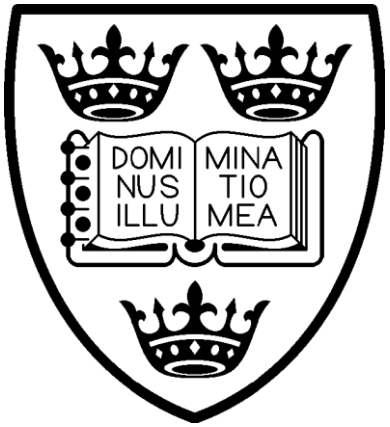

UNIVERSITY OF OXFORD

Discussion Papers in Economic and Social History

Number 96, February 2012

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Abstract

Between the 1870s and World War II, falls in world shipping costs and Western industrialisation gave rise to export-led Southeast Asian growth and specialization in a narrow range of primary commodity exports. A linked development was the emergence of a few dominant Southeast Asian urban centres, typically primate and always ports. Drawing on historical census data, this paper uses rank-size distributions and transition matrices to investigate the influence of commodity specialisation and exports on urban systems development in the region. It is argued that different commodities produced different spread effects, resulting in variation in degrees of urban concentration in the region. However, geography, path dependence and infrastructure also shaped urban systems development. The main cities that emerged during this period became the 'gateways' that connected frontier Southeast Asia to the global economy.

Keywords: urbanisation; gateway cities; agglomeration effects; export-led growth; staple exports; urban systems; rank-size distributions; transition matrices

JEL classification: N15, N95, R11

I. Introduction

Export-led growth in Southeast Asia between the 1870s and World War II progressively turned frontier into hinterland. This 'developed' hinterland, linked to Europe and the United States through a handful of large Southeast Asian cities, became an integral component of the global economy. One purpose of the present paper is to analyse the emergence of large Southeast Asian cities that grew up as part of late nineteenth- and early twentieth-century export-led growth, frontier settlement, and the extension of colonial rule over the region.

In five Southeast Asian countries, one city stood out from the others. The five were Burma (Rangoon), Malaya (Singapore), Thailand (Bangkok), Indochina (Saigon) and the Philippines (Manila). Together with these five cities, two in Indonesia, Jakarta (Batavia in colonial Indonesia) and Surabaya, comprised Southeast Asia's seven main cities.[1] All but Saigon and Surabaya were national capitals. Southeast Asia's main cities were always major ports.[2] Although sometimes long established, none became large cities until after 1870.

Fundamental to Southeast Asian export-led growth was extreme economic specialization. Just four staples — resource-intensive primary commodity agricultural or mineral exports central to a region's economy — dominated Southeast Asia's trade: rice, tin, rubber and sugar. Each of Southeast Asia's seven large cites relied heavily on the provision of handling, merchant and financial services for the export of one, or at most two, of these staples.

The growth of Southeast Asia's seven large cities can be modeled by a hybrid of locational fundamentals and increasing returns that encouraged a concentration of commercial services. Such a hybrid, suggested in other contexts (Davis and Weinstein, 2002), encompasses

[1] Malaya consisted of the Malay peninsula, Penang and Singapore. Indochina included today's Vietnam (over four fifths of colonial Indochina's population) Cambodia and Laos. Netherlands India is now Indonesia. To avoid the confusion of this colonial archaism, I refer to this area as Indonesia. Siam became Thailand in 1939.

[2] Previous studies of 1870-1940 urban Southeast Asia include McGee, 1967; Spate and Trueblood, 1942; Murphey, 1957; Bennett, 1967; Ullman, 1980; Sternstein, 1984; Doeppers, 1984; Abeyasekere, 1987; Huff, 1994; Dick and Rimmer, 1998; Papin, 2001; Dick, 2002; Vo (2011). Rimmer and Dick, 2009 provide comparative perspectives on pre- and post-World War II urbanisation.

the gateway model that this paper uses in analysing Southeast Asian urban development. Common to all seven Southeast Asian cities was a strong comparative advantage derived from near optimum port locations. Subsequent growth of the cities came through providing a range of commercial services. Increasing returns arising from these activities yielded incentives for urban agglomeration. Between the 1870s and World War II, size gaps between the largest and second largest Southeast Asian cities typically widened.

In the gateway model, applied to other primary exporting regions but not previously developed for Southeast Asia, cities gain prominence as transport hubs.[3] Gateways have a basis in the spatial, or 'first nature', advantage of transport nodality. They evolve through self-reinforcing, 'second nature', advantages of population and built environment to establish themselves as centres for commerce and finance (Cronon, 1991; Krugman, 1993). City and frontier interact dynamically. Gateways are 'spearheads' that advance frontier settlement (Burghardt, 1971: 272). An aspect of this advancement is that the frontier fills in with cities.

The other main aim of the paper — like the first facilitated by largely new data — is to analyse the growth in Southeast Asia of urban systems defined as the hierarchical organization of centres based on their size and economic function. According to the gateway hypothesis, after the gateway is established lesser cities emerge in a logically and chronologically distinct, second growth phase. Urban systems develop as the countryside fills in with smaller cities that provide traditional central place functions such as marketing and distribution to nearby producers. The 'filling in' of the frontier provides a basis for the maturation of gateways and smaller, regional centres into a stable, articulated urban system (Weiman, 1995: 39, 46).

Three further sections make up the paper. The next looks first at the fall in world shipping costs and industrialization in United States and Europe. Together, these forces generated a demand for the exports that Southeast Asia could produce by bringing frontier land

[3] The classic study is Burghardt 1971. Important studies which extend and apply the gateway concept include Meyer 1980; Vance 1970; Weiman 1988 and 1995; Odell and Weiman 1998; and Cronon 1991. Examples of United States gateway cities were New Orleans, St. Louis and Chicago.

under cultivation. The section then sets out the argument that this new demand for exports created Southeast Asia's seven dominant port cities.

In the third section, I assemble the first full set of population data for pre-war urban Southeast Asia. These data allow, for the first time, the construction of rank-size distributions and transition matrices to investigate differences in the evolution of urban systems in Southeast Asia. I argue that the development of urban systems varied according to the differing spread effects of staples. Rice was especially limited in effecting urbanisation. By contrast, rubber had substantial urban spread effects. The section further assesses how other factors — geography, path dependence and government policy towards infrastructure development — shaped urban patterns in different Southeast Asian countries.

Concluding remarks point to the wider developmental implications of pre-war Southeast Asian urbanization. Ragnar Nurkse (1959, p. 18) observed that post-1870 export-led growth created a 'lopsided pattern of development' in Southeast Asia, by which he meant the co-existence of well developed export sectors with 'primitive' domestic economies. The paper extends Nurkse's observation to analyse, as part of the same expansionary process, lopsideness in the growth of Southeast Asia's main cities and differential urbanisation patterns. By the 1930s, a 'lock-in' or path dependence effect, often leading to primacy (Nitsch, 2003) operated. In Southeast Asia today, lopsideness — contrary to an hypothesis of spatial transformation that reshapes economic geography and creates balance as countries develop — persists both in the dominance of cities that gained ascendancy before World War II and continued large regional imbalances.

II. Export-led Growth and Urbanisation

This section first identifies changes in the world economy that between the 1870s and World War II stimulated the transformation of frontier Southeast Asia and, at the same time, began a new era in Southeast Asian urban growth. By 1870, Southeast Asia had experienced two

centuries of de-urbanisation (Reid, 1993: 1-2, 63-77, 302-303). The region possessed, in Mandalay and Manila, possibly two cities with as many as 100,000 inhabitants; by the 1930s, there were 15 cities of 100,000 or more. In each Southeast Asian country, the main city ranged in size from a quarter of a million to over half a million (figure 1 and table 1). The section uses the gateway model to analyse these seven large Southeast Asian cities.

Shipping Costs, Colonial Rule, Western Industrialization and Frontiers

Globalization that creates opportunities for export-led growth can be measured by a reduction in economic distance. For Southeast Asia, the chief factor that effected this reduction was falling international shipping costs. The invention of steamships and inauguration of the Suez Canal in 1869 drastically cut the physical, and even more the economic, distance between Southeast Asia and Europe. Suez opened 'at one stroke' eastern waters to steamships (Fletcher, 1958: 558) and directed the world's main east-west shipping route within touching distance of Singapore and through the geographical centre of Southeast Asia. Because of Southeast Asia's advantageous geography at the centre of world east-west ocean traffic, shipping costs for the region fell dramatically, and faster than for world routes as a whole. Between 1870 and 1913, shipping freights from Southeast Asia to London declined by 3.2% per annum (Mohammed and Williamson, 2003: tables 1 and A3A). In 1914, the addition of the Panama Canal led to the creation a round-the-world route, soon adopted by several shipping companies. Steamships left London, continued eastwards through Suez to Southeast Asia and then, after passing Hong Kong, sailed westwards via Panama to New York (Imperial Shipping Committee, 1939: 9, 87).

On the supply side, the spread of colonialism, like the fall in shipping costs, was fundamental to Southeast Asian growth and urbanisation. Beginning in the later nineteenth century, Southeast Asia was rapidly colonized, and traditional political organization, with its numerous structurally weak states, swept away. By the turn of the century, four colonial powers governed Southeast Asia — Britain (Burma and Malaya); the Netherlands (Indonesia); France

(Indochina); and the United States (the Philippines). Thailand, nominally independent, had quasi-colonial arrangements and a British financial advisor. Crucial for export-led growth was that colonial administrations enforced property rights and ensured free trade.

The late nineteenth century collapse in economic distance and elimination of barriers to trade offered Southeast Asians opportunities to respond to new demand associated with Western industrialization and urbanisation. In all Southeast Asian countries, this response — Lillian Knowles' (1928: 138-52) 'unlocking of the tropics' — featured a moving frontier and depended heavily on millions of peasants. Historians, Harry Benda (1962: 132) observed, have long been fascinated by the moving frontier. Its settlement 'constitutes one of the most important periods of the economic and social history of modern Burma, Vietnam and Thailand'. After 1850 in Burma, access to global markets led to migration that was, at its height, a 'rice rush', of peasants from Upper Burma to the Irrawaddy Delta. By 1930, 10 million acres of swamp had been cleared and planted with rice. Thailand's rice frontier boomed in the 1890s and 1900s when 'in every direction the land was cleared of the heavy jungle grass which afforded shelter to wild elephants' (Johnston, 1981: 111). Indochinese export production centred on the southern Vietnamese province of Cochinchina. In 1860, it was 'a true frontier' and still, in 1937, had a 'vast reserve of available land ' (Brocheux and Hémery, 2009: 121, 279).

Frontier development also characterized Southeast Asia's non-rice exporting regions. The transformation of the Philippines' western Negros wilderness into a sugar export economy, as John Larkin (1993: 60) noted, 'shared much in common with the global frontier phenomenon'. Malaya in the 1870s was sparsely populated, largely unmapped and 'land was so abundant and readily available that it had no value' (Gullick, 1985: 59). In the twentieth century, west Java came into 'its own as a frontier for the planting of estate crops like tea and rubber', while beginning in the late nineteenth century eastern Java became 'the frontier of an expanding plantation economy' (Dick, 2002: 119-120; Naval Intelligence Division, 1944: 347).

Growth in Southeast Asia was extensive: increased primary commodity production in response to Western demand was achieved by bringing frontier land under cultivation with traditional techniques. Between 1870 and 1913, real Southeast Asian merchandise exports grew at 3.9% per annum and so at a pace similar to the 3.6% for industrial output in the global core (the United States, United Kingdom, Germany and France). Initially, for Southeast Asia, much of demand in the West was for rice to feed urban workers and for tin which, because of its unique anti-oxidization qualities, was essential to the manufacture of tinned foods. During the twentieth century, sugar and, even more, rubber, used almost entirely for automobile tyres, grew in importance as exports to Western markets, especially the United States. Parts of Southeast Asia, chiefly Malaya and Indonesia (rubber) and the Philippines (sugar), specialized in producing non-food commodities, and because of this became dependent on imported food. Western industrial needs therefore led to a large, new intra-Southeast Asian demand for rice from Burma, Thailand and Indochina, the countries specializing in its production.

Southeast Asia's seven large port cites grew as part of this export-led, staple-dependent, extensive economic growth. Just as Burma, Thailand and Indochina accounted for some four-fifths of world rice exports, so Rangoon, Bangkok and Saigon were the world's great rice ports (Robertson, 1936: 243; Wickizer and Bennett, 1941: 86). Singapore grew through the export of tin and rubber and ranked as a world market for both commodities (Huff, 1994: 22). Although abaca and coconut products were important to the Philippines, sugar came to dominate the economy and was Manila's chief export (Doeppers, 1984: 9-12). Jakarta's principal exports were tea and rubber from West Java, while Surabaya exported sugar from the east of the island as its main staple (Naval Intelligence Division, 1944: 347, 358).

Southeast Asian Gateways

Although physical geography finds little place in the new economic geography (Davis and Weinstein, 2002: 1270), it was fundamental to the post-1870 rise of Southeast Asia's seven large

cities. The early development of these cities depended on what proponents of the gateway model, and later Paul Krugman in a different context, term 'initial' or 'first nature' advantage (Cronon, 1991; 264; Weiman, 1995:39; Krugman, 1993:129). In Southeast Asia, this meant port locations near the coasts of their respective countries.

The modeling of major ports like Southeast Asia's seven large cities stresses comparative advantage (Fujita and Mori, 1996: 94). This argument is empirically supported by gateways for which comparative advantage encompasses linking specifically frontier areas to the global economy. Southeast Asian gateways were both economically accessible to ocean-going vessels and afford the best available access to the largest possible frontier exporting regions. A situation which allowed Southeast Asia's gateways to receive, assemble and process primary commodity exports from a hinterland of maximum size also allowed efficient distribution of a return flow of manufactured goods and food to the exporting regions.

Southeast Asian experience does not sustain the hypothesis that initial conditions are decisive and that cities remain dominant by virtue of being initially the biggest city (Krugman, 1991: 487; Fujita and Thisse, 1996: 371-372). If pre-1870 Southeast Asian urban centres like Mandalay had been in hill regions, post-1870 export-led growth that drew Southeast Asia into the world economy directed these centres to edges of export-producing frontiers.

Gateway cities can be likened to positioning at the point of a fan (Burghardt, 1971: 274; Spate, 1942: 628). For Rangoon, Bangkok and Saigon, river systems were the transport arteries around which gateway fans formed. Rangoon lay 21 miles from the sea on one of the distributing mouths of the Irrawaddy River. Like other delta cities (Shanghai, Rotterdam), its location avoided some of the silting and strong currents of the main stream but still commanded 'access to almost the whole of the productive part of the country' (Murphy, 1957: 232). Up-country from Rangoon, the Irrawaddy was navigable for 900 miles inland. Saigon was similarly located on another of Asia's great rivers, the Mekong (Dobby, 1966: 303-304). The port's

natural advantage of location was then enhanced by large French infrastructural investment. Bangkok, the only significant port in Thailand, was situated where rice exports could be most economically assembled via the Chao Phraya River and its tributaries (Murphy, 1957: 234).

Singapore, positioned at the tip of the Malaya Peninsula and at the southernmost extension of continental Asia, controlled the shortest of the two international water routes between the Indian Ocean and South China Sea (the other being the Sunda Straits) (Lady Raffles, 1830: 378; Raffles, 1969: 74; and see figure 1). Singapore's geographical advantage within Southeast Asia was also particularly evident. Partly because of this, the port pulled towards itself most of Malaya's trade and also much of that of Sumatra and Borneo.

Like Singapore, Manila, historically a trading centre, possessed a magnificent natural harbor. The Philippines gateway was 'well situated to collect and ship' the products on which colonial Philippines trade was based (Robequain, 1958: 293; Murphy, 1957: 244). For Indonesia, Jakarta, in conjunction with its port of Tanjong Priok five miles to the north-east, occupied 'by far the best location' for maritime communications, being at the head of a large bay and commanding the Sunda Straits (Naval Intelligence Division, 1944: 343; Murphy, 1957: 238). Surabaya was as much a gateway as Jakarta. In the late nineteenth and early twentieth centuries, it became 'the gateway to the fertile valley of the Brantas River' as that region specialized in growing sugar for export. On that basis, Surabaya emerged as one of Asia's great port cities (Dick, 2002: xvii, 419, 434-435; Naval Intelligence Division, 1944: 358-359).

Main city urbanization and primary commodities

Did primary commodity export expansion in fact lead to the growth of the main port cities in Southeast Asia which handled these commodities? Or was urban growth the precursor of greater hinterland exports? Causation could have flowed either or both ways. In this section, I attempt to provide an econometric check on the relationship between Southeast Asia's principal primary commodity exports and the rise of its main cities.

To test the two causal hypotheses, I first measure — for the dependence of urbanization on staples — the volume growth of staple exports over the decade that preceded census (or other official) observations of city population. I then measure — for causation from city size to greater exports — volume growth in staples during the decade after a census point. Cities and commodities are paired. The pairings are rice for Rangoon, Bangkok and Saigon; tin and rubber for Malaya; sugar for Manila; tea and rubber for Jakarta; and sugar for Surabaya.

Export volume, not value, is chosen for two main reasons. Swings in value, which became especially pronounced after 1913, can mislead because falling prices often masked upwards trends in volume. Second, volume provides the better long-term indicator of the employment of both unskilled and skilled labour. For unskilled labour, volume reflects the need for workers physically to handle, process and load commodities. In all Southeast Asia's main cities, ports were major employers but still in the late 1930s remained largely unmechanized. Volume also generated more demand for skilled workers. Through expanding the size of the market, it gave rise to a finer division of labour in the mercantile, marketing and financial functions which concentrated in Southeast Asia's main port cities.

Internal migration was significant to urban increase in Southeast Asia, but due to a near absence of data its effect cannot be tested. Export volume is, however, a proxy for the long-term labour demand that encourages net population inflows. Furthermore, greater export volume requires more infrastructure, much of which centred in Southeast Asia's main port cities.

The measure for city growth is population as a proportion of the country's inhabitants. Regression with this urbanization measure and staple growth rates avoids the problem of having two, non-stationary variables which can lead to spurious regression (Granger and Newbold, 1974: 111-20). Urbanization has a clear upper bound and may fall, as it did over long periods in Southeast Asian history.

Data for urbanization exist from the 1880s when censuses or other government counts began to be taken. Observations for staple exports were made for a decade or more before censuses and so encompass the first expansionary phase of export-led Southeast Asian growth.

Regression results are set out table 2. Regressing urbanization on staple export growth in the preceding decade shows a positive correlation, with statistical significance comfortably inside the 10-percent level. The second equation, which tests staple export growth as a function of port city urbanisation, does not yield an even remotely significant relationship.

Available data are, admittedly, imperfect and the tests simple. But they suggest, as conventionally argued by economic historians who identify 'staple ports' (Huff, 1994) and by geographers, that causation ran predominantly from hinterland production to urban growth. The tests do not disprove the hypothesis that cities cause trade through the generative role of being centres of innovation. But results are consistent with the extensive, and so largely "technologyless" nature of Southeast Asian growth.

Trade, marketing, information, and banking services

The late nineteenth-century industrial revolution dramatically increased international trade and the provision of related commercial and financial services. These services, by their nature subject to increasing returns, created incentives for urban agglomeration. The kinds of services provided by gateway cities are explored in this sub-section; the next quantifies the tendency in Southeast Asian countries for the gap between the largest and second city to widen.

While the gateway city initially provides physical services such as the handling and processing of primary commodities, if it is to consolidate its importance and become a metropolis, it does so by intensifying economic centrality through the supply of information, mercantile and financial services. At the same time as promoting urban growth by providing such higher order services, the gateway helps to transform frontier into hinterland. By linking its hinterland to world markets, the gateway transmits stimuli for increased primary commodity

export production and hinterland economic growth. If primary commodity exports are to be regarded as an engine of growth, the gateway city functions as the drive shaft of this process.

The gateway model analyzes an open system geared to the externalization of trade (Vance, 1970: 160-161). One measure of this external orientation is the distance over which trade is conducted. In trading relationships, as T. G. McGee (1967: 54) observes, Southeast Asia's '''primate' port cities of the nineteenth century were largely oriented to the West'. These Southeast Asian gateways sent a range of primary commodities to the world's industrial core of the United States, United Kingdom, Germany and France. By 1939 Indonesia supplied more than half the United States' import of 15 different commodities; and in 1940 Malaya, Indonesia and the Philippines sent half a billion dollars worth of goods to the United States, a quarter of US imports (Marshall, 1995: x). Although rice exports had a big intra-Southeast Asian market, large amounts of rice also went to India, China and Europe (Wickizer and Bennett, 1941: 87).

Bigger trade volumes arising from export-led growth increased market size and so led to a greater division of labour. With this specialisation came increasing returns and the urban agglomerative effects described in a large literature (Krugman, 1991; Fujita and Thisse, 1996). The sophisticated articulation symptomatic of specialisation in trade services in Southeast Asia's gateway cities provides a telling measure of external orientation. It was through providing these higher order services that Southeast Asia's gateway cities gained in importance and justify their description as metropolises. Three such services, marketing, information and banking, are now considered.

In the organization of long-distance trade, complementarities between Europeans and Asians made mercantile structure in Southeast Asia especially complex. European merchants, agency houses and banks linked Southeast Asia to markets in Europe and the United States. Asians, generally through several layers of dealers, sub-dealers, brokers and commission agents, assembled primary commodity exports from the hinterland and distributed manufactured goods

to it. These Asians, unlike most hinterland producers, were almost all either Chinese or Indians. Partly because of this, Singapore, Bangkok and Saigon were Chinese cities and Rangoon an Indian one. The main Asian traders in Jakarta were Chinese. In 1930, 23.1% of Jakarta's population was Chinese, European or other (non-native) Asians; 31.2% of all Chinese in Indonesia lived in the largest cities (Indonesia, 1933-34, vol. 1: 122-123, vol. 6: 150, vol. 8: 5, 38-39). Although Manila's Chinese population was smaller than other large Southeast Asian cities, Chinese were easily the dominant Asian mercantile group (Wong, 1999: 149-173).

Rangoon and Singapore afford examples of the convoluted mercantile structures typical of all Southeast Asia's gateway cities. Singapore's status as a world market for rubber was matched by Rangoon's for rice. By the inter-war period Singapore physically handled little rubber, but it remained the centre of Malaya's rubber market. In the morning, overnight orders from London and New York were cabled to up-country Malaya from Singapore. Throughout the day Singapore firms, including some 20 European dealers and seven brokers, were in constant touch with all of Malaya by telegraph and telephone. Although the Singapore auction handled minute quantities of rubber, it performed an important information function. Up-country people, explained a rubber dealer, watched the auction very closely. They 'know exactly what is paid in the auction and if anybody goes into that auction and puts up the price it affects almost the whole of Malaya at once' (Straits Settlements, 1934, vol. 2: 354).

In Rangoon, as in the other large cities, while there were relatively few European merchants, the intricacy of the Asian mercantile community defied easy quantification, as the following contemporary account suggests:

> Moghul Street, Rangoon's Wall Street, and the centre of the Indian Rice Merchants'Association, presented a striking scene during business hours. Thousands of prosperous merchants and their clerks, principally Hindus, dressed in Gandhi caps and homespun, thronged the streets, conducting a great deal of their brokerage business in the open air (Christian, 1945: 72).

Of Singapore's Asian mercantile structure, even the five-volume Straits Settlements Trade Commission had to admit that: 'The reticulation of dealers and sub-dealers, commission agents and brokers ... is too elaborate and various for concise description' (Straits Settlements, 1934, vol. 1: 41). 'The principal agent', it was observed, 'of this vital, valuable and complex organization is the Chinese dealer' (Straits Settlements, 1932: C158). The same was true of Indonesia (Indonesia, 1933-34, vol. 7: 159).

Finance is fundamental to the wholesaling and distributive functions that gateways assume. Banking statistics for 1940 indicate the concentration of formal financial services in Southeast Asia's gateway cities (table 3). In pre-war Southeast Asia, banks were predominantly European-owned, and because the main function of these so called 'exchange banks' was to finance long-distance trade, they concentrated in gateway cities. Everywhere except Malaya, gateway city banking density, measured as European- and Asian-owned banks per million population, was several times that in the country as a whole. In their respective countries, Bangkok, Rangoon and Saigon had half to two thirds, Singapore 29.1%, and Manila 18.1% of all banks. Banking in Indonesia concentrated in Jakarta and Surabaya and divided almost equally between them.

Primate Cities

The suggestion (Krugman, 1991: 17-19 and 1996: 19) that an orientation towards external markets decreases urban concentration and produces two cities of equal size is not borne out by Southeast Asian experience. As the Southeast Asian metropolis emerged between the turn of the century and the 1930s, the ratio of the first to the second largest city widened throughout Southeast Asia except in the Philippines. The increasing size of almost all of Southeast Asia's largest cities relative to the second biggest city in their respective countries gave pre-World War II urban growth an undeniable 'lopsideness'. That same imbalance is apparent when measuring the largest city as a percentage of the four biggest cities (table 4).

Nevertheless, not all the largest Southeast Asian cities in each country were primate, although sometimes classed as such (for example by Steinberg, et al., 1971: 392). While in each of Southeast's Asia's six main countries, four of the six most populous cities were over twice the size of the second biggest city and so primate, Jakarta and Saigon were not primate cities. Jakarta, at the western extreme of Java, and Surabaya, on the island's eastern fringe, ranked about equally as Indonesia's major ports. Hanoi was the French colonial capital and, partly because of this administrative role, remained over half the size of Saigon.

III. Urban Systems

Using a new set of population statistics for pre-war urban Southeast Asia, this section, after a brief discussion of data, constructs rank-size distributions and transition matrices to analyse urban development beyond Southeast Asia's gateway cities.[4] The production characteristics of staples heavily influenced the way in which the frontier 'filled in' as new areas were settled, and therefore helped to shape patterns of urbanisation. In Burma, Thailand and Cochinchina, rice did little to fill in the frontier and promote urban growth outside gateway cities. By contrast, in Malaya, finance and marketing arrangements associated with rubber promoted an expanding and increasingly interconnected urban system.

Java, like Malaya, gained a relatively articulated and integrated urban system. In Java, however, an insular geography, international transport cost minimization and an elaborate railway infrastructure were chief determinants of the urban system. As an island, Java afforded greater scope for small, coastal ports, and so urbanisation, than mainland Southeast Asia. Furthermore, Dutch colonial policy, which led to the construction of a dense railway network, promoted Javanese urban integration.

Data sources and limitations

[4] Urban is defned as an unbroken concentration of 10,000 inhabitants or more. While in Southeast Asia populations of 100,000 and over were clearly large cities, there is no universally accepted lower limit of urban size and 10,000 must be somewhat arbitrary. It satisfies, however, the criteria that an urban settlement is big enough to obtain sufficient data and avoids mistaking villages as towns.

Data derive largely from censuses assembled from multiple sources. Essential for the first comprehensive map of the Southeast Asian railway system were Allied World War II maps. Two main data gaps exist. One is that for some countries not even skeletal censuses were taken until after the turn of the century. Nor were pre-1900 censuses always complete. Indonesia's 1890 census, largely just a population count, was only for Java. In omitting the Outer Provinces, the census excluded a large area of Indonesia, although no cities as big as 100,000 and at most a few of over 10,000. In Thailand initial attempts in 1904 and 1909 to take censuses were 'piecemeal' (Skinner, 1957: 73). The 1936 Indochina census — reliant on capitation tax returns for persons aged 18 to 60 and the evaluations of local headmen — is approximate and probably understates Saigon's population (Smolski, 1937: 60). For Malaya, Burma and Indonesia the last census was at the beginning of the 1930s. Almost nothing of the 1941 Burma census survives (Sundrum, 1957: 113). Post-war data in the paper help to substantiate the argument that World War II ended a distinct phase in Southeast Asian urbanization.

The second main data gap is for the Philippines until the 1930s and for Thailand until the later 1940s. Data are, the very largest Philippine cities apart, for administrative districts ('municipalities') rather than urban areas of an unbroken concentration of buildings and habitation (Spencer, 1958: 288-294; Sternstein, 1984: 44-47; Wilson, 1983: 27).

Rank-size distributions

Rank-size distributions provide an empirical measure of the development and maturity of urban systems. To derive these distributions for Southeast Asia, I regress the log of city size on cities ranked by size. Computationally, this may be expressed as $\log P = \log k - q(\log R)$ where P is population, R is rank and k and q are constants. Distributions which, when plotted, closely approximate a straight line with a slope of – q can be regarded as lognormal. They suggest a mature urban system in which the extensive interaction of cities with one another has given rise to an articulated urban structure (Berry and Horton, 1970; Richardson, 1973; Smith , 1982,

1990).

A special case of lognormality, and common benchmark to assess urban integration, has a slope of -1.00 and so perfect log linearity. Such a distribution, identified in the 1920s as often true of urban ordering (Lotha, 1941), and popularized by G. K. Zipf (1949), conforms to the rank-size rule: the second largest in a series is half the size the biggest or first-ranked, the third largest a third the size of the biggest and so on.

At one rank-size extreme — in Southeast Asia (and the world) most nearly true of Bangkok — a single city would contain all urban population. The slope of a regression of city size on rank would be infinite. The other extreme, a collection of equally sized cities and a regression line with zero slope, would reflect a grouping of small, autonomous urban areas without significant linkages to one another. In practice, no country of any size approaches, over its entire range of cities, this flat distribution. Often, however, within distributions there is a bunching of (usually relatively small) cities with a quite gently-sloped, even plateau-like, distribution. At the upper end of city-size distributions in newly developing regions, a comparatively flat slope, generally thought of as around –0.50, often occurs. Flatness at the top, and concavity for the distribution as a whole, points to an immature and weakly integrated urban system (Smith, 1990: 27, 41).

A reason for weak integration, identified by J. B. Parr (1985: 208), is that in natural-resource dependent countries just starting to develop, the growth of major ports and transport nodes provides the initial basis for urbanisation. The early growth of Southeast Asia's gateways fits that pattern. Staples depended on the natural resource of frontier land and, as the gateway model specifies, the frontier 'filled in' with cities only in the course of development.

Rank-size distributions of urban systems are subject to various irregularities (Parr, 1976: 285-92). They require, as Jan de Vries (1984) and Carol Smith (1990) emphasise, careful, historically informed, interpretation. For numerous European and Asian pre-modern and

developing countries, conformity (or not) to lognormality and a Zipfian slope of minus unity have been used as an investigative standard and the norm towards which city systems should trend (Allen, 1954; Skinner 1977: 241; de Vries 1984). Although not previously applied to Southeast Asia, this standard, carefully treated, is similarly helpful in assessing pre-war Southeast Asian urbanisation. By the 1930s some Southeast Asian city systems conformed — if sometimes for historically divergent reasons and perhaps over a limited number of cities — tolerably well to the rank-size rule. But others did not and their urban systems remained weakly integrated and unarticulated.

Figures 2 to 5 show rank-size distributions for the five Southeast Asia countries with available data for cities of 10,000 and over. When cities become larger, rank-size curves shift upwards. An increase in cities over 10,000 shifts a distribution rightwards. Changes in the slope of a curve, either as a whole or along its contours, indicate relative growth in different-sized cities.

Between 1891 and 1931 in Burma, the faster than average growth of Rangoon and decline of Mandalay transformed a flat-topped distribution into, by 1931, an approximately log normal one with a slope of -0.94 (figure 2). More striking, however, and indicative of a limited need for urban functions outside Rangoon, was that over four decades rank-size curves shifted only slightly. The main shift occurred between 1921 and 1931, when cities of around 20,000 to 25,000 grew relatively rapidly to form a roughly plateau distribution. The move up-country of some rice milling probably contributed to this plateau. Although after 1910 new German-made machinery facilitated the spread of milling beyond Rangoon and promoted growth in several smaller cities, these traded little among themselves. Rangoon remained the focus of marketing and finance for Burma's rice exports (Grant, 1932: 29-30; Spate 1941: 79-83).

The specification of an appropriate region is important in rank-size analysis. Exclusion from Burma's distribution of the one-time Burmese capital of Mandalay in north-central Burma

on the (substantially true) grounds of limited integration with the 'modern' southern rice-exporting economy would create an urban distribution which at its top sharply descended from Rangoon (400,400 population in 1931) to the next largest city, Moulmein (65,500). The slope, if less extreme, would look like the 1947 distribution for Thailand where (figure 3) the distribution drops from Bangkok (400,000) to Chang Mai (about 30,000).

In Thailand, the 1947 distribution's very gentle slope, beginning with the third city, reflects several small, relatively autonomous cities with limited central place functions. The gateway model's second 'filling in' phase remained largely absent. Looking at early 1950s Thailand, G. William Skinner (1958: 18) doubted whether, Bangkok apart, any Thai population centre deserved the title of city: 'the nation possesses no middle-sized cities, no small cities, but only towns, the largest of which has a population of less than 50,000'.

Indochina as a whole shows a flat-top, pre-modern distribution (figure 3). But for Indochina's main rice-growing province of Cochinchina (4.8 million people in 1936) a distribution similar to Thailand's obtained. City size falls from Saigon-Cholon (256,000) to the market towns of Can Tho and My Tho with 27,108 and 25,000 inhabitants respectively and then to the 13,000 population of Vinh Long (Naval Intelligence Division, 1943: 369-408, 470-477). The feature common to Thailand, Burma and Vietnam — and a key element in explaining patterns of urbanisation — was that rice dominated the export sectors, and so the entire economies, of all three countries. I return to this point in the next sub-section.

The 1931 distribution for Malaya's seven largest cites is steeply sloped with a coefficient of -1.24 (figure 4). The steepness reflects both the geographical realities of strategic location on the Straits of Malacca and path dependence. In 1870, when much of Malaya remained jungle, the two largest Malayan settlements of Singapore and Penang were thriving cities. As Malaya developed, both Straits ports gained disproportionately in size through building on established positions as trading centres. Furthermore, both gained substantial extra-Malayan roles,

especially for nearby Sumatra and Borneo, on the basis of earlier trade and finance functions.

A characteristic of Malaya's rank-size distributions, especially striking when compared to Burma's, is that over successive decades they move strongly upwards and to the right. Rapid urban growth accompanied Malaya's transition from a frontier economy. However, a better developed urban system would be thought to have a city distribution with a slope nearer to -1.00 than Malaya's –1.24. Excluding Singapore and Penang, the regression coefficient drops to -1.08, but it approaches lognormality for only a few Malayan cities. The expectation of lognormality over more than a limited number of cities is unrealistic. A distribution in strict accordance with the rank-size rule for ten Malayan cities, with Singapore as the first-ranked, would imply urbanisation amounting to almost a third of national population. That large an urban sector would have been inconsistent with an economy like Malaya's, in which agriculture was the chief source of wealth and largely responsible for the country having the world's highest per capita exports (cf. de Vries, 1984: 114).

Analysis of Indonesia is, as in other respects, complicated by the contrasting natures of Java and the Outer Provinces (figure 5). By 1930, Indonesia displayed an integrated urban system largely because of Java: it had Southeast Asia's most integrated urban system and accounted for over two thirds of total Indonesian population. Additionally, substantial Outer Province urbanisation occurred. Contributing to this urban expansion was the rapid increase in Outer Province exports, a prominent feature of late nineteenth- and early twentieth-century Indonesian economic history (Booth 1998: 35, 235). Between 1890 and 1930 in Indonesia, swift growth in Jakarta and Surabaya, and even swifter growth in a number of smaller Indonesian cities including several in the Outer Provinces, converted a concave, pre-modern distribution into one, by 1930, not too far adrift of Zipf 'normality' with slopes of -0.82 over all cities, and -0.87 for the first 50. By 1930, over Indonesia's 119 cites of at least 10,000, small plateaus appear, but not a lower limb.

Transition matrices

This and the next two sub-sections use transition matrices to help explain the factors which shaped urban systems in Southeast Asia. This sub-section considers the three rice-exporting areas of Burma, Thailand and Cochinchina and contrasts their urbanisation with Malaya's, where rubber created substantial urban spread effects. The next sub-section focuses on Indonesia's geography- and infrastructure-dominated development, while the third sub-section looks at the Philippines.

Transition matrices provide an analytical means to trace city growth in Southeast Asia and assess the dynamism, or torpidity, of the region's urban systems. Did small cities of 10,000 to 20,000 in 1891 generally move, by 1931, into the proportionately larger grouping of 20,000 to 40,000, or even advance two categories to have 40,000 to 80,000 inhabitants? Or, in 1931, were cities in a particular Southeast Asian country much the same size as four decades earlier, which would make gateway cities increasingly appear 'over-large'?

City distribution by size category in 1891 for the three Southeast Asian countries with urban population data is shown in the far right hand column of the transition matrices (tables 5 to 7). The bottom row of the matrices gives the 1931 distribution of cities by categories of population size. In Burma, for example, the first row of the matrix (table 5) shows 12 settlements of below 10,000 in 1891. The second and third columns indicate that in 1931 11 of these 12 settlements had progressed to become cities of between 10,000 and 20,000 and that one moved up two size categories to over 20,000 inhabitants.

Burma is striking for its lack of urban growth and the increasing dominance of Rangoon. Between 1891 and 1931, most of Burma's 29 cities did advance but, with a single exception, by only one size category. Growth of the advancing cities was at roughly the same rate as for Burma's overall population, which doubled during this period. Many of the settlements of under 10,000 in 1891 that by 1931 had joined the urban category were only marginally within it. Two

cities in the 10,000 to 20,000 grouping in 1891 had declined to fewer than 10,000 inhabitants in 1931. One city of over 20,000 in 1891, by 1931 no longer met the urban qualification of a population of 10,000. Urban increase in Burma came largely from Rangoon. It moved from the category of under 320,000 to a population size (400,400) well above that level. Between 1891 and 1931, Rangoon's population increased by 122.1% but urban population elsewhere in Burma by just 38.4%.

Urbanisation in Malaya, unlike in Burma, rose substantially (table 6). Smaller cities grew at a similar pace to the large ones of Singapore and Penang. Population in the medium-sized cities of Kuala Lumpur and Ipoh rose even faster than in the two Straits metropolises. A transition matrix that showed no urban change between its beginning and ending dates would form a diagonal from the upper left and lower right corners. By contrast, entries for Malaya concentrate in the upper half of the matrix. The pattern is one of a frontier country that began with few cities but urbanized rapidly. All of Malaya's 17 cities moved up by at least one size category; no city declined to a lower grouping. Four cities jumped by two categories and Kuala Lumpur and Ipoh by three. Kuala Lumpur gained through being the administrative seat of the Federated Malay States government; through being on the Malayan railway main line and a hub for three rail branches; but chiefly through functioning as a service centre for the rubber industry (Federated Malay States, 1935; Fisher, 1948: 130-31; Bennett, 1961: 327-29).

Ipoh, on Malaya's west coast railway line and near the state of Perak's rich tin deposits, rose to prominence as a mining centre. Until 1914, tin mining was predominantly a Chinese industry. Miners relied on mines advancers to finance the prospecting for, and mining of, tin. The Ipoh-based operations of many of these advancers enhanced the town's commercial role.

The contrasting processing, marketing and financial linkages of the staples of rice and rubber help explain why relatively little urban development occurred in Burma, Thailand and Indochina while in Malaya vigorous city growth filled in the countryside. In Burma, despite the

inter-war opening of many small up-country mills, in the 1930s 31 of the 72 rice mills that employed over 100 workers were still located in Rangoon. Similarly, most Indochina rice was husked and milled in Saigon, where 27 mills, each several stories high, concentrated (Naval Intelligence Division, 1943: 379, 334).

Rice, as paddy, could be transported some distance for milling without significant deterioration but rubber, as raw sheet, could not. Although initially Singapore was a milling centre, by the inter-war period most Malayan rubber coming to the port was off-grades and scrap. Rubber was mainly milled up-country, either on European estates or in towns and cities. Moreover, finance and lower order marketing functions devolved to Peninsular cities (Straits Settlements, 1934, vol. 3: 246, vol. 2: 331-32). Rubber buying, explained the Chairman of the Singapore Chamber of Commerce Rubber Association, 'is all done in the towns'. Kuala Lumpur had Malaya's greatest concentration of buyers. They, in turn, had representatives in bigger towns like Klang and Seremban with populations of around 20,000 by the 1930s. (Straits Settlements, 1934, vol. 2: 750). The shift of finance to Peninsular centres helps to explain why Malaya had easily Southeast Asia's highest banking density (table 3).

Rice did not promote urban growth outside gateway cities because it lacked the extensive marketing and formal, or institutional, financial functions associated with rubber and tin. The practice in Burma was to buy all principal crops with cash (Burma, 1930, vol. 1: 47). Likewise, in Thailand, rice marketing outside Bangkok necessitated little urban structure and did not give rise to banks or other institutional finance which would have promoted urbanisation. Growers sold or — often having taken advances in the form of goods — bartered rice with local paddy dealers or sub-dealers. The paddy dealer and his family typically lived on a boat and used it or a cart to go to the villages of central Thailand to buy rice. The grain, as paddy, was taken by rail or, more usually, by boat to Bangkok, where mills concentrated (Zimmerman, 1931: 175-177; Andrews, 1935: 313-314).

It was consistent with rice's few linkages to formal finance that Thailand and Indochina had by some margin Southeast Asia's lowest banking densities (table 3). A relatively high density in Burma is explained by the eleven branches of Dawson's Bank. This institution was unique in Southeast Asia as a European-owned agricultural bank, and one which, rather than financing trade, lent long-term to Burmese rice growers against the security of land (Burma, 1930, vol. 1: 44-45; Tun Wai, 1962: 71-75).

Indonesia: Geography, Policy and Infrastructure

Comparison of the Indonesian censuses for 1890 and 1930 yields data for 71 cities (table 7). Because nearly all of the 48 cities recorded in the 1930, but not the 1890, census were under 20,000, the transition matrix must considerably understate the post-1890 birth of new cities. Nevertheless, strong urban growth is a feature of the matrix. Indonesian urbanisation — contrary to the law of proportionate effect, or Gibrat's Law, that all cities are equally likely to grow at the same rate — is striking in its selectivity. Of the 71 cities, 19 grew by two or more size categories. Adjusting for population, the Outer Provinces contributed more of these fast-growing cities than Java and so added significantly to greater Indonesian rank-size regularity.

Three factors largely account for Java's city growth and urban integration. One is an insular geography which allowed, on the northern coast of Java, the gateways of both Jakarta and Surabaya. Each city could economically link to international shipping flows. In Java, geography which dictated linkages to international trade, not external orientation per se as suggested by Krugman (1991:17-19), lay behind the existence of two equally sized cities. Furthermore, Indonesia's insular geography conduced, in Java and the Outer Provinces, to the growth of smaller port cities with their associated handling and marketing functions. Such cities included the large port of Semarang in central Java and a number of smaller ports such as Palembang, Pontianak and Makassar in the Outer Provinces.

Internal transport systems, like ocean shipping, also shaped patterns of Javanese

urbanisation (figure 6). Political decisions were central to this infrastructure development (cf. Henderson, 2003). The Dutch colonial government determinedly constructed a comprehensive inland transport network, partly with the intention of balancing food availability across the island. The first Javanese railway opened in 1873. By the 1930s, Java's rail system had a density comparable to European countries (Naval Intelligence Division, 1943: 414; figure 7). Java's large cities and, furthermore, 'numerous smaller towns' were connected, the geographer Charles Fisher (1967: 184) observed, 'by what may be fairly called a metropolitan network of railways'. Through efficiently linking ports to surrounding hinterlands, the rail network promoted the rapid expansion of Jakarta, Surabaya and Semarang. The traditional urban centre of Yogyakarta benefited from good rail connections and railway workshops (Naval Intelligence Division, 1943: 430). Railway expansion was instrumental in the growth of large inland urban centres, notably Bandung (headquarters of the western half of the State railway network), Malang and Surakarta in Java and Medan in Sumatra. Table 7 identifies 14 Javanese cites that grew by two or more size categories. Of the 14, 12 (including all cites rising by more than two categories) had been linked to the railway by 1899, and usually well before.

Javanese geography and infrastructure contrast markedly with the strongly north-south patterns in most of the rest of Southeast Asia (figures 6 and 7). The southwards extension from mainland Asia of Burma, Thailand and Indochina predisposed these countries to a predominately north-south geographical configuration. Because Thailand was largely surrounded by Asian land mass, its geography offered scant opportunity for smaller ports to develop or for alternatives to Bangkok's extreme dominance.

In Malaya, Burma, Thailand and Indochina, the gateway ports were not just nature's gift: internal transport developments reinforced their geographically-derived comparative advantage (Fujita and Mori, 1996: 118). Already, these ports were nearest to the world east-west shipping route that bisected Southeast Asia after the inauguration of the Suez Canal. Rather than

providing an alternative to an historic reliance on water transport which focused on a single large city, railways strengthened the nodality of Rangoon, Bangkok, Saigon and Singapore. Railway lines, although sometimes branching to form a tree-like configuration, generally paralleled major rivers or the coastlines. These ran north-south. In adhering to this geography, infrastructure construction ensured that internal communications focused on a single port city in the south. North-south railway configurations and the economics of ocean shipping contributed significantly to Singapore's growth and help explain the extreme urban primacy of Bangkok and Rangoon.

Philippines Urbanisation

The emergence of provincial centres in the Philippines had similarities to both Indonesia and Malaya. In the Philippines, as in Indonesia, an insular geography encouraged port development beyond the Manila gateway. The explanation for the expansion of medium-sized cities like Iloilo and Cebu relative to Manila was their acquisition of port and staple-export related commercial functions.

Philippine urbanisation resembled Malayan because economic roles in processing, wholesaling, and finance promoted secondary urbanisation outside the main city. Sugar, like latex rubber, underwent first-stage processing near the point of production. After 1918 in the Philippines, this swelled employment and incomes in the urban centres of sugar-producing districts. An example was Bacolod in Negros Occidental. It became, as a commercial centre for sugar, 'an attractive, bustling community with markets, department stores and amusements'. As part of the same urbanisation process, other communities, especially those with large (sugar processing) centrals, 'harbored an active urban life' and even smaller towns obtained electric lights and a telephone service (Larkin, 1993: 182-183, 14-15; Wernstedt, 1956: 337-343; Ullman, 1960: 212-213). There were four banks in Iloilo and one in Bacolod; and the Philippines had Southeast Asia's highest banking density after Malaya (table 3).

IV. Concluding Remarks

Analysis of Southeast Asia's urban growth from the 1870s to 1939 provides an important historical perspective in understanding of present Southeast Asian urbanisation. Pre-war urbanisation created a path dependence that set the locational pattern for contemporary Southeast Asia's main cities. In ending over two centuries of de-urbanisation and creating this template, comparative advantage rooted in geography was a necessary but not a sufficient condition. A range of higher order services required by long-distance trade consolidated the position of Southeast Asian gateways as great cities. Through agglomerative effects the gateway cities grew to become commercial nerve centres in their respective countries. The market for, and the finance of, staples was coordinated from the gateway city, even when, as in Malaya, hinterland cities took over direct physical export.

Beyond Southeast Asia's gateway cities, important determinants of urbanisation can be identified: the differing strengths of staples-created urban spread effects; geographically-determined economic realities such easy access to the sea; railway configurations influenced by geography and economics; and government policy that lay behind infrastructure development. These factors were the principal determinants of where, and which, cities grew, and whether small cites grew fast enough to promote the spread of urbanisation and a greater rank-size regularity of urban systems.

Analysis of pre-war urbanisation allows comparison over time of urban and regional growth and their underlying forces. Although the largest Southeast Asia cities are still the region's pre-war gateways, today they are typically megalopolises like Jakarta, Manila, Bangkok and Ho Chin Minh City (Saigon). Growth in these cities has been driven by an essentially different set of considerations than before the war. Although much of pre-war Southeast Asia received large migrant flows from India and China, abundant frontier land and rapidly expanding agricultural export sectors limited cityward migration. Contemporary Southeast Asia

lacks the pull of a similarly attractive rural sector to check the flow of hinterland migrants to cities. Furthermore, prior the war the usual colonial government ethos of free trade minimised government-created rents. Now in Southeast Asia, as often in less developed countries (Krugman and Elizondo, 1996; Ades and Glaeser, 1995), rents associated with city-centred import substitution and a large central government role draw in rural migrants. Nor before the war, unlike today, did natural increase contribute much, if anything, to urban growth.

Pre-1940 Southeast Asian experience exemplifies a number of the forces behind urban and regional spatial transformation identified in the recent World Development Report *Reshaping Economic Geography* (World Bank, 2009). The Report emphasizes trade as a catalyst for urban growth and the agglomeration effects of higher order services. Both growth processes were evident in Southeast Asia's pre-war gateway cities. The Report also stresses that early growth tends to be unbalanced and spatially uneven. In Southeast Asia, these were predominant characteristics due to export-led expansion and exploitation of the frontier.

Pre-war Southeast Asian growth was 'lopsided' in two respects. One was that growth which relied on exports and reproducing traditional cultivation techniques on frontier land was growth with limited rural modernization. Parts of Southeast Asia were drawn into a globally-oriented export economy but other areas left comparatively untouched. Even the region's export-producing hinterlands remained little modernized compared to gateway cities. The gateways themselves were geographically marginal in their respective countries due to an orientation towards external linkages. Second, there was 'lopsideness' in the gap in population size between Southeast Asian gateways which emerged as primate cities and their second-city counterparts. This lopsideness persists as a post-war problem.

In evaluating the urban-regional development process over time, the World Bank Report provides an optimistic interpretation of history (Rigg, et al., 2009). It draws attention to the strong spread effects and centrifugal forces that are likely to emerge from growth to correct early

spatial imbalances. Contrary to this interpretation of history, however, in Southeast Asia, despite several post-war decades of trade and globalization, economic and spatial unevenness have not been erased. Often these characteristics appear to have strengthened, as, for example, in the region's megalopolises and in large regional income disparities. Pre-war Southeast Asian export-led growth and the accompanying development of gateway cities created an urban path-dependency apparent in Southeast Asian today. The sheer size of these former gateways and issues of urban-rural balance are central to the Southeast Asian development agenda.

Appendix: Data sources

Burma

Urban Population: Burma, 1954: 2; India, 1932, Part II: 280-281; Saito and Lee, 1999: 16. Figures for 1938 refer to 1941 and are from Murphey, 1957: 22.

Population: Hlaing, 1964: 13; Saito and Lee, 1999: 7 for 1938 -1983. For 1938 population data refers to 1941.

Malaya

Urban Population: Straits Settlements, 1892: 47, 87, 104; 1901: 30, 71; Federated Malay States, 1902: 28; 1911: 25; Malaya, 1949: 44; Huff, 1994: 158; Marriott, 1912: 34-41; Malaya, 1957: 8, 53; Singapore, 1973, vol. 1: 231. Penang had over 100,000 inhabitants for the first time in 1911 and Kuala Lumpur in 1931. The figures for 1938 refers to 1936 and for Penang and Kuala Lumpur are estimated assuming proportionate population growth between 1931 and 1947.

Population: The 1881 is population is estimated by assuming that population grew at the same rate as in 1891 - 1901. For 1891 and 1901 figures are estimated for the Unfederated Malay States (UMS) only. Estimation is on the basis of 1911 census figure of a UMS population of 899,968 persons and backwards extrapolation assuming that during both decades the population grew at 0.65 per cent per annum. A basis for this assumed rate of UMS population growth is Dodge, 1980: 457-74. Data for 1891-1911 is from Federated Malay States, 1911: 18, 95; Malaya, 1921: 18. For 1921-1947 data is from Malaya 1949: 39; Malaya 1957, Final Report: 3; Singapore 1973, vol. 1: 31. The 1938 population figure refers to 1936 and is an estimate which assumes proportional population growth between 1931 and the 1947 census figure of 5,848,910.

Thailand

Urban Population: Because data for Thailand are for municipal areas, I rely for figures for Bangkok's urban population on the painstaking calculations of Sternstein1984. The figures for Bangkok include Bangkok and Thonburi. Thailand, 1963: 52 gives statistics for municipal areas; see also Wilson, 1983: 38 for municipal data for 1947-1970. Apart from Bangkok, the earliest available data for 'centres' is 1943. These centres, for the larger of their number, correspond to a measure of municipal population (Sternstein, 1965: 24-25). Before 1947 figures for Bangkok are estimated by applying a log scale to the vertical axis in the figure that shows Sternstein's (1984) estimates of the population of built-up Bangkok and reading the population from the regression line that he fits. Population estimates are for 1880, 1890, 1900, 1910, 1920, 1930 and 1940. In 1970 when Bangkok had a population of 2,495,312 Chiang Mai, the second city, had only 83,729 inhabitants. Wilson, 1983: 27

Population: For 1881-1901 figures are from Skinner 1957: 79 and refer to 1880, 1890 and 1900. Subsequent figures are from Thailand 1937-38 and 1939-40, 46 and refer to the census returns for 1911, 1919, 1929 and 1937.

Indonesia

Urban Population: Indonesia, 1893: 6-7; 1926: 23-25; 1933-34, vol. 1: 122-123, vol. 2:146-149, vol. 3: 124-125, vol. 4: 142-143, vol. 5: 141-142, vol. 8: 78-81; 1947: 13; Boomgaard and Gooszen, 1991: 220-221, 245. Data for 1891, 1921 and 1931 are for 1890, 1920 and 1930. Data for 1939 and 1948 for Jakarta and Surabaya are from Dick, 2002: 123. *Population*: Indonesia: Data for 1891, 1901, 1921 and 1931 are for 1890, 1905, 1920 and 1930. For 1890 Outer Province population is estimated by assuming that between 1890 and 1905 it grew at 1.25% annually. The estimated is based on Gooszen, 1999: 8. She suggests Indonesian population growth rates in the range of 1% to 1.25%. Available statistics suggest that from 1890 to 1905 the population of Java and Madura grew at 1.56%. Boomgaard and Gooszen, 1991: 117-121, 133-137, 224-230.

Indochina

Urban Population: Indochina, 1923-1929: 30-31, 61; 1931-32: 53, 1943-1946: 27. A population estimate for 1921 indicated the following: Cholon 200,000 of which 130,000 were Chinese, Saigon 100,000, Hanoi 100,000 and Phnom Penh 100,000 (Indochina, 1923-1949, edn. 1923-1929: 28). During the 1950s the rapid growth of Saigon-Cholon was very largely due to the migration of refugees from Tonkin and from civil disorder in the south. On the impossibility of a post-war census of Saigon-Cholon, see Principales Observations Concernant Les Différents Chapitres in Vietnam, 1952. For Saigon-Cholon data for 1891, 1902, 1911, 1921, 1931 and 1938 are for 1890, 1902, 1910, 1921, 1930 and 1936; for Hanoi data are for 1900, 1910, 1920, 1930 and 1936; and for Phnom Penh data for 1901, 1911, 1938 and 1946 are for 1900, 1910, 1936 and 1948. For 1946 for Saigon-Cholon and Phnom Penh data is for 1948.

Population: Figures for 1880 and 1911 are from Brocheux and Hémery, 2009: 254 and are orders of magnitude. The figure for 1911 refers to 1913 and that for 1938 refers to 1936. The 1901 figure is for 1906 and from Smolski, 1937: 56. Cochinchina, or Nam Bo ('the southern part of Vietnam'), consisted of the six provinces the French conquered in the 1870s and had Saigon as its main city (Brocheux, 1995: 223). For population figures for Cochinchina for 1880 to 1936, see Sansom 1970: 259, 261;1910: Coquel, 1911: 225; 1921 and 1931: Indochina, 1923-1949, edn. 1923-1929: 61; 1931-32: 53, 1943-1946: 271. The 1946 Indochina population is for 1950 and consists of Vietnam 25,348, Cambodia 4,163, Laos 1,886 from Maddison 2003: 168.

Philippines

*Urban Populatio*n: The figure for 1891 includes rural areas of Manila township and is from Mitchell 1998: 41. For 1901, 1921 and 1938 figures for Manila, and for Cebu and Iloilo for 1901 only, are for 1903, 1918 and 1939 and from Philippines 1905, vol. 2: 129-130; 1921b, vol. 2: 20; 1942, vol. 2: 59; 1946: 10. The 1931 population of Manila is estimated by calculating the mean growth for Manila for 1918-1939 and assuming that population grew at the same rate (.0372) between 1918 and 1931. Data for 1911-1931 for Cebu are from Murphey, 1957: 227 and refer to 1910, 1918 and 1929. The 1931 population of Cebu is estimated by applying a 1929-1941 growth rate (.0410) to the 1929 population. The 1939 census shows Zamboanga as a city of 131,455 but in fact it was chartered to include an area of 1,139 square miles and the actual urban area contained only about 18,000 people. Wernstedt and Spencer, 1967: 171. For 1948 population by cities is from Philippines 1960: 8. Urban population for 1948 may be somewhat overstated for cities other than Manila because of the conventions of official Philippine statistics which record population in political areas rather than the usual definition of a city as an unbroken urban area. Statistics are for municipalities (rather like a county in the United States) and each municipality has as its capital a city. The municipality had the same name as the capital. See Spencer, 1958: 288-294.

Population: For 1881 the figure refers to 1877. It is the census figure that year for civilized people (5,567million plus the 1903 census figure for wild people transformed into an estimate for 1877 under the assumption of population growth of 0.60% per annum. Philippines, 1905, vol. 2: 19, 123). The 1901 figure is for 1903 and from the census for that year (Philippines, 1905, vol. 2: 123). The 1921 figure refers to 1918 and is the census figure (Philippines, 1921b, vol. 2: 19). Figures for 1911 and 1931 are estimates and from Philippines, 1921a:13 and Philippines, 1940: 24. For 1931 the figure refers to 1930. The figure for 1938 is for the census of 1 January 1939 and is from Philippines, 1939; 3. For 1948 population is from Philippines, 1960: 5.

Railway maps

Burma: 'Burma Occupied' and 'Southeast Asia Selected Strategic Facilities' both from United States, 1977 and respectively microfilm reel 14, item 11 and microfilm reel 9, item 15. *Malaya*: Federated Malay States, 1935: 2. *North Borneo*: Naval Intelligence Division, 1944: 483. *Thailand*: Kakizaki, 2005: 36; Ingram, 1971: 85-86. *Indonesia*: Reitsma, 1925: 72-73, 75-76;

Naval Intelligence Division, 1944, maps between pp. 428-429. *Indochina*: Indochina 1923-1949, edn, 1937-38, fold out map; Indochina Railroads and Railroad Facilities in United States, 1977, microfilm reel 12, item 6; Naval Intelligence Division, 1943: 423. *Philippines*: Spencer, 1954: 76; Worcester, 1930: 622-623, end map.

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Table 1
Southeast Asia main urban centres and country populations, 1891-1947
(population 000)

(a) Cities

		1891	1911	1931	1947
Burma					
	Rangoon	180.3	293.3	400.4	737.1
	Mandalay	188.8	138.3	147.9	185.9
	Moulmein	55.8	57.6	65.5	102.8
	Bassein	30.2	37.1	45.7	77.9
Malaya					
	Singapore	153.5	259.6	445.7	679.7
	Penang	51.6	101.2	149.4	189.1
	Kuala Lumpur	19.1	46.7	111.4	176.0
	Ipoh	3.2	24.0	53.2	80.9
Thailand					
	Bangkok	100.0	130.0	400.0	781.7
	Chang Mai				38.2
	Lampang				23.0
	Nakhon Ratchasima				22.3
Indonesia					
	Jakarta	126.7		533.0	1,050.0
	Surabaya	118.0		341.7	400.0
	Semarang	71.2		217.8	
	Bandung	18.1		166.8	
	Surakarta	100.3		165.5	
	Yogyakarta	57.5		136.6	
Indochina					
	Saigon-Cholon	81.0	182.0	256.0	492.2
	Hanoi		114.0	135.0	238.0
	Phonm Penh		62.0	96.0	111.0
Philippines					
	Manila	154.0	234.4	462.9	983.9
	Cebu			95.0	167.5
	Basilan				110.3
	Iloilo				110.1

(b) Countries

	1891	1911	1931	1947
Burma	7,772	12,115	14,667	19,051
Malaya	1,710	2,651	4,348	5,900
Thailand	6,670	8,266	11,506	17,443
Indonesia	33,800		60,727	
Indochina	13,400	16,395	21,450	31,397
Philippines	7,635	8,835	13,405	19,234

Notes: Cities are the four largest in 1931 and 1947 but not always in earlier years. In Burma, Sittwe (Akyab) was slightly larger than Bassein from 1891 to 1911. In Malaya, Malacca was larger than Ipoh in 1891 and 1901. A number of Indonesian cities were bigger than Bandung in 1890. For 1891 for Indonesia and Indochina populations are interpolated and approximate.
Source: Appendix.

Table 2
Southeast Asia Regressions of Main City and Staple Commodity Growth, 1870-1940

Dependent variable:	Main city growth	Staple growth in subsequent decade
Independent variable:		
Staple growth in previous decade	0.201*	
(std. error)	0.11	
Main city growth		-0.28
(std. error)		0.29

*Significance at the10 percent level

Note: The number of observations for staple growth as a function of earlier main city growth (35) are fewer than for the dependence of main city growth on the growth of staples (39) because World War II rules out meaningful observations for staple growth ten years after census data from the later 1930s. Source: Appendix.

Table 3
Southeast Asia Banks and Banking Density, 1940

	No of banks	Banks per million total population	Banks per million persons in largest city	% banks in largest city	No of cities outside the largest with banks
Thailand	12	1.04	20.0	66.6	3
Burma	34	2.31	42.5	50.0	15
Indochina	23	1.07	19.5	47.8	11
Malaya	68	15.64	49.4	29.4	20
Indonesia	102	1.68	18.8	9.8	38
Philippines	72	5.4	28.1	18.1	50

Note: In Indonesia Surabaya had more banks (11) than Jakarta. All the banks in Surabaya were branches. Dick (2002), p. 417.
Source: Bankers' Almanac (1941).

Table 4
Southeast Asia indexes of centralization and primacy, 1891-1957

(a) ratio of the first to second largest city

	1891	1901	1911	1921	1931	1938	1947	1957
Burma	1.0	1.3	2.1	2.3	2.7	3.1	4.0	
Malaya	3.0	2.1	2.6	2.8	3.0		3.6	2.9
Thailand							20.5	25.9
Indonesia	1.1			1.6	1.6			2.9
Indochina		1.6	1.6	2.2	1.9	1.7	2.1	
Philippines		7.1		4.4	4.9	4.0	5.9	5.9

(b) population of the largest city as a percentage of the largest four cities

	1891	1901	1911	1921	1931	1947
Burma	39.6	46.1	55.7	57.5	60.7	66.8
Malaya	63.8	57.6	60.2	59.3	58.7	60.4
Thailand						90.3
Indonesia	30.5			38.7		42.3
Indochina					44.3	
Philippines						71.7

Notes: For Burma 1947 refers to 1953; for Indonesia data in panel b are for 1890, 1920 and 1930 and in panel a 1957 refers to 1961; for the Philippines 1947 refers to 1948 and 1957 to 1958; and for Indochina 1931 in panel b refers to 1936. Source: Appendix.

Table 5
Burma Urban Transition Matrix 1891 - 1931
(distribution of cities of at least 10,000, 1891 and 1931)

000 persons	<10	10 20	20 - 40	40 - 80	80 - 160	160 - 320	320 - 640	City distribution 1891
<10		11	1					12
10 20	2	3	5					10
20 - 40	1		2	1				4
40 -80				1				1
80 - 160								
160 - 320						1	1	2
320 - 640								
City distribution 1931	3	14	8	2		1	1	29

Notes: The city which advanced two size categories was Maymyo, although with a population of 21,300 in 1931 it only just crossed the threshold. No city rose by three size categories. Yandoon fell by two size categories. Between 1891 and 1931 the only city of between 20,000 and 80,000 to rise a category was Bassein. Source: Appendix.

Table 6
Malaya Urban Transition Matrix 1891 - 1931
(distribution of cities of at least 10,000, 1891 and 1931)

000 persons	<10	10 20	20 - 40	40 - 80	80 - 160	160 - 320	320 - 640	City distribution 1891
<10		8	4	1				13
10 20			1		1			2
20 - 40								0
40 -80					1			1
80 - 160							1	1
160 - 320								0
320 - 640								0
City distribution 1931	0	8	4	2	2	0	1	17

Notes: Cities rising by two size categories were Taiping, Johore, Semerlan, Klang, Singapore. The cities rising by three size categories were Ipoh and Kuala Lumpur.
Source: Appendix.

Table 7
Indonesia Urban Transition Matrix 1890 - 1930
(distribution of cities of at least 10,000, 1890 and 1930)

000 persons	<10	10 20	20 - 40	40 - 80	80 - 160	160 - 320	320 - 640	City distribution 1890
<10	1	16	7	3				27
10 20		12	10	3	1	1		27
20 - 40			4	6	1			11
40 -80					2	1		3
80 - 160						1	2	3
160 - 320								
320 - 640								
City distribution 1930	1	28	21	12	4	3	2	71

Notes: Cities rising by two size categories: In Java: Jakarta, Buitenzorg, Soekaboemi (Sukabumi), Garoet, Tarkinmalaja, Pemalang, Semarang (Samarang), Madioen (Madium), Kedri, Surabaya and Probolinggo. In the Outer Provinces: Makassar, Manado and Teluk Betung. Cities rising by three size categories: In Java: Cirebon (Cheribon) and Malang. In the Outer Provinces: Medan and Pontianak. Cities rising by four categories: Bandung (Bandoeng) in Java. Source: Appendix.

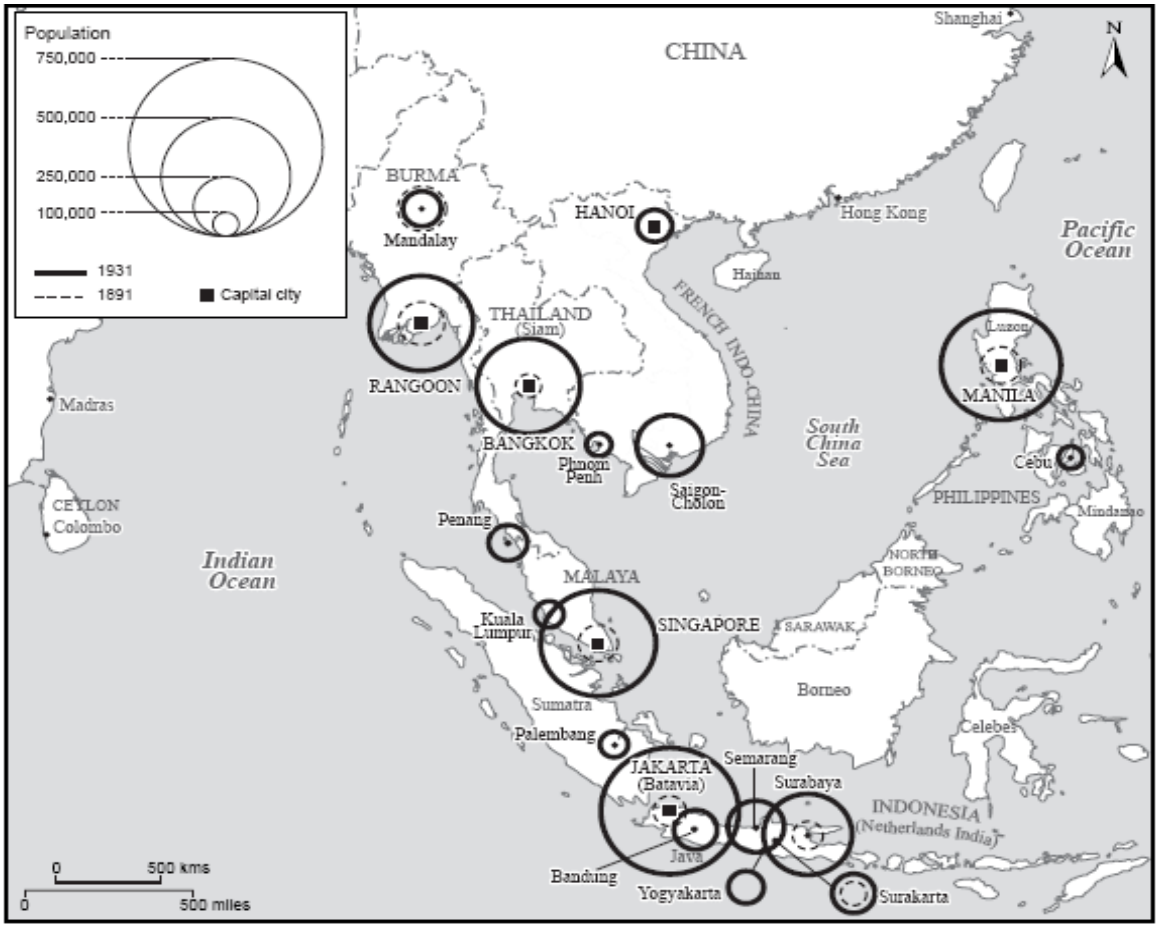

Figure 1: Southeast Asia cities of 100,000 and more, 1891 and 1931

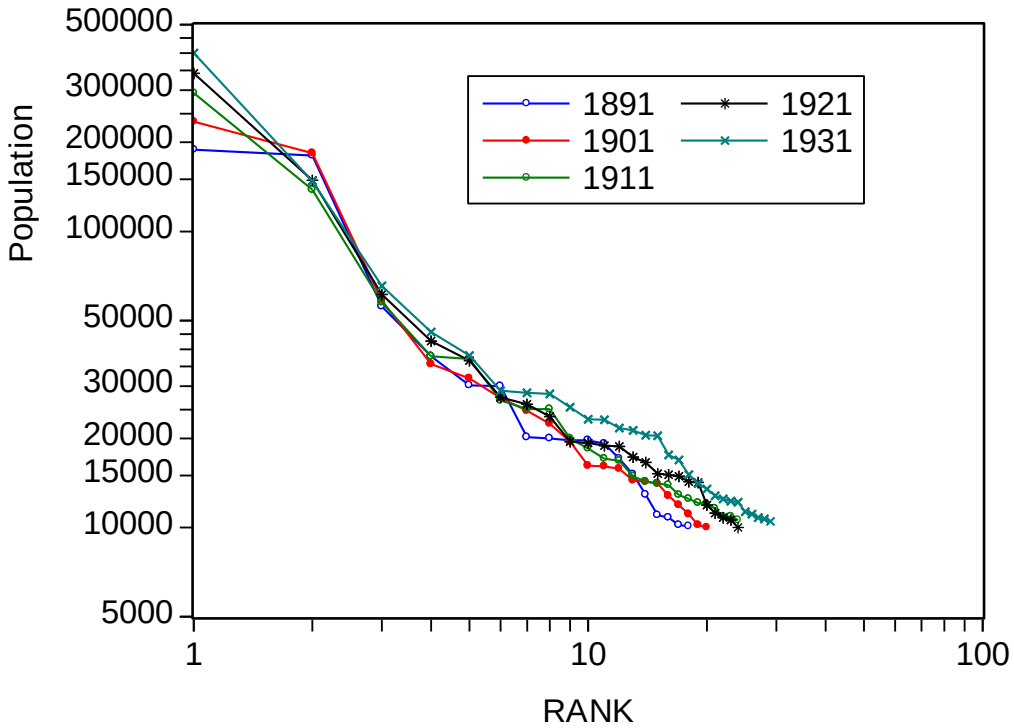

Figure 2: Burma rank-size distributions 1891 - 1931

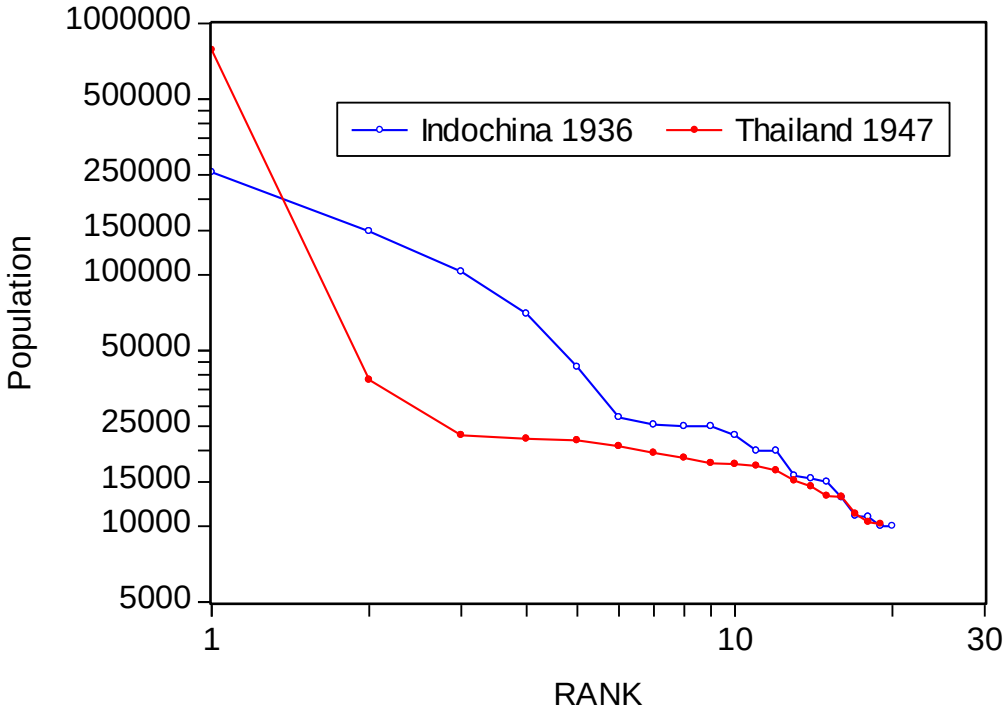

Figure 3: Indochina 1936 and Thailand 1947 rank-size distributions

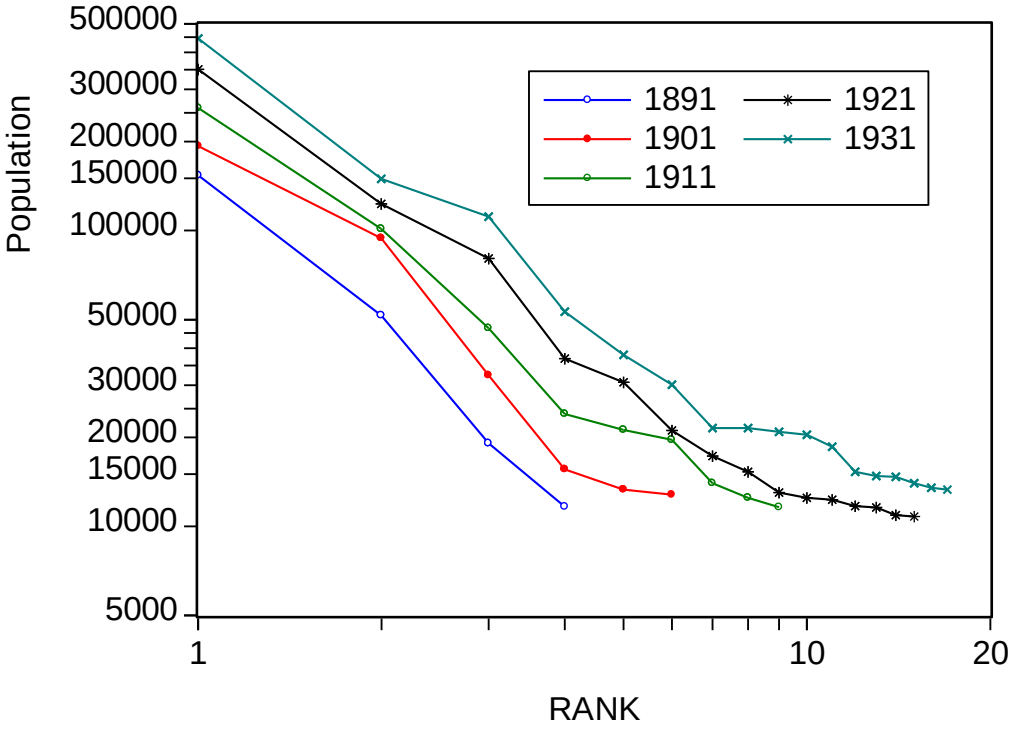

Figure 4: Malaya rank-size distributions 1891-1931

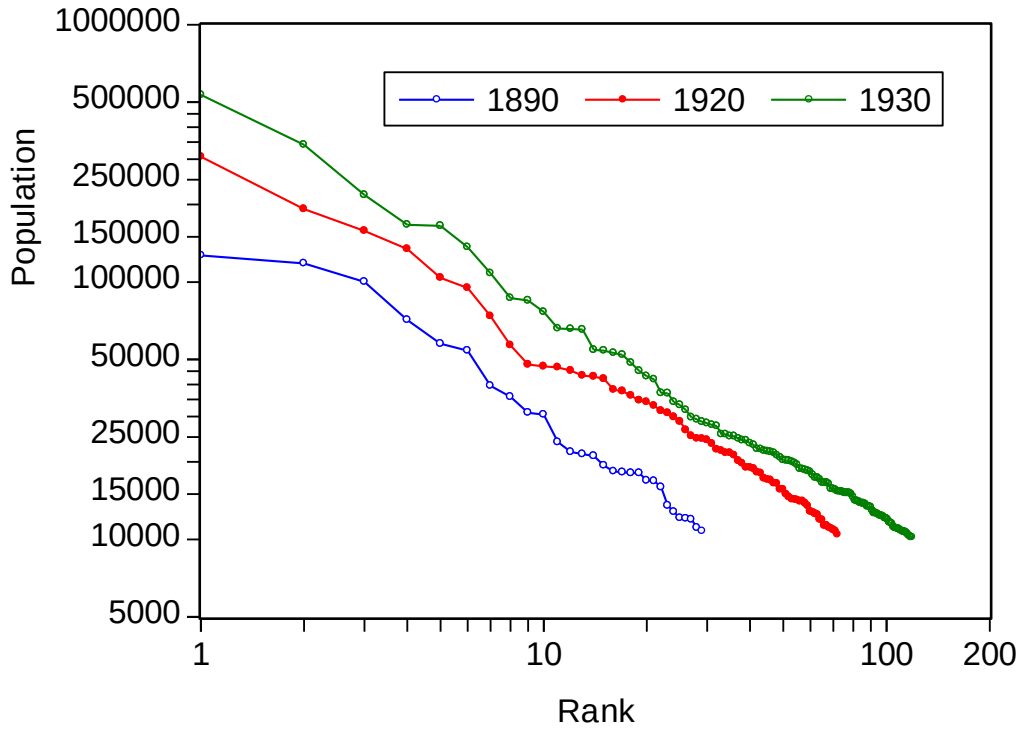

Figure 5: Indonesia rank-size distributions, 1890-1930

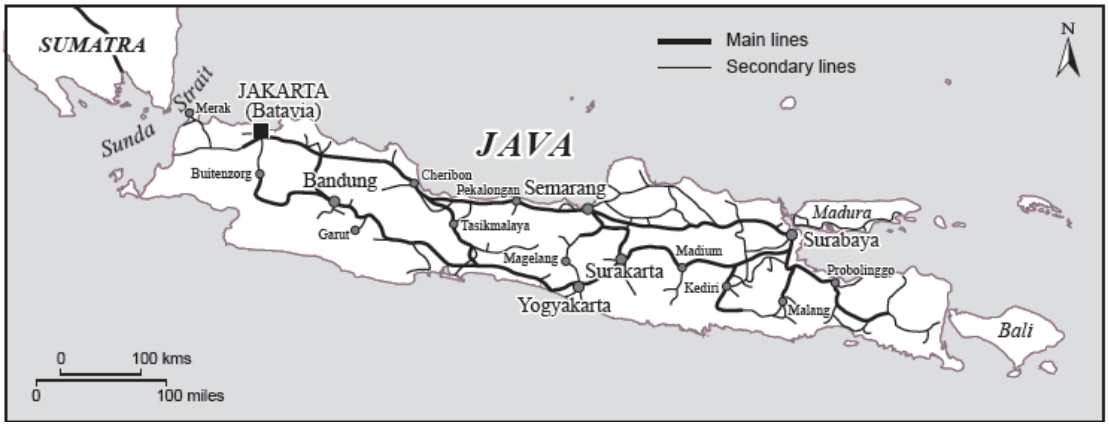

Figure 6: Java railways, 1939

Figure 7: Southeast Asia railways, 1939

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