of 320,000. India and China had big population centers several centuries before the common era. All of these centers were associated with extremely powerful empires. Bairoch stresses the role of international trade in supporting these cities. However, as much as Babylon was a trading city, it was even

tion and over the period of Rome's greatest growth, in this discussion we accept Garnsey's [1988] population figures and his claim that the period 130–50 B.C.E. is the period of Rome's greatest expansion, when its population grew from 375,000 to 1,000,000.[16] During this period, five distinct political events directly and indirectly increased the incentives to come to Rome: (1) the empire expanded into Gaul and the eastern provinces of Asia: Bithynia, Pontus, Cilicia, and Syria; (2) Pompey declared that all conquered land was the property of the city's government; (3) the Gracchis' Sempronian law and then the Clodian law extended the grain distribution to a large number of the citizens as long as they came to Rome; (4) Sulla extended Roman citizenship to all of the inhabitants of Italy; and (5) internecine warfare made the hinterland fundamentally unsafe. As a result of events (3) and (4), by 46 B.C. E. 320,000 people were in Rome receiving grain handouts.

The first two events mentioned above were the result of successful Roman military leadership, impressive military technology, and the remarkable incentives (ranging from great wealth to control over the world's largest empire) offered to reward military success. Events (3)–(5) are related to internal Roman weakness. The traditional aristocracy was forced during this period, first by the Gracchis and later by popular uprisings, to distribute grain more liberally to Roman citizens.[17] The expansion of citizenship throughout the Italian peninsula was the result of the Roman failure (under the leadership of Gaius Marius) to reject the demands of the Italian rebels in 90 B.C.E., despite these rebels' defeat in the Social Wars. Weak control over local mobs and local revolts coupled with strong control over distant empires enabled Roman mobs to extract rents (indirectly via the legions) from

more a center of taxation and tribute. Herodotus estimates that two-thirds of Babylon's revenues came from non-Assyrian provinces. Babylon's main function was as a base for military force and political stability, not as a center for trade.

16. Rome's population is disputed. Bairoch estimates the population at about 800,000 by the second century A.D. based (in part) on the list of recipients of state grain (Garnsey also uses this source to get estimates at over one million). In contrast, using structural densities as an estimation device, Russell [1985] provides us with a lower bound of approximately 200,000 at the height of Imperial Rome. While there are problems with any estimate, the mass of evidence (ranging from the structural expansion of Rome in this period to the eyewitness discussions of overcrowding during the 130–50 B.C.E. period) suggest that Rome was growing rapidly during the late Republic.

17. The grain distributions were not completely egalitarian. Some fee was required for the distribution (under the earlier Sempronian Law but not under the later Clodian Law), and slaves and others of the poor were excluded. But the grain was essentially a dole meant to appease the politically active elements of Rome. See Scullard [1959].

distant Egypt and Spain. The Roman empire delivered rents not just to the Proconsuls of the territories but also to the general population of the capital. Most visible of all these rents being transferred from the conquered province to the masses of Rome were the circuses (and other games) which cost fortunes to produce and were put on (at their height) more than 50 times per year.

Eventually, Julius Caesar restored stability and reduced the grain distribution around 45 B.C.E. The growth of Rome then began to slow. Rome's growth illustrates how an ability to extract from the hinterland and an inability to quell revolts at home together lead toward overconcentration in the capital. While other factors also played an important role (Rome had both trade and industry), Rome's huge unemployment and underemployment levels, and the overwhelming size of the state's bureaucratic, military, and redistributional systems make it clear that Rome's size was, ultimately, a result of government size and transfers. The timing of Rome's expansion suggests that liberal grain distributions funded by foreign conquests fueled Rome's growth.

V.2. London, 1670 C.E.

For almost 1200 years after Rome's disintegration in the fifth century C.E., Europe had only two cities with 400,000 or more inhabitants: Byzantium, with a population of between 400,000 and 600,000 from 600–1000 C.E., and Cordoba with a population of approximately 400,000 in 1000 C.E. [Bairoch 1988]. The first strictly European metropolises to come close to 500,000 inhabitants were London and Paris around 1700. While the first British population census with data for London is in 1801 (giving London a population of 960,000), Wrigley [1986] has earlier estimates that seem consistent with the numbers given by Bairoch, Braudel [1979], and others. His estimates for London's population are 55,000 in 1520 (or 2.25 percent of England's population), 200,000 in 1600 (or 5 percent), and 475,000 in 1670 (or 9.5 percent). London's population continued to rise after 1670, and as a share of England's population it peaked at 11 percent in 1700.[18]

While the rise of textile production in London in the late sixteenth century did coincide with the period of the city's growth,

18. A particularly striking feature of London's growth between 1600 and 1670 is the dominance of deaths over births. Wrigley and Schofield [1981] report that London had 600,000 more burials than baptisms between 1600 and 1675. Given a natural deficit of this magnitude, net migration to the capital must have been more than 875,000 people.

it seems that London's rising control over these goods indicates the increasing importance of trade, not any causal role play by textile technology. This rise in trade is one explanation of London's growth. The late sixteenth century saw innovations in both internal and external trade. Kerridge [1988] argues that the four-wheel cart (a major innovation introduced in 1558) made transport much cheaper within England and increased London's role as a center of internal commerce. International trade grew because of military victories against the Spanish, improvement in shipping technology, the discovery of vast new markets in Asia and the Americas, and rising government support for trade. The London transport industry also benefited from the massive emigration to the New World [Borer 1977].

Some of the trade-related factors were actually political. The ability of England to subdue Spain and acquire goods from the hinterland reflects political strength outside the capital. The allocation of rents to local trade monopolies represents Stuart weakness at home. London's growth was also closely related to political factors. Despite the unusual English system of local justice, the centralization of military power and financial strength in the hands of Parliament and the King in the city of London made England the European nation with the most centralized political structure and the most control over its provinces [Brewer 1990].

Several Tudor monarchs, (Henry VII, Henry VIII and Elizabeth I) were strong and semidictatorial, but Stuart (James I and Charles I) disregard for the rights of Parliament, which represented the hinterland, was particularly blatant. Stuart instability is also easily seen: Charles I lost his throne and his head in the Civil War. As in our model, these dictators responded to instability by collecting more income from the weak provincial areas and relatively less from the dangerous capital. Examples of Stuart redistribution from provinces to capital include James I's novel imposition of naval taxes (ship moneys) on the hinterland. James I also re-created trade monopolies (which had been eliminated by Elizabeth I) and allocated them to the great London merchants. Stuart mercantilism can be seen as a policy of enriching the capital's traders and producers at the expense of the hinterland's consumers [Ekelund and Tollison 1981]. Instability also increased London's size because the mid-seventeenth century civil war made much of the hinterland unsafe. It is unclear whether London's growth was more strongly based on trade or politics. We believe that the evidence points to the importance of both factors.

V.3. Edo, 1700 C.E.

While both Paris and London appeared like colossi upon the map of Europe in 1700, neither city was nearly as big as the Asian capitals of China and Japan. Peking had reached a population of 600,000 by 1500, and was the largest city in the world until London surpassed it in 1830. Japan's capital, Edo (modern Tokyo), was almost as large as Peking in 1700 in absolute population and much larger relative to Japan's much smaller population. Excluding military personnel, Edo's population in 1700 lay between 500,000 [Sansom 1963] and one million [Seidensticker 1980], or between 2 and 4 percent of Japan's population. The high productivity of rice economies has been the traditional explanation of Asian urbanization, but while this nutritional edge might explain urbanization in general, it does not explain concentration in a single city. The period of Edo's greatest growth was between 1580, when Edo was a castle surrounded by a village, and 1700, when it was the second largest city in the world.

Edo's growth derives from its establishment as the Shogunal capital by Tokugawa Ieyasu. Ieyasu (along with Odo Nobunaga and Hideyoshi) unified Japan in the late sixteenth century. Over the seventeenth century Ieyasu's descendants amassed a monopoly of political and economic power far beyond that of any European king. By 1690 the Shogun had rice revenues of 14.68 million *koku*, approximately half of the country's produce and more than six times the Shogun's revenues in 1598.[19] The Tokugawa shoguns stripped rival chieftains of their authority and limited the power of the samurai (following the path of Hideyoshi and his great sword hunt). At the end of the civil war, 100,000 *ronin* (unemployed soldiers) were left lordless; many of these were induced to come to the military capital. The *daimyo* (local lords) and the shogunate cut soldiers off from their local power bases and encouraged samurai to take their feudal dues as annuities and move elsewhere (mainly to the capital) [Sansom 1963]. Despite the power of the Shogun, some instability (such as the Shimabara uprisings of 1638–1639) remained in the hinterland and further encouraged people to move to the safety of the capital.

There is some support for the Krugman-Livas trade hypothesis in the story of Edo. The Tokugawa shoguns excluded Christians

19. This should be compared with a national production of 25 million *koku* and with the nutritional needs of one Japanese of one *koku* per year. This means that 2.56 million people could be fed by the rice revenues owed to Ieyasu alone.

from Japan in 1638, lowered the importance of foreign trade and thus damaged Edo's rival, the international trade center of Nagasaki. Anticommercial attitudes of the *Bakufu* (the Shogunate) also limited the rise of Osaka (the leading commercial center). The anti-industrial bias of the leadership further prevented any other cities growing from the development of local industries. Japan does not display the Roman combination of strength abroad and weakness in the capital—the Shogunate was strong everywhere. However, the sheer power of the central Japanese government created such a disproportionate amount of employment, safety, and wealth in Edo that the city became an urban giant.

V.4. Buenos Aires, 1900 C.E.

Latin American nations, such as Chile, Mexico, Peru, and Uruguay are often heavily concentrated in their central cities. The first of these Latin American urban giants was Buenos Aires. By 1914 Buenos Aires was the largest urban agglomeration south of New York City with 1.6 million inhabitants (20 percent of Argentina's population). Although Buenos Aires had been growing for 250 years before 1887 (and has not stopped during the 80 years since 1914), the 27 years between 1887 and 1914 mark the period when the city grew most. Over those 25 years the city grew by more than 1.1 million people (an increase of 265 percent).

Industry did not play a prominent role in the rise of Buenos Aires. In 1914 less then 15 percent of the Argentine labor force was involved in manufacturing activities. The Argentine government displayed hostility toward manufacturing and innovation (examples include heavy tariffs on manufactured exports and the absence of effective patent protection). By comparison, trade expanded heavily over this period. Total exports rose 400 percent between 1887 and 1914 (measured in gold pesos, cattle, or sheep). Approximately 20 percent of Argentina's population (and a much higher percentage of Buenos Aires' population) was involved in commerical activities.

The growth of Buenos Aires came from its role as a commercial center and from its role as a center for migration. The city expanded with almost even increases in native population and immigrants. The share of immigrants in Buenos Aires' population (mostly of Italian and Spanish origin) was 52.4 percent in 1887 and 49.6 percent in 1914. From 1905 to 1909 immigrants to Argentina, almost entirely coming through Buenos Aires, totaled around one million. Between 1887 and 1914 approximately 550,000 out of

three million immigrants to Argentina stayed in Buenos Aires. Buenos Aires retained a larger proportion of its immigrants than its new world rival, New York, possibly because of: (1) undeveloped transportation facilities within the hinterland; (2) the absence of any other important pre-existing urban centers or industry in the hinterland; (3) a decline in the demand for labor in the hinterland as agriculture was consolidated into large firms that replaced labor with capital; and (4) instability in the hinterland coming from wars and unfriendly relations with the native Americans.

Politics also played a role in Buenos Aires' growth. In 1914, 95 percent of government revenues came from tariffs. Scobie [1974] suggests that this heavy dependence on port-related income induced the government to keep its activities in Buenos Aires, the source of its wealth. The heavy dependence on tariffs created an incentive for the government to support trade and Buenos Aires at the expense of industry and the hinterland. The large share of government revenues that came from tariffs also created a stunning array of regulations open to interpretation by local officials. Unsurprisingly, this created tremendous opportunities for bribery or *coima*. An estimate by Scobie puts bribery in Argentina at about 25 percent of government revenues. This kind of personalized corruption greatly increased the need to be close to the officials administering the tariffs.[20] Like London, Buenos Aires was a center for international movements of goods and capital (both human and physical), but the concentration of government and bureaucratic corruption also played a prominent role.

V.5. Mexico City, Today

Mexico City (*née* Tenochtitlan) dates from the fourteenth and fifteenth centuries, when it was built as the center for the Aztec empire. Both the Aztecs and later the Spaniards extracted as much wealth as possible from surrounding provinces and spent that wealth either in the city or sent it elsewhere (i.e., Spain). Despite a limited role as a center for trade (e.g., the Manila Galleons), premodern Mexico was ultimately a collector of rents. Mexico City remained a small rent-seeking capital until after World War II. In 1900 when Buenos Aires had already reached preeminence, Mexico

20. Along with this concentration around revenues, came other governmental actions that increased the size of Buenos Aires. Massive public works programs were associated with the celebration of the one-hundredth anniversary of Argentina's independence from Spain in 1910. Streetcar mileage increased fourfold between 1887 and 1914. There was no corresponding increase in public investment in the hinterland.

City had 470,000 inhabitants. By 1940 the city had 1.5 million people. By 1970 this number had swelled to 8.5 million (in the metropolitan area), and today Mexico City's population has reached 18 million.

As Krugman and Livas argue, trade did not play a role in the growth of Mexico City. The city grew as a center for manufacturing. Mexico's industrial expansion was heady in the 1945–1970 period. Industrial real wages increased by 250 percent over this period. Manufacturing employment expanded by 2.3 million (120 percent). The federal district's (Mexico City and its environs) share of manufacturing employment grew from 25 percent in 1950 to over 40 percent in 1960 and back down to 30 percent in 1970. Employment in the service sector expanded by 1.2 million (600 percent). Agricultural employment actually declined over the 1960–1970 period.

Industrial growth was concentrated in Mexico City because the capital was the major market for most goods as well as the major supplier (Krugman and Livas' thesis). Mexico's industrialization followed the big-push-type pattern [Murphy, Shleifer, and Vishny 1989]; urban concentration facilitated the coordination of demand and supply. Import-substitution policies made it more necessary for consumers (especially firms consuming intermediate inputs) to locate in Mexico City close to domestic suppliers because foreign suppliers were excluded from the country. Industrial growth also thrived in the capital because Mexico City was the center for foreign capital and ideas.

Political factors behind Mexico's concentration were also quite strong. Mexico has a nominally federal government, but all real power is concentrated in the capital. Even regional governors spend most of their time within the capital out of fear of losing political influence [Kandell 1988]. The Mexican government is also particularly susceptible to unrest in the capital. Kandell describes a typical episode of rural-urban migrants coming to the outskirts of the central city and beginning as squatters on the land. These migrants then choose a political leader or *cacique* who agitates against the leading party (the PRI). The government responds by giving the migrants title to the land and providing them with some kind of minimal infrastructure (paid for with taxes levied on the country as a whole). The migrants then become loyal supporters of the PRI. This model of an oligarchic regime paying off local rioters with transfers seized from remote regions of the country is highly

reminiscent of Rome. It suggests that politics, as well as trade, contributed to Mexico City's size.

VI. Conclusion

Krugman and Livas' [1992] hypothesis that urban concentration is negatively related to international trade is borne out in the data. Good internal transportation infrastructure also decreases urban concentration. However, our time series and instrumental-variables results cast doubt on the causality in these correlations. Trade and cities are connected, but it may be that urban concentration is causing low levels of trade, not that low levels of trade induce concentration.

Our political results are stronger than our results on trade. They display a robust causality running from dictatorship to urban centralization. Urban giants ultimately stem from the concentration of power in the hands of a small cadre of agents living in the capital. This power allows the leaders to extract wealth out of the hinterland and distribute it in the capital. Migrants come to the city because of the demand created by the concentration of wealth, the desire to influence the leadership, the transfers given by the leadership to quell local unrest, and the safety of the capital. This pattern was true in Rome, 50 B.C.E., and it is still true in many countries today.

Appendix

In the 85-country sample	Not in 70-sample	Not in 50-sample
Algeria	*	*
Benin	*	*
Burundi		*
Cameroon		*
Central African Republic	*	*
Chad	*	*
Egypt		
Ethiopia		
Ghana		
Ivory Coast	*	*
Kenya		
Liberia		
Madagascar	*	*
Malawi		
Mali		* *

APPENDIX
(CONTINUED)

In the 85-country sample	Not in 70-sample	Not in 50-sample
Morocco		
Niger	*	
Nigeria	*	
Rwanda		
Senegal	*	*
Sierra Leone		*
Somalia	*	*
Sudan		*
Tanzania		*
Togo	*	*
Tunisia		
Uganda		
Zaire		*
Zambia		
India		*
Israel		*
Japan		*
Jordan		
Korea		
Malaysia		*
Nepal		
Pakistan		
Philippines		
Saudi Arabia	*	*
Sri Lanka		
Syria		*
Thailand		
Austria		
Belgium		
Denmark		
Finland		
France		
Germany		
Greece		
Ireland		*
Italy		
Netherlands	*	
Norway		
Portugal		*
Spain		
Switzerland		*
Turkey		
United Kingdom	*	
Canada		
Costa Rica		
Dominican Republic		*

APPENDIX
(CONTINUED)

In the 85-country sample	Not in 70-sample	Not in 50-sample
El Salvador		
Guatemala		
Haiti		*
Honduras		
Jamaica		*
Mexico		
Nicaragua		
Panama		
United States		
Argentina		*
Bolivia		*
Brazil		*
Chile		
Colombia		*
Ecuador		
Paraguay		
Peru		*
Uruguay		
Venezuela		
Australia		*
Burkina Faso		
Yemen	*	
Indonesia		

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