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Hong Kong as a Complex Adaptive System

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Executive summary

In this article the post-War economic development of Hong Kong is considered from a complexity theory perspective. It is argued that over the last fifty years Hong Kong has displayed many of the signature qualities of a complex adaptive system in its transformation from dusty entrepot port to the second-wealthiest Asian economy. Insights from the science of complexity are used to shed light on a range of empirical phenomena including the rise of billionaire Li Ka-shing (and in particular his takeover of Hutchison-Whampoa in 1979), and the near-mutiny which followed Governor MacLehose's founding of the Independent Commission Against Corruption in 1974. In contrast with the orthodox laissez faire account of Hong Kong's ascendancy, a complexity-based explanation can be used to account for the presence of endogenously-induced systemic disruptions (such as the Star Ferry riots of 1966) and does not discount the role of external intervention in those areas of the economy prone to escalating feedback (such as currency markets).

Introduction

The recent crisis of confidence in several Asian economies has given pause to the long and drawn-out debate surrounding the causes of their - erstwhile - rapid growth.ⁱ Now as Asia-watchers wait with baited breath to see if this unexpected slowdown in growth is cyclical or structural - presumably with the intent of interpreting either outcome as unequivocal support for whichever East Asian model they hold most dear - it seems an appropriate moment to introduce a fresh perspective into the dialogue. In this paper the economic ascendancy of just one Asian economy, Hong Kong, will be considered in light of some recent theoretical developments that have been made in the area of complexity theory. Briefly, it will be shown that the inherent simplicity of Hong Kong's renowned laissez faire system has given rise to an economy characterised by inordinate complexity and a number of emergent properties that are not captured in the traditional view of markets. While the insights of neo-classical economics are useful for explaining the workings of competitive markets, much of the economic activity in Hong Kong is characterised by increasing returns to scale, being a kind of positive feedback. The high degree of laissez faire that has historically been practiced in Hong Kong has given rise to the situation where feedback effects are able to cycle faster and more freely through the economy than elsewhere and such effects, when combined with the reactions of local entrepreneurs, give rise to a number of emergent properties uniquely characteristic of a complex adaptive system (CAS).

Before the "signature qualities" of a CAS are described, a brief overview of the various explanations for Hong Kong's rise is warranted. In the period following the end of the Pacific War, Hong Kong's economy evolved from a dusty entrepot port playing a distant second fiddle to rival Shanghai to become one of the world's leading service economies. In the early 1990s Hong Kong's per capita GDP surpassed that of her Colonial parent Britain and at the time of the handover Hong Kong was the fourth largest trading economy in the world.ⁱⁱ

Extant explanations

On the one hand it may seem odd that there is any debate about the reasons why Hong Kong succeeded. Of all the Asian economies, Hong Kong is, at first glance, an open-and-shut case. While Japan-watchers debate the pros and cons of MITI's hand in the market, and Taiwan-experts argue over a role for the ruling KMT, few people doubt the historical influence that unbridled capitalism has had in shaping Hong Kong's post-War economic development.

To quote the now-famous words of Nobel laureate Milton Friedman, who visited the Colony in the late-1970s, “if you want to see capitalism work, go to Hong Kong.”

According to the Washington DC-based Heritage Foundation, Hong Kong is the most liberal economy in the world.ⁱⁱⁱ Economic liberalism in this case denotes a free port combined with a lack of industrial planning and minimal organisation of the labour-force. This state of affairs is not so much attributable to Hong Kong’s past governors as it is to a succession of Financial Secretaries that included Arthur Grenfell Clarke, Sir Philip Haddon-Cave, and, most notably, Sir John Cowperthwaite. These gentlemen presided over Hong Kong’s economy for a combined period of three decades beginning in the early 1950s. In an age where a good proportion of the world was shifting to planned economics, these men resisted calls to intervene in the market preaching instead a doctrine of “positive non-interventionism”. For example, when challenged in the Legislative Council in 1968, Sir John replied:

One of the things that most surprises me about my honourable Friend’s remarks is that he characterizes his proposal for state intervention in, and control of, industry as “innovation and a spirit of adventure” and condemns free enterprise as “prosaic precedent”. This is a strange paradox. I would put it precisely the other way around. What he advocates is based on the “prosaic precedent” of many of our rivals who have to resort to wooing industry with artificial aids and have had remarkably little success at it. Recent events have shown that enterprising spirits still prefer our economic freedom to the restrictive swaddling clothes offered elsewhere. Possibly I am a romantic in this but I, for one, do not believe that our spirit of adventure is in need of artificial stimulation - nor do I believe that we can afford the wasteful application of our scarce resources which they would entail - we are neither desperate enough, nor rich enough, for such expedients to make economic sense.^{iv}

But *laissez faire*, on its own, merely describes a certain kind of administrative environment in which economic growth may take place. Thus many commentators have singled out specific stimulants supposedly responsible for the “Hong Kong miracle”. Some have attributed a key role to export-led growth during the 1960s, while others have focused on the internal development of the economy itself.^v Still others saw political and cultural factors as being influential while even a few have considered the case from a Marxist-perspective.^{vi} Upon closer examination, however, it seems that Hong Kong’s rise was the result of a cocktail of ingredients including:

1. locational advantages, chiefly, a deep-water harbor situated on major shipping routes,
2. a largely migrant population who arrived ready to work hard and for low wages,
3. initial capital injection provided by migrants, overseas Chinese and foreign multinationals and subsequently enhanced through high levels of public and private savings,
4. a local milieu of entrepreneurial opportunism, and
5. a *laissez faire* colonial administration which provided the infrastructure and a stable regulatory framework designed to protect private property and ensure the enforcement of contracts.^{vii}

While it is unlikely that Hong Kong ever would have grown so rapidly if any of these underlying conditions had not been met, it is the potent combination of entrepreneurial talent and capital that was - just as Adam Smith predicted - the creative force behind the emerging economy. But what Smith and the other classical economists could not foresee was the end product of that development. Indeed, with a neoclassical understanding of markets, there is fundamentally no way of explaining the dynamic path of Hong Kong’s rise. This is because of the inherent difficulty with which the neoclassical model treats those industries characterised by increasing, rather than diminishing, returns to scale. Such industries challenge the neoclassical axiom that there exists some predictable equilibrium point at which prices and market-shares stabilize.^{viii}

The neo-classical perspective is best-expressed in that Marshallian ideal of competitive markets where firms are price-takers adjusting their production in accordance with variations in demand. A number of industries in Hong Kong approximate this competitive-market model including textiles, garments, watches, toys, and plastics. However, other local industries are characterised by scale economies and thus, by definition, are only able to support a handful of larger firms. In Hong Kong these industries have traditionally included property development, banking, telecommunications, power-supply, and aviation.

In effect, Hong Kong has bifurcated into two separate but inter-related economies, one characterised by innumerable Chinese family businesses competing largely on the basis of price, and the other characterised by the presence of fewer, larger firms benefiting from economies of scale and scope. Moreover, the boundary between these two economies is often in a state of flux reflecting shifts in bargaining power, technological advances, the rise and fall of entry and exit barriers, and external shocks. For example, the outbreak of the Korean War and the UN embargo which followed severely culled the number of firms in the emerging plastics industry in the mid-1950s. Within the space of five years the number of plastics manufacturers dwindled from 28 to 10 before rebounding to 300. During this period the Kader Industrial Company, with its private stocks of restricted cellulose

acetate and polystyrene (purchased just prior to the embargo), emerged from the pack to become the largest plastics company in East Asia and accounting for as much as four-fifths of all Hong Kong production.^{ix}

The point of departure for this paper lies with the inherent inability of the neoclassical model to portray, in any but the crudest sense, the empirical phenomenon that is Hong Kong. While laissez faire capitalism may be the basis for Hong Kong's rapid growth, the neoclassical explanation is inherently partial by virtue of its inability to account for the emergent properties of the economy which stem from the system's internal feedback mechanisms. The aim of this paper, therefore, is not to provide an alternative explanation for Hong Kong's growth but to show how the creative potential of the capitalist motive, when combined with a free market, can give rise to some of the signature qualities of a complex adaptive system (CAS).

Signature qualities of complex adaptive systems

Complexity-based research is appropriate when the phenomenon of interest is a complex system consisting of a large n of interacting agents who adapt their individual actions in response to those events which occur in the natural process of interaction with others.^x In the ordinary course of economic life, agents (e.g., firms and entrepreneurs) cooperate and compete leading to emergent structures (e.g., new industries and product-markets) and behaviours (e.g., new ways of conducting business). Thus it can be said that complex systems are adaptive or self-organising in the sense that as agents learn about their environment - which is composed of other agents - through feedback, they embed that learning by reorganizing the very system in which they co-habit.^{xi}

Complexity theory may be contrasted with its predecessor chaos theory. In general, chaoticists are quick to see the potential for deterministic chaos in any complex system and consequently tend to discount the value of long range forecasting.^{xii} In contrast, complexity theorists recognize that chaotic disruptions, such as a technological break-through or a stock-market crash, are typically followed by periods of relative stability. Complex systems are thus said to exist at "the edge of chaos" and, unlike truly chaotic or highly-ordered systems, are characterised by a cornucopia of diversity, opportunity and novelty.^{xiii}

All economies are complex systems. However, as the process of systemic adaptation is influenced by the speed and clarity of the feedback to which agents are exposed, it is the central premise of this paper that a free-market economy, such as Hong Kong, will tend to display more of the hallmark qualities of a CAS than a more ordered and planned economy. The essential differences between the traditional view of economics and the emerging insights from the science of complexity are listed in Table 1. For the purposes of the following discussion, three signature qualities of economies as complex adaptive systems will be emphasised:

1. economic activity is embedded in a historical, social and political context,
2. environmental disruptions conform to the pattern described by a punctuated equilibrium, and
3. as the economy becomes increasingly complex it passes through a series of phase changes.

Each of these signature qualities will be illustrated with reference to the post-War economic development of Hong Kong.

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Embedded economic activity

All complex systems are path-dependent because of the nature of their inherent feedback mechanisms. Dissipative systems release resources into their environment to disperse the disruptive effects of incoming inputs. This type of negative feedback, which is intended to maintain the stability of the system, ensures that the system's dynamic path or trajectory will be irreversible.^{xiv} Similarly, positive or reinforcing feedback, such as the presence of increasing returns to scale in an industry, will allocate a decisive role to the insignificant or chance events of history in shaping economic outcomes.^{xv} Increasing returns refutes the idea that an economy moves toward some point of equilibrium and recognises that economic choices, once made, can become 'locked-in' regardless of the advantages of alternatives.^{xvi} Under these conditions success breeds success and those that get ahead tend to stay ahead.

History and geography

Perhaps the most visible example of increasing returns in any economy is found in the context of industrial geography. As many researchers have found, the evolution of an industry-cluster is characterised by a sensitive dependence on the initial conditions. In essence, the concentration of industrial activity tends to be based on the interaction of chance and necessity. "If some location by good fortune attracts more firms than the others in the early stages of this evolution, the probability that it will attract more firms increases".^{xvii}

The urban development of Hong Kong reflects this self-reinforcing process. In particular, the central business district continues to be the focal point around which much of the harbor's business was conducted over 150 years ago. Although the size of the already congested Colony increased tenfold in 1898 with the lease of the New Territories, most of the population remained within Kowloon and Victoria. As noted in the Government's Annual Review of 1957, "the moulds already set for the two cities made it inevitable that, in subsequent years, all major developments, in commerce, administration and industry, would converge on them".^{xviii} For the first half of the lease the New Territories remained much as they always had - a collection of agricultural communities serviced by a handful of small market towns. The pattern set by history was only broken by the enormous pressure created by the influx of migrants who arrived in the Colony after the end of the War in the Pacific and the Civil War in China.

Good and bad migrants

The Hong Kong industrial machine was built during the 1950s with the sweat and toil of the growing migrant population. The birth-pains of the Communist regime in the PRC caused many Chinese to flee to safer havens. But even here history and chance were to play a decisive role, for the migrants who came to Hong Kong were, for the most part, either workers from Guangdong or industrialists from Shanghai. Both groups assimilated well into the Colony; the former because they were from the same province as those already living here and the latter because Hong Kong, unlike Shanghai in 1949, was the ideal home for their capitalist talent. In contrast, and as Hong Kong's first economic historian noted:

The newcomers to Taiwan, who came from various provinces of China, had difficulty in merging with the predominantly Fukienese indigenous population, speaking a different dialect and thinking in different political terms. The refugees who went to Taiwan were mainly politicians, soldiers, and bureaucrats of the Kuomintang regime. It was a group ready to rule or fight but not to work. Refugees in Hong Kong were determined to survive through toil.^{xix}

History and transportation

In discussing how historical accidents have shaped modern Hong Kong, one final feature is worth mentioning - the ubiquitous minibus. While most tourists never sit inside one, the 4,000-plus green- and red-roofed public light buses are an indispensable part of the local transportation infrastructure carrying 1.7 million passengers per day in 1995.^{xx} The modern minibus owes its existence to the communist riots of 1967. The riots disrupted regular bus services and stimulated opportunist bus operators into business. These illegal services were studied by the government in the following two years and were found to provide “an important, viable, and relatively safe service to the public”.^{xxi} Consequently, in September 1969 the Government created two new categories of licensed vehicles for public and private light buses. Although restricted to carrying a maximum of 14 passengers, license-holders were otherwise free to set their own routes and fares as the market determined. Within four years of the riots there were 3,800 minibuses carrying over one million passengers daily.

The political and social context of economic activity

In addition to a sensitive dependence on historical events, economic outcomes are also embedded in a social, institutional, and political context. While this can be taken as self-evident, the point is worth making because complexity theory, unlike neo-classical economic theory, does not divorce economic man from his context. Indeed, the interaction of agents with each others is seen as a fundamental determinant of system adaptation.

In the history of Hong Kong local captains of industry have long-understood the symbiotic relationship between business and government. In colonial times taipans typically enjoyed positions on UMELCO (Unofficial Members of the Executive and Legislative Councils) where they were well-placed to enact change in their firms’ operating environments and did so often, especially during periods of instability. The “new breed” of Chinese taipans learnt this lesson well and courted favor with British parliamentarians whilst simultaneously developing their *guanxi* in Beijing. In return, savvy networkers like Li Ka-shing were rewarded with positions on the Preparatory Committee from where they were able to endorse pro-business SAR CEO-candidates such as local shipping boss Tung Chee-hwa.

In many countries the government interferes in business. In Hong Kong, it could be argued that the reverse is true. Not only the chief executives but lesser businessmen also cultivate their connections in government in what has been described by one civil servant as the “parallel escalator” phenomenon.

Chinese business people choose a person of similar rank in government with whom they will carefully develop a close friendship. This twinning occurs early: by their mid to late thirties possible “horses” within junior government ranks are carefully eyed and approached. If all goes well, the two individuals’ careers will develop in parallel, eventually giving the businessman access to a high-ranking official and vice versa.^{xxii}

The interaction that takes place between micro-level agents (e.g., businessmen) and macro-level structures (e.g., government) is a defining characteristic of a CAS. To illustrate this phenomenon further, consider the rise to prominence of Hong Kong’s “Mr Cash”, Li Ka-shing. In the 1950s Hong Kong’s fledgling plastics industry was nearly wiped out by the political decision made by the UN to prohibit all trade with the PRC of polystyrene and cellulose acetate. One young plastic flower-maker who survived the embargo was Li Ka-shing, destined to become one of the world’s richest men. Li Ka-shing’s big break came in 1979 when he became the first ethnic Chinese to acquire a controlling stake in one of the old British hong, namely Hutchison-Whampoa. This coup was only made possible through the connections Li enjoyed with the Hongkong and Shanghai Bank which sold him its 22 percent stake in the trading company. The decision to sell “Hutch” was largely influenced by two men, Y.K. Pao and Michael Sandberg. In the first instance, Y.K. Pao, who had become the first Chinese ever to be appointed to the board of “The Bank”, was returning an earlier favor granted to him by Li who had sold Pao a 28 percent stake in the Kowloon Wharf and Godown in 1978 (from which Pao launched a fruitless bid for Jardine Matheson). In the second place, Sandberg, who was then the bank’s CEO, saw Li as being central to the future direction of his business. As Li’s biographer explained:

For while Li’s business prominence in the colony was noteworthy to the Hongkong Bank, it was Li’s special contacts in China that played a prominent role in the bank’s ultimate decision to sell Hutchison Whampoa to the Chaozhou native. By 1979, Sandberg had already sensed a change in the politics of China, especially with Deng Xiaoping’s new economic policies. The emergence of China as an economic force demonstrated to the bank that it needed to acquire allies and associates accessible to Beijing - an avenue to Chinese clients in the People’s Republic of China. There would be no better conduit than Li Ka-shing to supply the contacts and clients.^{xxiii}

While the most important macro-level structures influencing the business performance of local entrepreneurs may be defined in terms of the government and the banking system, in Hong Kong the final arbiters of success are the

markets - the property market and the stock market. By virtue of their connections and spheres of influence, guanxi-rich tycoons are able to move the markets according to their desires. On the odd occasion when the markets turn against them, the loss of invested capital is compensated by drawing on their stocks of “social capital”. For example, in 1984, the year of the Joint Declaration, a real-estate deal between Li Ka-shing’s firm International City Holdings and a well-connected Beijing cadre called Wang Guangying led to a quick \$39m profit for Li when the stock market rewarded what it perceived to be as a sign that the recession was over. However, when Wang later pulled out of the deal the stock market plunged interpreting the move as a loss of confidence in Hong Kong by China. Wang was only able to break out of the contract because Li, not wanting to be seen as taking advantage of a real estate rookie, had provided a secret six-month escape clause. However, in taking the fall for Wang, Li’s own reputation suffered when he was tried for insider trading. To the Insider Dealings Tribunal it appeared that the transaction had only been made to drive up the price of International City Holdings. Although Li was embarrassed by being found to be “involved in culpable insider dealing”, he was rewarded by Beijing (for helping Wang) by being given a “reputation-affirming” appointment to the Basic Law drafting Committee the following year.^{xxiv}

2. Punctuated equilibrium

Another distinguishing feature of any complex system is that the mere process of action and reaction, combined with positive feedback, can cumulatively engender chaotic disruptions which shift the system away from its current “attractor set”. Complex systems are thus said to be characterised by a punctuated equilibrium which describes an inverse relationship between the probability and the magnitude of a disruption. In other words, while systemic disruptions will tend to be small most of the time, periodically a large-scale fluctuation will spontaneously emerge from the normal workings of the system.^{xxv} This also means that interventionist actions can lead to unintended reactions. A good example of this CAS-property occurred in the mid-1970s shortly after Governor MacLehose set up the Independent Commission Against Corruption (ICAC) to combat endemic graft in the Police Force. This solution to the problem proved to be, in the words of one historian, “embarrassingly successful” as “policemen were arrested in veritable droves”.^{xxvi} Things came to a head in October 1977 when disgruntled off-duty police officers stormed the ICAC headquarters and assaulted staff. This unanticipated threat to public order prompted the governor to back down on corruption investigations and declare an amnesty on all but the most serious offences. In this case the deviation-correcting action (establishing the ICAC) led to an unforeseen reaction (the threat of a police mutiny) which was several magnitudes worse than the problem originally being addressed (graft).

Delicately balanced between order and chaos, the Hong Kong system has endured a number of spontaneous disruptions ranging from stock market crashes (1973, 1987) and property market slumps (1982, 1995) to bank runs (1965, 1983) and riots (1956, 1966, 1967). While these crisis-situations are not uncommon to any developing economy, one disruption in particular is notable both for its infamy and for the triviality of its causes.

Star Ferry Riots

In October 1965 the Star Ferry company applied to the government for its first fare increase in nineteen years. During the application process a lone protester began a hunger-strike at the ferry terminal in Central and was soon joined by other young people. Within the space of three days the protest escalated from a sit-in at both ferry terminals to a march to Government House followed by two nights of rioting in Kowloon.^{xxvii} In the aftermath of the riots an inquiry was held to determine the causes of the incident but no evidence was found to suggest the kind of malicious intent that had sparked the Tsuen Wan riots of 1956. While it would have been simple to blame the triads or the outspoken social activist who had complained about the fare increase, the inescapable conclusion was that the social conditions present at the time within the system were largely to blame. During the difficult period of industrialization, when waves of migrants in 1956 and 1962 saw the local population increase by 50 percent in a decade, life in Hong Kong, and particularly, inside the densely-crowded housing settlements, was never far from civil disorder and unrest. It is for this reason that a price rise of just five cents in the first-class fare of the Star Ferry led to the death of one person and injuries to another 26.

When a spontaneous large-scale disruption occurs within an industry or a market, outside intervention is usually required to arrest any developing vicious cycles. For example, a bank run is invariably caused by a loss of confidence in the security of the bank. That lost confidence can usually be restored by a government guarantee of all deposits (such as the Hong Kong government’s rescue of the Sun Hung Kai bank in the early 1980s). Similarly, a speculator-fuelled property boom, with the attendant threat of runaway housing prices, can be treated by enacting laws designed specifically to curb speculation. In Hong Kong the government is renown for its “hands off” approach to business. However, the laissez faire philosophy is occasionally set aside when the government perceives that the stability of the economic system is under threat. For example, in 1982 British Prime Minister Margaret Thatcher’s talks with Deng Xiaoping, and in particular her indelicate reference to the “happy record of contacts between China and Britain in the nineteenth and early twentieth centuries”, had the effect of undermining

business confidence in Hong Kong as evidenced by falls in the property- and stock-markets, and most seriously, a dramatic drop in the value of the Hong Kong dollar. Prior to the opening of handover discussions, the Hong Kong dollar had traded as high as \$5.25 against the US dollar. By September 1983 it had fallen to an all-time low of \$9.55 and, with local banks running out of US dollars to sell, panic began to set in. The Financial Secretary of the day, Sir John Brembridge, immediately responded by pegging the Hong Kong dollar at \$7.80 against the US dollar. The run on local reserves of US dollars was thus arrested and a full-blown financial crisis was averted.

3. Systemic phase changes

The final signature quality of a complex adaptive system concerns the adaptation of the system itself, the change in phase portrait that occurs when “the attractor that is presently defining its steady state motion becomes unstable and the system suddenly switches to a new attractor”.^{xxviii} Phase changes are not analogous to the sudden jolts of a punctuated equilibrium, although they may be initiated by such a jolt. Rather, phase changes are the creative flipside to the destructive properties of spontaneous disruptions in that they are characterised by the emergence of new structures and patterns of behaviour that result when the system’s trajectory crosses some critical threshold level.

In an economy, a phase change is simply a spontaneous re-organization of economic activity. In the post-War period the Hong Kong economy has gone through three such reorganizations each of which occurred automatically and without the direction of any planning agency. For the purposes of analysis the three dominant forms of local economic activity evident over the last half-century may be defined as follows:

1. entrepot port (1945-51)
2. light industry (1951-mid-1980s)
3. services (mid-1980s-)

Entrepot port

For much of World War II the local economy was part war-machine and part black market. When the Japanese Occupation Forces departed in August 1945 they left the economy in ruins. However, within the space of three months private trading recommenced and Hong Kong resumed its former role as an entrepot port.^{xxix} The transition from a war-based economy into an economy based on the thriving re-export trade which had flourished in the Colony for 100 years, should not be surprising as none of the underlying attractor points had changed. As Figure 1 shows, the entrepot trade picked up right from where it had left off.

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INSERT FIGURE 1 ABOUT HERE

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Industrial revolution

However, in 1951 China’s involvement in the Korean War and the concomitant joint UN/US embargo on trade with the PRC, killed off Hong Kong’s entrepot role virtually overnight (Figure 2). What followed was what historian Jan Morris labelled “the most phenomenally rapid of all the world’s industrial revolutions”.^{xxx} During the 1950s industrial production grew by as much as 20 percent annually and by the end of the decade exports of locally-produced goods surpassed the value of re-exports for the first time.^{xxxi} By the 1960s more than 90 percent of Hong Kong’s industrial production was being exported.

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To be accurate, the transition to a manufacturing-based economy had already begun in the late 1940s with the arrival of Shanghainese cotton spinners, yarn dyers, wool-knitters and the like fleeing the Communists up north. Not only did these migrant industrialists bring the necessary expertise needed to kick-start Hong Kong's textiles and garments industries, in some cases they also brought the equipment to do it with as well. But it was the trade embargo which dramatically increased the pace of change and within a short time many local import/export companies had begun their own production of enamelware, torches, lamps, zip fasteners, water heaters, footwear, toothbrushes, mugs, combs, and Disney characters. These low-tech products were to be followed by cameras, LED and LCD watches, toys, handheld electronic games, and, for a time, even wigs. The thirty years spanning 1950 to 1980 was a golden age for Hong Kong as a manufacturing center. During this period the number of manufacturing establishments grew from 1,500 to 46,000 while the number of people employed in the manufacturing sector increased from 90,000 to 900,000 workers.^{xxxii}

Regional service-provider

The third phase change evident in the local economy began to appear a few years after the opening of China in the late 1970s. As labour costs and rents continued to rise in Hong Kong, local factories began to migrate *en masse* into neighbouring Guangdong Province and parts of Southeast Asia leading to a rapid decline in local manufacturing employment (Table 2). Manufacturing's dominant role in the economy was replaced by the provision of all those services necessary to run these factories from a distance (e.g., finance, R&D, technology transfer, insurance, marketing, etc.). By the mid-1990s services accounted for 83 per cent of GDP making Hong Kong the second most highly developed services economy in the world after the United States (Figure 3).^{xxxiii}

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INSERT TABLE 2 and FIGURE 3 ABOUT HERE

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When a system reaches a certain level of complexity, it spontaneously reorganizes itself into a new economic structure. Sometimes the phase change is slow in the making (such as Hong Kong's switch from manufacturing to regional service provider), while other times the change may be hastened by an external shock (such as the UN's prohibition of trade with the PRC, remembering that China has always been very much a part of Hong Kong's economic environment). However, it is important to not lose sight of the fact that the systemic phase change is simply the cumulative effect of many individual agents responding to signals in their environment. The system is said to adapt when agents as a group change their actions as a result of events in the process of interaction.^{xxxiv}

When a system undergoes a phase transition, the rules of the game are changed for all concerned. Those agents who adapt fast enough survive and prosper while those who do not are winnowed out of the population. In 1951 companies who had enjoyed a profitable trade in the import/export business were compelled to source from local manufacturers who have themselves since felt growing pressure to invest in production facilities offshore in low-labour cost locales in order to remain cost-competitive. (One side-effect of this latest phase change has been the reappearance of Hong Kong's former entrepot trade (Figure 4).) Generally Hong Kong firms have adapted well to changes in their environment. Their ability to respond quickly to emerging trends in the market has earned them a reputation based on "hustle" and "footlooseness". Perhaps the strongest argument that can be used to explain the survival of local firms during the turbulent period of economic development is that, just as the digital wizards of Silicon Valley have profited from their ability to be "the first to make sense of the new games looming out of the technological fog"^{xxxv}, so too have Hong Kong's entrepreneurs been among the first to discern and adapt to the new rules of the game emerging from the political fog and uncertainty of their environment.

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A CAS perspective of Hong Kong's rise

Complex adaptive systems are characterised by their natural tendency to self-organise. For example, Hong Kong relies heavily on imports of foodstuffs yet there is no central agency to manage the distribution of food. There is no need for one. But not only do markets spontaneously organise, as Hayek observed, they tend to become more complex in terms of structure and patterns of behaviour. With increased levels of complexity comes greater potential for endogenous instability which in turn is balanced by higher levels of emergent order. Every so often a

phase change takes place which is the autocatalytic response brought about by the inability of the old economic structures to cope with the emerging demands being placed on the system.

It should be clear now that while the free market-capitalist model is a useful basis for understanding how capital reproduces itself in a economy, it cannot be used to explain the emergent properties of an economy. Beyond recognising the efficiencies derived from an ever-increasing division of labour, the model is silent regarding those endogenously-induced phase changes which are evident in every developing society. The absence of some “thing” (i.e., government intervention) cannot explain the emergence of some other thing (e.g., new product-markets and new ways of conducting business). It is easy to conclude that *laissez faire* succeeds in the Hong Kong case because low tax rates induce high levels of saving thus creating the investment capital necessary for economic development. But other Confucian cultures have higher tax rates yet still enjoy high savings and capital growth. To return to the insights of Adam Smith, the reason *laissez faire* works is because it removes those obstacles which would otherwise obscure the signals entrepreneurs receive from the market. In other words, *laissez faire* makes the rules of the game, and hence the requirements for success, clearer to a society’s risk-takers. In any CAS, agent-level adaptation is predicated on timely, reliable feedback from the environment. If Hong Kong succeeds, it is because that feedback mechanism is more efficient than it is in markets where governments play a greater role. A classic illustration of this point is made by Jon Woronoff who compares the “spontaneous import substitution” which took place in Hong Kong with those government-backed initiatives that failed in Korea and Taiwan:

All they did (in Hong Kong), as for everything else, was to allow entrepreneurs to consider their abilities and the existing opportunities and decide on their own whether to go ahead. This often meant that a demand would arise which could not be met immediately and tight supplies of such a product would push the price up. This was the crucial market signal. It attracted imports. It also attracted [local] entrepreneurs who thought they could make the same goods cheaply enough to replace the imports. If they could, then they won. If not, it was their loss and not the state’s.^{xxxvi}

Conclusion

In a universe of entropy the ability of an economy to spontaneously organise is a marvelous thing. Perhaps the chief insight of complexity theory is that this emergent order takes place without any central direction. Economic order in Hong Kong is the result of the process of interaction among agents and not the careful deliberations of the Civil Service.

While complexity theory helps us to understand some of the emergent properties of an economic system, it also provides some guidelines for evaluating the merits of external attempts to intervene in the system. Chief of these are the implications for economic planning. In essence, the efficacy of any planning activity will be undermined by the fact that outcomes in a complex system are both open and unknowable, due to the presence of positive feedback. Thus planning requires, to quote Sir John Cowperthwaite, a certain “degree of omniscience”.^{xxxvii} Perhaps more importantly, the act of planning can interfere with the natural process of self-organisation by obscuring the signals sent to entrepreneurs and capitalists. This observation was the basis for Adam Smith’s call for governments to leave the market alone. But, unlike the neoclassical economists, complexity theory does imply some role for external intervention because it recognises that the structure of the system itself can be manipulated to achieve desired goals. For example, through selective taxes and subsidies governments can shift the odds to favor firms in priority areas. A generous handout from government may help a local firm to overcome the barriers to entry posed by an entrenched foreign rival. While the merits of this kind of market manipulation are currently the subject of much debate^{xxxviii}, a less contentious implication is the insight that complex systems offer the potential for enacting large-scale change via the use of strategically-located lever-points. This is based on the recognition that system structure influences behaviour. For example, the linked exchange rate system established by Sir John Brembridge in 1983 exemplifies a remarkably simple yet highly effective solution to a potentially intractable problem in that the Hong Kong dollar is not pegged by the government at all but floats in a self-regulating manner around the \$7.80. Deviations from this norm are, by design, self-correcting.

Finally, complexity theory explains why Shanghai will have a difficult time supplanting Hong Kong as East Asia’s premier center for international business. Although massive infrastructure investments are being made and various FDI incentives are being offered, many of Hong Kong’s locational advantages are self-reinforcing. Western MNCs, for example, will generally continue to use Hong Kong as a doorway into China simply because that is what they have always done and because Hong Kong has developed a critical mass of sourcing expertise. Having been the preferred port of entry into China for Westerners and Overseas Chinese for two decades, Hong Kong has established a pattern which will not be easily broken.

Table 1: Two views of economics

<i>Traditional view of economics</i>	<i>CAS perspective of economics</i>
<ul style="list-style-type: none"> • economic activity is subject to diminishing returns (negative feedback) which means that prices and market-shares ultimately converge on some predictable, stable equilibrium: under such conditions, no firm can corner the market • the 'invisible hand' clears the market and directs the behaviour of firms within it • large-scale fluctuations can only result from external shocks • free markets spontaneously organise • markets make the best, most efficient, choices 	<ul style="list-style-type: none"> • some economic activity is subject to increasing returns (positive feedback) which means there is no equilibrium point and many outcomes are possible: under such conditions, those that get ahead tend to stay ahead • interactions between micro-level agents and macro-level structures reciprocally cause one another • large-scale fluctuations may be the cumulative result of action and re-action within the system - periodically the economy will spontaneously induce its own disruptions • occasionally markets spontaneously re-organise into new structures and patterns of behaviour • markets sometimes 'lock-in' inferior economic choices even when better alternatives exist

Table 2: Manufacturing employment as a percentage of the labour force

1931	1960	1971	1976	1981	1985	1991	1994
19.2	39.3	47.7	45.3	41.2	35.6	28.2	20.0

source: Census of HK 1931; Census and Statistics Dept., HK Government.

ⁱ For a concise overview of the various explanations for Asia's high-performing economies, see: World Bank, *The East Asian Miracle: Economic Growth and Public Policy* (Oxford: Oxford University Press, 1993); Paul Krugman, "The Myth of Asia's Miracle," *Foreign Affairs* 73, No. 6 (1994): 62-78; Alwyn Young, "Lessons from the East Asian Newly Industrializing Countries: A Contrarian View," *European Economic Review Papers and Proceedings*, May (1994); Jon Woronoff, *Asia's Miracle Economies*, (New York: M.E. Sharpe, 1992).

ⁱⁱ In 1996 Hong Kong was the fourth largest international trading economy behind the European Union, the United States, and Japan (Hong Kong Trade Development Council).

ⁱⁱⁱ Bryan T. Johnson and Thomas P. Sheehy, *Index of Economic Freedom*. (Washington DC: Heritage Foundation, 1996).

^{iv} Quoted in Jon Woronoff, *Hong Kong: Capitalist Paradise*, (Hong Kong: Heinemann Asia, 1980): 33-34.

^v See for example: Shou-eng Koo, "The Role of Export Expansion in Hong Kong's Economic Growth," *Asian Survey*, (June, 1968): 499-515; S.C. Tsiang and Rong-I Wu, "Foreign Trade and Investment as Boosters for Take-off: The Experiences of Four Asian Newly Industrializing Countries," in W. Galenson (ed.), *Foreign Trade and Investment: Economic Growth in the Newly Industrializing Asian Countries*, (Madison: University of Wisconsin Press, 1985); Tien-tung Hsueh and Kam-kun Chow, "A Dynamic Macroeconomic Model of the Hong Kong Economy," *Hong Kong Economic Papers*, No.14, (1981): 14-36.

^{vi} See for example: Edward K.Y. Chen, "An Investigation into the Change in Development Stage of Asia's Four Little Dragons," *Hong Kong Economic Journal Monthly*, No. 132 (March, 1988): 19-24; John Browett, , "The Newly Industrializing Countries and Radical Theories of Development," *World Development* 13, No. 7 (1985): 789-803.

^{vii} For a fuller exposition of these initial conditions see: E.F. Szczepanik, *The Economic Growth of Hong Kong*, (London 1958); and Woronoff (1980).

^{viii} A significant body of literature has developed since the 1970s exploring the implications of increasing returns to scale. For a comprehensive overview of this literature, see; Wilfred Ethier, "Internationally Decreasing Costs and World Trade," *Journal of International Economics* 9 (1979): 1-24; Nicholas Kaldor, "The Role of Increasing Returns, Technical Progress and Cumulative Causation in the Theory of International Trade and Economic Growth," *Economique Applique* 34, No.4 (1981): 593-617; Paul M. Romer, "Increasing Returns and Long-Run Growth," *Journal of Political Economy* 94, No.5 (1986): 1002-1037; W. Brian Arthur, "Competing Technologies, Increasing Returns, and Lock-In by Historical Events," *Economic Journal* 99, March 1989): 116-131.

^{ix} Chan, Anthony B. (1996), *Li Ka-shing: Hong Kong's Elusive Billionaire*, Oxford University Press, Hong Kong.

^x Vriend, N. J. (1994), Self-organised markets in a decentralised economy, working paper no. 94-03-013, Santa Fe Institute; Waldrop, M. Mitchell (1992) *Complexity: The Emerging Science at the Edge of Chaos*, Penguin, London

^{xi} A good introduction to adaptation in complex systems is provided by David H. Freedman, "Is Management Still A Science?" *Harvard Business Review*, (November-December 1992): 26-38; and Stephan Phelan, "From Chaos to Complexity in Strategic Planning", paper presented at the 55th Annual Meeting of the Academy of Management, Vancouver BC, (August 1995): 6-9.

^{xii} Phelan (1995); David Levy, "Chaos Theory and Strategy: Theory, Application, and Managerial Implications," *Strategic Management Journal*, 15, (1994): 167-178; Ralph Stacey, *The Chaos Frontier*, (Oxford: Butterworth-Heinemann 1991).

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- ^{xiii} John Holland, *Hidden Order: How Adaptation Builds Complexity*, (Reading, MA: Addison-Wesley 1995); John Horgan “From Complexity to Perplexity,” *Scientific American*, (June 1995): 104-109.
- ^{xiv} Michael J. Radzicki, “Institutional Dynamics, Deterministic Chaos, and Self-Organizing Systems,” *Journal of Economic Issues* 24, No.1 (1990): 57-102.
- ^{xv} Paul Krugman, “Increasing Returns and the Theory of International Trade, in Truman F. Bewley (ed.), *Advances in Economic Theory: Fifth World Congress*, (Cambridge: Cambridge University Press: 1987): 301-328.
- ^{xvi} W. Brian Arthur, “Positive Feedbacks in the Economy,” *Scientific American*, (February 1990): 93-99.
- ^{xvii} Arthur (1990): 83.
- ^{xviii} *Annual Review*, (Hong Kong: HK Government Information Service 1957): 5.
- ^{xix} Szczepanik (1958): 5.
- ^{xx} *Hong Kong Annual*, (Hong Kong: HK Government Information Service 1996).
- ^{xxi} *Annual Review*, (Hong Kong: HK Government Information Service 1971): 13.
- ^{xxii} Felix Patrikeeff, *Mouldering Pearl: Hong Kong at the Crossroads*, (London: George Philip 1989): 88-89.
- ^{xxiii} Chan (1996): 85-86.
- ^{xxiv} Chan notes that, at the time, insider trading was not a crime but merely a source of “acute embarrassment” (1996, p. 112).
- ^{xxv} Per Bak and Kan Chen, “Self-Organized Criticality,” *Scientific American* 264 (January, 1991):26-33. It is for this reason that some have suggested that complexity research can be fruitfully applied to a range of phenomena including the international arms race (G. Mayer-Kress and S. Grossman, “Chaos in the International Arms Race,” *Nature* 337, (1989): 701-704), the extinction of a species (Michael Crichton, *The Lost World*, (London: Century Books 1995)), and the demise of political regimes (T. Kuran, “Sparks and Prairie Fires: A Theory of Unanticipated Political Revolution,” *Public Choice* 61, (1989): 41-74.) and business organisations (R.I. Hall, “A System Pathology of an Organization: The Rise and Fall of the Old Saturday Evening Post,” *Administrative Science Quarterly* 21, (1976): 185-211.).
- ^{xxvi} Frank Welsh, *A History of Hong Kong*, (London: Harper-Collins 1993): 492.
- ^{xxvii} Patrikeeff (1989).
- ^{xxviii} Radzicki (1990, 67).
- ^{xxix} The Japanese surrender was announced on 14 August 1995 but it took Admiral Sir Cecil Harcourt two weeks to sail to Hong Kong where he assumed the role of Commander-in-Chief of the interim military administration. It is telling to note that while private trading recommenced on 23 November and the first ocean-going freighter entered Victoria Harbor in mid-December (i.e., within four months of the Japanese withdrawal), the civil administration under Governor Sir Mark Young was not restored until May the following year.
- ^{xxx} Jan Morris, *Hong Kong: Epilogue to an Empire*, (London: Penguin 1988): 167.
- ^{xxxi} Dick Wilson, *Hong Kong! Hong Kong!*, (London: Unwin Hyman 1990).
- ^{xxxii} Jon Woronoff, *Asia’s ‘Miracle’ Economies*, 2nd edition, (Armonk: M.E. Sharpe 1992); Wilson (1990).
- ^{xxxiii} *World Competitiveness Report* 15th edition, (Lausanne: IMD/World Economic Forum 1995).
- ^{xxxiv} Vriend (1994).

^{xxxv} Arthur (1996): 104.

^{xxxvi} Woronoff (1992): 254-255.

^{xxxvii} Woronoff (1980): 34.

^{xxxviii} For an overview of the political ramifications of increasing returns to scale, see; Paul Krugman (ed.), *Strategic Trade Policy and the New International Economics*, (Cambridge, MA: MIT Press 1986); and Paul Krugman, *The Age of Diminished Expectations*, (Cambridge, MA: MIT Press 1994).