Studying Extended Metropolitan Regions in South-East Asia*

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Introduction

More than half the world's megacities are now in Asia. The two largest mega-urban regions in South-East Asia (Jakarta and Manila) each has a population not much less than the population of Australia.

The vast urbanized regions centred on these major metropolitan areas are clearly exerting economic dominance in the countries where they are located. For example, Bangkok produces a highly disproportionate amount of Thailand's industrial output, and its per capita income levels are such as to make it appear as a 'developed country enclave' in Thailand. Similarly, Jakarta exerts disproportionate economic and political influence in Indonesia. A recent study (Asian Development Bank 1997) states that Bangkok produced 37% of Thailand's GDP, and Manila, 24% of the Philippines' GDP. In 1990, the ratio of city GDP per capita to national GDP per capita was 3.5 for Bangkok, 1.9 for Manila and 3.7 for Shanghai.

As reported in Population Briefs 1997, Brockerhoff claims that "in most developing regions, big city residents are increasingly disadvantaged, and researchers and policymakers can no longer assume that the quality of life in urban areas is better than in rural areas". Brockerhoff and Brennan (1997) show that infant mortality in African and Latin American cities has not fallen as expected, and indeed has risen in many African cities; the mortality differential in favour of urban areas has narrowed considerably.

This is not the case, however, in Asian cities. Most indicators of welfare show that big city dwellers (for example, in Jakarta or Bangkok) have a considerable advantage over their rural compatriots.[1] Indeed, there is a large body of literature that sees the big cities in a much more positive light - as 'engines of growth', where productivity is

* Paper presented at the XX1V General Conference of the IUSSP, Salvador, Brazil, 18-24 August 2001

much higher than elsewhere in the country, and where economies of agglomeration should be celebrated. As Mera (1981:36) argues provocatively, "the optimal city size may be beyond any size achieved thus far anywhere in the world".

The need for careful studies of the dynamics of growth of these enormous cities, their changing labour markets and the planning issues they pose has never been greater. Administrative boundaries are increasingly irrelevant in studying the dynamics of their growth (McGee, 1991; McGee, 1995; Dharmapatni and Firman, 1995). Typically, metropolitan growth has extended well beyond official boundaries. Many analysts draw the conclusion that growth of megacities is slowing, because they concentrate on what is happening inside official boundaries, whereas the fastest growth is taking place outside these boundaries. It is necessary to designate an "extended metropolitan region", frequently consisting of an inner and outer zone, to really come to grips with demographic and labour market dynamics of the megacity region.

Methods

Recent studies of megacities in South-East Asia (Jones, Tsay and Bajracharya, 2000; Mamas, Jones and Sastrasuanda, forthcoming) have used the official metropolitan area as the core, and determined boundaries for an inner zone and an outer zone using differing criteria in different cases. For Bangkok, the designation of the zones followed planning convention. The inner zone was taken to include the five *changwat* (provinces) adjoining the city and which (when added to Bangkok) are referred to in planning circles as the Bangkok Metropolitan Region. For Manila and Taipei, population density and proportion of employment in primary industry were the main criteria used to delimit the inner zone. For the Indonesian cities - Jakarta, Surabaya, Bandung, Medan, Semarang and Makassar - urban scores derived on the basis of population density, proportion of employment in primary industry and presence of urban facilities were used to determine which 'desa' (lowest level census unit) should be included in the inner zone. The final decision on boundaries in such cases, of course, involved judgements based on examination of the spread of urbanized areas

[1] This conclusion, of course, could well change if we compared urban slum dwellers with rural dwellers. Data are rarely available to do this.

outwards from the core. Some more rural *desa* were included in the inner zone because of their contiguity with other *desa* that were more urban in nature.

To delimit the outer zone, administrative boundaries of surrounding provinces or districts were used in Bangkok, Manila, Jakarta and Taipei, and a range of considerations in the other Indonesian cities.

Typically, in the largest cities the inner zone extended distances of 30 to 50 kilometres from the city centre, at least in some directions, and the outer zone in some cases up to 100 kilometres. Map 1 shows the areas we defined as the core areas and the zones of Indonesian megacities. As the circle drawn round a radius 30 or 50 kilometres from the city centre shows, these zones are quite extensive. Demographic and employment data for the core and the two zones were derived from the 1980 and 1990 Population Censuses in the South-East Asian study, and in the Indonesian study, from the 1990 Census and the 1995 Intercensal Population Survey.

Size and population density in the South-East Asian megacities

The inner zone is the area of marked urban expansion, where population growth is rapid, and migration is contributing massively to this growth (both migration outward from the metropolitan core and inward from other parts of the country). The outer zone is further out, less affected by migration and change in occupational mix, and more in a state of 'incipient urbanization'.

Table 1 shows the populations of the South-East Asian megacities and their zones in 1990, and Table 2 those of the extended metropolitan regions of the largest Indonesian cities in 1995.

Issues of comparability between the cities

In comparative studies of this sort, issues of consistency of definitions of the zones are important. Use of the official metropolitan area to define the core could introduce elements of non-comparability if some of the metropolitan boundaries are more far-

flung than others. This turns out to be the case with Bangkok and Semarang, as Table 3 shows.

Table 1: Population, density and population growth by zones in Extended Metropolitan Regions (EMR), 1980 and 1990

	EMR and Year							
	BANGKOK		JAKARTA		MANILA		TAIPEI	
Item and Zone	**1980**	**1990**	**1980**	**1990**	**1980**	**1990**	**1980**	**1990**
A. Population ('000)								
Core	4,697	5,876	6,481	8,223	5,926	7,948	2,268	2,761
Inner zone	1,947	2,706	5,413	7,676	2,820	4,107	3,070	4,035
Outer zone	2,513	3,061			2,932	3,908	709	757
Whole EMR	9,157	11,643	11,894	15,899	11,678	15,963	6,047	7,553
B. Density (Person/km2)								
Core	3,000	3,754	9,760	12,384	9,318	12,497	8,344	10,157
Inner zone	314	437	1019	1446	964	1,403	3,450	4,534
Outer zone	130	158			312	416	282	301
Whole EMR	337	429	1991	2661	901	1,231	1,644	2,053
C. Growth 1980-1990 (%)								
Core		25.1		26.9		34.1		21.7
Inner zone		39.0		41.8		45.6		31.4
Outer zone		21.8				33.3		6.8
Whole EMR		27.1		33.7		36.7		24.9

DEFINITIONS

Core	Bangkok=	BMA (Bangkok Thonburi).
	Jakarta=	DKI Jakarta.
	Manila=	Metro Manila.
	Taipei=	Taipei Municipality.
Inner zone	Bangkok=	changwats of Samut Prakan, Nonthaburi, Pathum Thani, Samut Sakhon and Nakhon Pathom.
	Jakarta=	parts of the kabupatens of Bogor, Tanggerang and Bekasi, plus kotamadya Bogor.
	Manila=	parts of the provinces of Cavite, Pampanga, Rizal, Batangas, Bulacan and Laguna.
	Taipei=	Keelung city, the urban part of Taipei County and the urban part of Taoyuan County.
Outer zone	Bangkok=	changwats of Ayuthaya, Saraburi, Chachoengsao, Chonburi and Rayong.
	Jakarta=	parts of the kabupatens of Bogor, Tanggerang and Bekasi.
	Manila=	parts of the provinces of Cavite, Pampanga, Rizal, Batangas, Bulacan and Laguna.
	Taipei=	the rural part of Taipei County and the rural part of Taoyuan County.

Table 2.
Total Population and Average Annual Rate of Population Increase, Indonesian Metropolitan Cities and their Sub-regions, 1990-1995

City/Zone	Population ('000)		Average Annual Rate of Increase (%)
	1990	1995	
(1)	(2)	(3)	(4)
1. Jakarta			
a. Core	8,223	9,113	2.08
b. Inner Zone	5,434	7,276	6.01
c. Outer Zone	3,442	3,771	1.84
Total	**17,098**	**20,160**	**3.35**
2. Bandung			
a. Core	2,057	2,356	2.75
b. Inner Zone	2,322	2,683	2.93
c. Outer Zone	2,423	2,778	2.77
Total	**6,802**	**7,817**	**2.82**
3. Semarang			
a. Core	1,249	1,346	1.51
b. Inner Zone	1,292	1,667	5.23
c. Outer Zone	1,251	1,337	1.35
Total	**3,792**	**4,351**	**2.79**
4. Surabaya			
a. Core	2,473	2,695	1.73
b. Inner Zone	2,490	2,816	2.50
c. Outer Zone	1,698	1,775	0.89
Total	**6,661**	**7,286**	**1.81**
5. Makassar			
a. Core	944	1,086	2.84
b. Inner Zone	452	535	3.44
c. Outer Zone	279	345	4.29
Total	**1,676**	**1,966**	**3.25**
6. Medan			
a. Core	1,730	1,902	1.91
b. Inner Zone	1,296	1,691	5.46
c. Outer Zone	845	868	0.54
Total	**3,871**	**4,461**	**2.88**

Note: Inner and outer zones for Jakarta were defined differently from those in Table 1

Table 3. Characteristics of the megacity cores

City	Area (sq. km.)	Population (mill.)	Density (per sq. km.)
Jakarta	661	9,113	13,787
Bangkok	1,565	5,876	3,754
Manila	636	7,948	12,497
Taipei	272	2,761	10,157
Surabaya	326	2,695	8,256
Bandung	167	2,356	14,136
Semarang	374	1,346	3,604
Medan	265	1,902	7,177
Makassar	176	1,086	6,179

Note: Populations of the Indonesian cities are for 1995; all others for 1990.

Differences in the compactness of the urban cores have implications for the comparability of the inner and outer zones as well. Given the comparative 'overboundedness' of their urban cores, it is not surprising that the inner zones of Bangkok and Semarang also display a lower population density and larger share of agriculture in their employment structure than do the inner zones of other cities of comparable size.

Demographic change in South-East Asian megacities

For each of the zones in each extended metropolitan region, population trends, migration patterns, population composition (especially educational attainment), employment trends and (in the Indonesian cities) housing characteristics were studied. Comparisons were made between cities and between zones within each city region. Time trends were studied in all cases.

Demographic characteristics and trends in these megacities were the heart of the study. The following important points can be stressed:

1. The population of these cities roughly doubles when we add the zones to the metropolitan core; in the cases of Taipei, Bandung, Semarang, and Surabaya there is much more than a doubling.

2. The considerable variation in population density in the cores largely results from wide differences in the land area included in the core. Bangkok has two and a half times the area of DKI Jakarta or Metro Manila, hence its population is less dense. Semarang's core is much less densely populated than those of Jakarta or Bandung. But differences in the morphology of these cities also affect their density. Bangkok has few of the crowded urban slums so prevalent in Manila, for example.

3. In the Indonesian urban agglomerations, natural increase accounted for more of the population growth over the 1990-95 period than net migration. But the role of migration differed greatly between zones. The inner zones are where the action is – migrants come there from both the core and elsewhere in the country; net migration in many cases contributes as much as two thirds of the population growth in these zones, whereas in the city cores, net migration contributes little to growth. The age structure of migrants to the inner zones reflects the more prevalent 'family' migration, whereas migration to the core is frequently dominated by single young people.

Megacity growth – has it been slowing?

It is frequently argued that the growth of megacities is slowing, partly because of the slowing of overall population growth, and partly because as cities become very large, the rate of net in-migration tends to decline. However, we should be cautious about this claim. The pool of population remaining in rural and regional areas (including urban population in the regions) is still large enough to generate high rates of net in-migration, and of megacity growth, if the factors inducing regional dwellers to move to the megacities are favourable.

What actually happened to megacity populations over the 1980s varied widely between cities. Two factors which tend to lead to an understatement of the growth of megacity populations complicate any assessment. The first is that the spread of urban

activities disregards existing urban boundaries. As already noted, growth of many megacities has spread well beyond the metropolitan boundaries normally used to define these cities. The population growth rate in areas outside the metropolitan boundaries is frequently much higher than that inside the boundaries. When these megacities were smaller, their core areas frequently had relatively slow growth, and their outer areas faster growth, but at that time both core and outer areas were contained within the metropolitan boundaries. Hence the growth of the metropolitan population took account of both the slower core growth and the faster peripheral growth. But with the further expansion of these cities, the peripheral areas with faster population growth are in many cases located almost entirely outside the metropolitan boundaries. Therefore the growth of the metropolitan population may be quite slow, but it would be a grave mistake to interpret this to mean that megacity growth is slowing. Such an interpretation should only be made when the growth rates of the extended metropolitan region as a whole have been carefully studied, and found to be declining.

The second factor making for an erroneous conclusion that megacity growth is slowing is the tendency for censuses to undercount most seriously in megacities, and perhaps for this tendency to increase in recent years as the size of cities increases and their populations become increasingly mobile. Crowded cities with mobile populations provide the strongest challenge to census takers, and undercounts have been suspected in many of these cities over a long period – cities as widely divergent as Bangkok and New York. In the recent round of censuses, a large undercount is suspected in both Jakarta and Karachi.

The evidence, as shown in Tables 1 and 2, is that indeed the growth of the core has been slower than that of the zones, so that the growth of the extended metropolitan region as a whole has been faster than that of the metropolitan core. To be more precise, however, in most cases it is only the inner zone whose population growth rate has exceeded that of the core, usually by a wide margin. Population growth in the outer zone has in most cases been slower than that in the core.

Social and economic change in the megacities

In the inner zone, educational levels of the population tended to be rising rapidly because of both rising levels of school attendance over time and a tendency for migrants to this zone, especially those moving out from the city core, to be much better-educated than the longer-term resident population. This is particularly marked in the case of Jakarta, where the educational attainment of the original population of the inner zone was very low. One factor in the Jakarta case was that migrants were disproportionately young, and young people generally have higher educational attainment; but also for any given age group, the educational level of migrants was higher than that of non-migrants. Thus over the course of the 1980s, the proportion of the employed people of Jakarta's inner zone who had at least completed lower secondary education increased from 17 per cent to 49 per cent (Jones and Mamas, 1996, Table 7).

The inner zone was in a process of rapid economic transformation, reflected by a sharp decline in the proportion of employment in agriculture, and offsetting increases in the share of industry, trade and services. There was considerable inter-city variation, both in the original share of agriculture and in the sectors showing the greatest increase. In Bangkok, both because the boundaries of the inner zone are more far-flung than in the other cities, and also because of a very inclusive definition of agricultural employment, agriculture constituted a larger proportion of employment in the zones than in the other cities. Nevertheless, the share of agriculture in employment in its inner zone did decline from 45 per cent to 27 per cent between 1980 and 1990. In Taipei, where the inner zone shared the characteristics of the core more than in the other cities, and where the economy has entered a 'post-industrial' phase, the share of manufacturing actually declined. So did the share of services. Trade and finance were the two sectors showing the greatest increase.

An index of dissimilarity comparing the one-digit industrial structure in 1980 and 1990 shows the greatest change in Jakarta and Bangkok was in the inner zone, but in Taipei it was in the outer zone.

Not surprisingly, there is an occupational gradation from the core to the inner and then to the outer ring, with the share of agriculture increasing and the share of professional, managerial and sales and service workers falling. More interestingly, in Bangkok, Manila and Taipei the employment structure of the inner zone resembled that of the outer zone more than it resembled that of the core, but in Jakarta the inner zone resembled the core more than it did the outer zone. This suggests a more thoroughgoing transformation of the employment structure of the inner zone in the case of Jakarta. In Jakarta, too, there was a narrowing of differences in occupational structures between the three zones between 1980 and 1990.

There are important differences in occupational structure by sex, age and migration status in the different zones, but space does not permit an analysis of these differences here.

One weakness of the employment measure, of course, is that it reflects employment of the population resident in the inner zone, but we do not know the location of these jobs. Many of them may well have been in the city core.

Hints of recent trends

Although detailed analysis will have to wait on a study planned to utilize the results of the 2000 round of population censuses, preliminary findings from Jakarta and Bangkok suggest that the 1990s witnessed some important modification of earlier trends. The official metropolitan population of these cities has slowed distinctly – indeed, in the case of Jakarta, an actual *decline* in population was recorded between 1995 and 2000. But the regions immediately surrounding the metropolitan areas have continued to grow quite rapidly. To complicate the picture, however, the trends for Manila over the same period have been very different.

Table 4 gives some indications of recent trends in these three cities. Populations in the metropolitan areas of both Bangkok and Jakarta grew very slowly over the 1990s,[2]

[2] It is unlikely that this growth rate was constant over the whole decade. It is likely that the growth rate in both cases was slowing towards the end of the decade, both because of falling rates of natural increase and a lessened attraction of the big city to migrants since the economic crisis began in 1997.

representing a sharp deceleration of their growth over the 1980s, and this slow growth was characteristic also of the other largest cities of Indonesia. Does this slowing of growth represent a key turning point in the history of these major megacities?

Table 4. Growth of population in the extended metropolitan regions of Bangkok, Jakarta and Manila, 1990-2000.

	1990 ('000)	2000 ('000)	Average Annual Increase (%)
Bangkok	5,882	6,320	0.72
Rest of BMR	2,707	3,760	3.3
BMR	8,590	10,080	1.6
THAILAND	54,549	60,607	1.05
Jakarta	8,259	8,385	0.16
Botabek	8,876	12,749	3.7
Jabotabek	17,135	21,134	2.1
INDONESIA	179,379	202,000	1.2
Metro Manila	7,945	10,491	2.9
Manila outer zone	6,481	9,458	3.9
Manila EMR	14,426	19,949	3.3
PHILIPPINES	60,703	72,345	1.8

Note BMR: Bangkok Metropolitan Region; Jabotabek is the Jakarta extended region

The answer is not clear, for a number of reasons. First, there is controversy about the extent of under-enumeration in these large cities in the year 2000. Under-enumeration may have been worse in 2000 than in 1990. But before concluding that this was the case, it is necessary to be aware that fertility rates have sunk very low in these large cities, thus reducing rates of natural increase of the population. And movement of people from the city to suburban areas outside the metropolitan area is certainly taking place. The data in Table 1 show that the zone surrounding the metropolitan area maintained considerable population growth over the inter-censal period. When the growth rate for the entire extended metropolitan region is computed, the growth rate of population in the mega-urban region of both Jakarta and Bangkok turns out to have exceeded that of the nation's total population, and probably of the total urban population.

Evidence for Indonesia based on comparison of the 2000 census results with the 1995 Inter-Censal Survey certainly indicates that this was the case for Indonesian cities.

In the case of Manila, fertility rates are higher, no doubt leading both to more rapid natural increase in the city and to more migration from still rapidly-growing rural and regional populations. Within Metro Manila, population growth rates in the 1990-2000 period were very slow in some older, inner areas, and much more rapid in areas further from the centre. The overall growth of the extended Manila region appears to have been very rapid indeed.

Conclusions

Rates of growth of Asian megacities are matters of debate, because of the uncertainty about the appropriate boundaries to use, and because of the tendency to under-enumerate their population in censuses. But these rates of growth are not unmanageable, partly because fertility rates have fallen to low levels, and partly because the rates of in-migration are lower than were frequently projected. These megacities resemble living organisms, with population steady or even declining in inner areas, growing rapidly on the fringes, and age structures changing in all areas. The economic structure of the zone lying outside the municipal boundaries is changing dramatically, as is the educational level of its population.

Realistic appraisal of the planning needs of South-East Asia's megacities requires integrated research into the broader metropolitan region surrounding the metropolis proper. In the past, such research has been hindered by the lack of detailed data on the zones surrounding the city. It is important for census and survey data to be made available for zones identified as relevant for planning purposes, even though they do not tally with major administrative boundaries. Such data need to be linked with other sources of data such as Industrial Census data and data on traffic flows to obtain a picture of metropolitan growth that is relevant for planning purposes. The increasing sophistication of Geographic Information Systems (GIS) should enable more use to be made of them for purposes of analysis of mega-urban regions in future.

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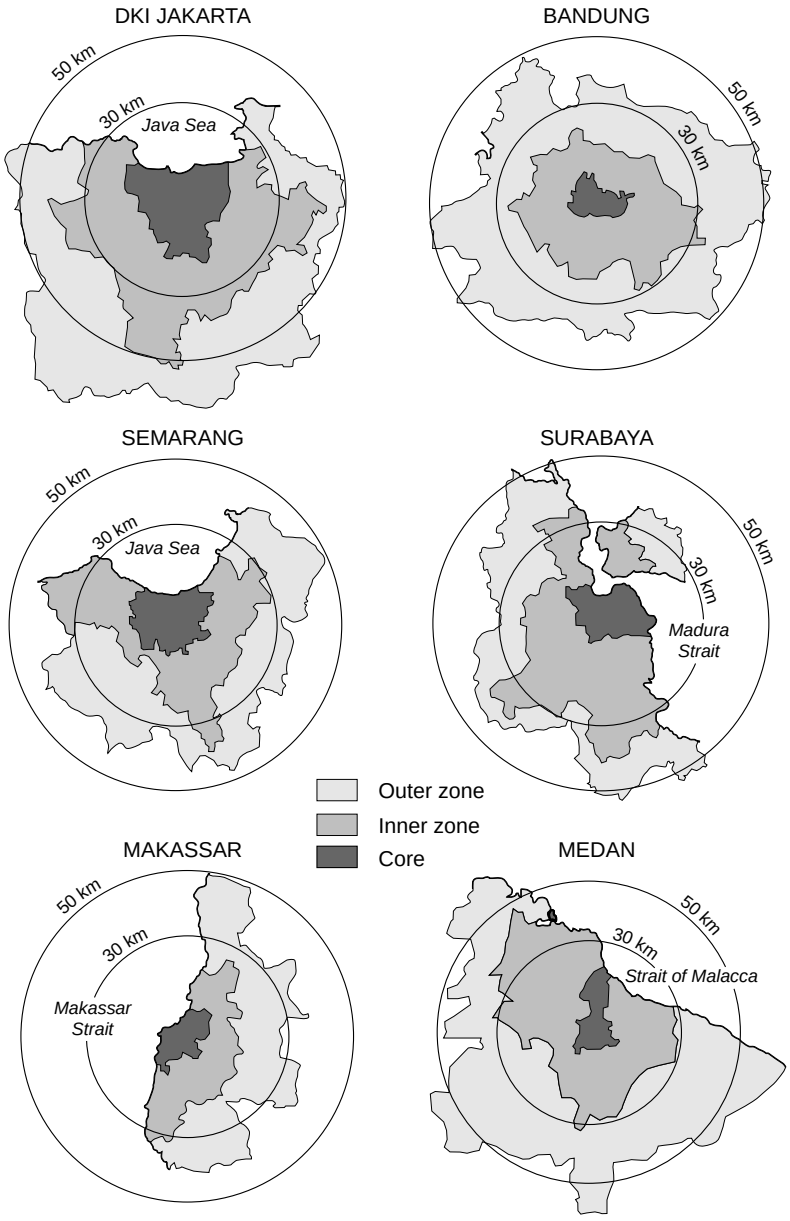
Map 2: Zones for six Indonesian Metropolitan Regions.



The ultimate spectre: breakdown of the megacities

There is a recurring nightmare shared by many of us, even if we fail to articulate it. This is the total breakdown of order in the megacity. A metropolitan region with a population as large as that of the total population of Australia requires sophisticated systems of accessing and distributing foodstuffs and other necessities. Such megacities are totally dependent on supplies imported from other parts of the country and abroad. They are also subject to an implicit threat of breakdown of law and order. Their populations are so large that, given certain conditions, unrest and mass violence can overwhelm the capacity of police and army to maintain control.

The results of cutting off food supplies were evident in St. Petersberg (then Leningrad) during the long siege by the German army in World War 2. More than half a million deaths resulted, mainly from scurvy and starvation, but basic law and order were maintained. More recently, we have seen the emptying of the (relatively small) city of Phnom Penh by the Khmer Rouge, and massive deaths resulting, partly because city dwellers were expected quite unrealistically to produce their own food supplies in the countryside. We have seen anarchy over periods in some African cities such as Mogadishu. There was a near-breakdown of law and order in Karachi during the mid-1990s, with average daily murders exceeding 3 in 1994 and 6 in 1995 (Karim, no date). And we have seen Jakarta on the brink of total lawlessness for two terrifying days in May 1998, when an orgy of looting, arson, murder and rape took place, with the connivance of elements of the armed forces (Tim Relawan Untuk Kemanusiaan, 1998). Even this year, a daily average of at least one person caught in petty crime has been beaten to death and often set on fire by mobs in and around Jakarta, sometimes watched by police who were apparently too terrified to intervene. Such events engender a widespread fear in the population.

However, it is easy to exaggerate the negatives here. In Jakarta, for example, most people are going about their daily business without being much affected by either violence or the fear of violence. They may be careful to avoid travelling by public transport at night, and to wind up car windows while waiting for traffic lights to change at key intersections. Women are cautious about catching taxis alone. Wearing of jewellery is avoided. And while Jakarta is clearly the worst case of insecurity in the Southeast Asian megacities, in Bangkok and Manila the population is seeing some improvement of the former traffic gridlock as a result of completion of overhead rail systems.

Conclusions

Southeast Asian megacities are not yet global cities, but some of them may become so. Their rates of growth are matters of debate, because of the uncertainty about the appropriate boundaries to use, and because of the tendency to under-enumerate their population in censuses. But these rates of growth are not unmanageable, partly because fertility rates have fallen to low levels, and partly because the rates of in-migration are lower than were frequently projected. These megacities resemble living organisms, with population steady or even declining in inner areas, growing rapidly on the fringes, and age structures changing in all areas. The economic structure of the zone lying outside the municipal boundaries is changing dramatically, as is the educational level of its population.

These cities pose immense, but not insuperable, planning issues. Perhaps the greatest challenge of all is to achieve greater transparency in planning, and to involve civil society in planning and management, in ways that overcome the usual NIMBY (not-in-my-back-yard) syndrome.

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