The Role of Innovation-Led Profits in the Development of an International Financial Centre: The Case of Qianhai

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Abstract

Qianhai – an innovation park in Shenzhen – has the possibility of boosting innovation in Hong Kong, Shenzhen and in the wider region. This paper reviews the existing evidence about which policies have promoted profitable innovation in the Qianhai region (Hong Kong and Shenzhen) in the past. We also point to the importance of profitable innovation -- rather than just innovation for its own sake. Profits attract and keep firms in an international financial centre. Yet, until we know exactly how much profitability these innovative firms require..and how to promote such profitability, the advice given in the literature to Qianhai's and other policymakers will remain woefully inadequate.

JEL Codes: P48, R12, R58,
Keywords: Qianhai, cross-border economic zones, innovation, special economic zones.

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Profits and the Innovation-Led International Financial Centre: The Case of Qianhai

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Introduction

Qianhai represents the first of its kind – the attempt by two special economic zones to create another (common) economic zone. Behind the public declarations stands a vision to use the project to support R&D, innovative new companies in selected sectors like high-tech and logistics, and to attract capital as a way to bolster both cities' position as national/international financial centres.[1] How Qianhai affects the development of innovative firms in the region will determine the success of -- what is effectively - a free trade/economic zone. Yet, What role can regulatory reform play in maximising Qianhai's impact on innovation-led profits in the 'Qianhai region' (covering principally Hong Kong and Shenzhen)?[2]

We argue that the literature fails to discuss the profitability of innovation - making these studies unsuitable for determining the likely future of firms in places like Qianhai. We address this lacuna in four branches of the finance-of-innovation and international financial centre literature. In the first section, we look at the special economic zone studies -- noting how authors hope that increased proximity will miraculously lead to innovation (putting the cart before the horse). The second section looks at the innovation system literature. Again, these authors assume that with the right 'institutional configuration', innovation will just appear -- again without looking at the profitability of such innovation. The third section looks at the way these international financial centres finance innovation. Authors writing in this vein stress attracting investment. They rarely (if ever) discuss the subsequent return on that investment that draws in this investment in the first place. The fourth section looks at the way investment in innovation 'flows' over international financial centres - like some wave that these centres try to attract with a range of policies. Increasing the profitability of innovaton-investment never features as one of these policies. The final section concludes, by setting up the stage for future studies looking explicitly at the profitability of innovation in international financial centres.

We do not argue or touch/upon a number of things. First, our 'Qianhai region' only covers Hong Kong and Shenzhen, conspicuously omitting Guangzhou (and to a lesser extent) Zhuhai. We do so given the physical proximity of Qianhai to the two megacities, as well as their complementarity (which we discuss in the article). Second, we do not compare Hong Kong and Shenzhen with other jurisdictions. This will disappoint readers who want to know how the optimal design could draw on "lessons" from other jurisdictions. We try to reference some of this comparative literature for interested readers in our literature review.[3] Second, we do not review

[1] Qianhai also represents an attempt to liberalise Mainland capital markets, integrate them with Hong Kong's and encourage the repatriation of RMB. We do not discuss the capital market aspects of Qianhai, in order to focus on our main topic of supporting product/service market innovation.

[2] Ambitiously, the government of Hong Kong, as of 2020, might not only include Zhuhai and Macao (the obvious nearby areas), but far away areas such as Foshan, Zhaoqing, and Huizhou! See Greater Bay Area, The Cities, available online.

[3] A vast literature -- exists showing readers how to supposedly import lessons from other jurisdictions. Block and Keller (2011) show how government agencies in the US helped foster technological innovation. Klerkx and Leeuwis (2009) describe the challenges for government agencies to encourage private agricultural enterprises to adopt innovative practices in the Netherlands.

the profitability of innovation in general. As we focus on Qianhai's promise, we want to assess the way an international financial centre's policies (and its explicit, intentional creation) affects such profitability. We do not deny that - and thus have no need to review - once innovation becomes profitable, innovation-focused companies in an international financial centre will engage in investing in such profitable innovation. Third, we treat profitability as an all-of-nothing proposition. Either firms in an international financial centre are profitable - or not. Naturally, a range of outcomes, for different firms and at different times, may exist.

What Do We Know About Finance and Innovation in the Qianhai Region?

Many of the so-called studies from the private sector paint Qianhai in glowing colours. Figure 2 shows the main conclusions reached by a number of example studies which looked at the likely effects of Qianhai on Hong Kong and Shenzhen. Most studies note that the successful development of Qianhai would ease Hong Kong's real estate constraints, help attract funds (particularly in the form of off-shore RMB that Chinese seek to repatriate) and attract a critical mass of finance, IT, and logistics companies needed to create a self-sustaining business system. Most also raise the moot question of whether Qianhai will serve to accentuate complementarities between Shenzhen and Hong Kong or exacerbate competition?[4] These self-interested publications draw on the same implicit formula. Expanding the number and size of companies working in the Hong Kong and Shenzhen region (which we call the "Qianhai region" for reasons of convenience) will automatically increase innovation and profits. Without any reference to previous studies or any convincing story, these studies just assume that expanding the availability of real estate, providing incentives for information technology (IT) companies and money (both publicly and privately given), innovation and profits will inevitably arise. None of the existing studies talk about the core role of profits.

[4] While the non-academic community continues to use the rhetorical device of Hong Kong versus Shenzhen as a way of attracting attention to their publications, academics have already shown that financial and other services in the region tend to specialise – like any sector in a freely traded economy. Arner et al. (2015) provide the data and academic references for such specialisation.

Figure 2: Self-Interested Parties Writing About a Glorious Qianhai and their Formulae for Success

What advantages would the creation of Qianhai generate for Hong Kong and Shenzhen? Would profit-led innovation exceed the destructive influence of financial market and industrial competition? Most of the analyses boil down to the simple formula shown below. Qianhai could serve as nothing more than a glorified real estate development. Yet, with full participation by the Hong Kong and Shenzhen governments, Qianhai could represent the first special economic zone created by/from two special economic zones – with real twin cities' benefits. Yet, these studies do not talk about Qianhai's real *raison d'etre* – how the region will promote profitable innovation.

Value of Qianhai innovation	=	financial easing + tech company attraction + access to big market - costs from financial market and industrial competition

Author (and link)	Major theses
Colliers *	Qianhai will promote innovation by relaxing space (real estate) constraints and easing the flow of money (RMB) to companies.
Credit Suisse *	Qianhai represents a platform for internationalising the RMB and Hong Hong's high-tech service offerings into the Mainland.
Daiwa *	Logistics plus finance and incentives to bring financial, technological, logistics and telecoms make for a unique geographical place of profit.
Cushman Wakefield *	Qianhai represents a land extension for Hong Kong (as little geographical room to grow).

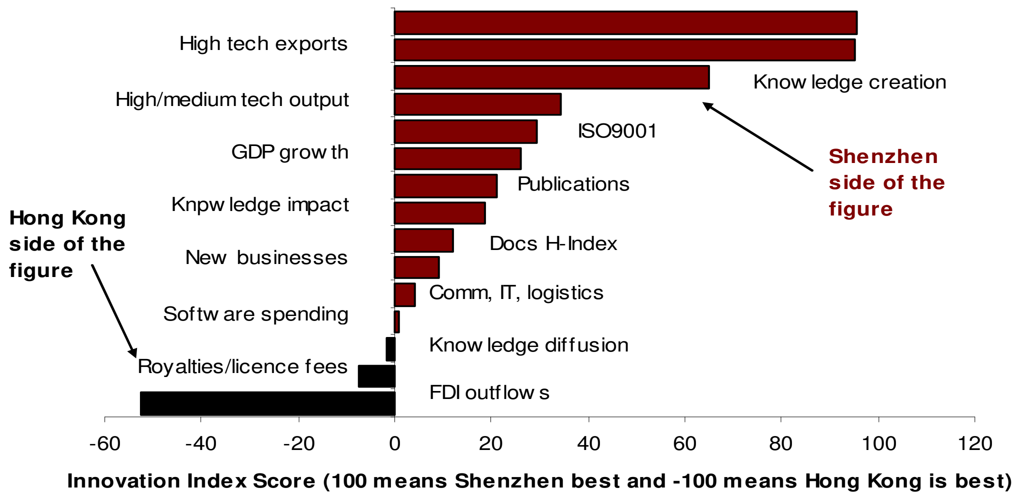
Source: See individual sources for more information.

The data falsely appear to confirm the common sense intuition that Shenzhen would supply the property rights (the brains) and Hong Kong would supply funding (or the financial brawn) to a joint Qianhai undertaking. Figure 3 shows the scores from the Global Innovation Index for 2015 for Shenzhen (which we calculated using regression analysis by using national China-level scores) and for Hong Kong.[5] As shown, Shenzhen scores much higher in most of the "knowledge and technology outputs" (part 6) components of the dataset (Reynoso and Litner, 2015). Hong Kong appears to diffuse – rather than create – knowledge as well as provide a vector for collecting licensing and royalty fees and for sending money out of the China region. Given Hong Kong's rank – of 29th place ranking out of 56 countries on the recent Global Innovation Index -- Hong Kong needs to cooperate with Shenzhen on Qianhai in order compete with other jurisdictions like the US or Finland.[6]

[5] As explained in the figure, we treated Shenzhen as a separate jurisdiction, looking at correlations between similar jurisdictions and Shenzhen. With these differences in mind, we could adjust the China-level national scores up or down to reflect our regression outcomes. In practice, such a complicated technique turned out useless – as Shenzhen's scores differed in only a few areas.

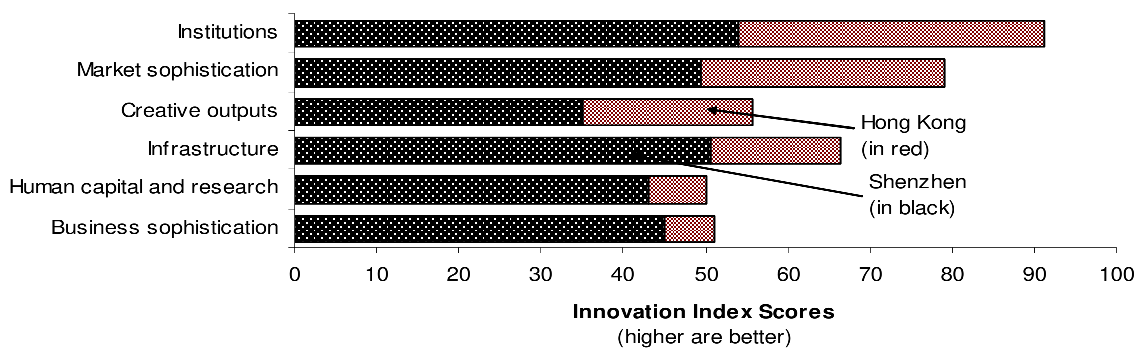
[6] The Index uses the usual quantitative indicators of innovation policy – like patents, journal citations, spending per capita on R&D and so forth. Ezell (2016) provides more on these indicators.

Figure 3: Showing that Shenzhen Provides the Brains and Hong Kong the Financial Brawn



The figure show s the Global Innovation Index for Shenzhen and Hong Kong in 2015. We use China's data as a base for calculating Shenzhen's Innovation sub-indices. We adjust Mainland innovation scores, as the dependent variable, from a regression w hich regresses Shenzhen's GDP per capita and its proportion of GDP in industry w ith the innovation scores held by other countries w ith similar levels of these GDP per capitas and industrialisation. In practice, w e only needed to modify tw o variables (know lege creation and know ledge impact).
Source: Escalona and Litner (2015).

Figure 4: Yet Hong Kong Beats Shenzhen in the Factors that Make for Profitable Commerce



The figure show s the Global Innovation Scores for China (as a proxy for Shenzhen) and Hong Kong. We do not adjust China's scores to take into account Shenzhen's particularities - as don't w ant to confuse the reader by presenting data w hich have been highly modified. We also might argue that national policy determines most of these factors -- thus Shenzhen might show little meaningful difference w ith the broader Mainland. Hong Kong can clearly provide the market-oriented institutions, market sophistication, infrastructure, human capital and business sophisication needed to make Qianhai a success. Source: based on data from Escalona and Litner (2015).

Yet, behind the self-serving analysis of companies looking to cash in on Qianhai, what do we already know from the academic literature about the way a Qianhai-style development might promote innovation-led profits?[7] Figure 5 shows the clusters of research which directly or indirectly answer the question – what effect would Qianhai have on Hong Kong's innovation-led profits? The first group of studies looks at the Closer Economic Partnership Agreement (CEPA) and other related agreements covering the region -- ignoring recent initiatives like the Greater Bay Area initiative (given their number and seeming unimportance).[8] Unsurprisingly, academics consider the largest positive benefits stemming from the usual gains from trade. Scholars have not specifically addressed the extent to which relaxing capital constraints and industrial policies (specifically choosing sectors rather than having market forces decide them) has contributed to this growth.[9] And they certainly have not considered the role of profitability on growth in the region.

Figure 5: Literature of Relevance for the Qianhai Design Question

Summary and major authors	Description and Results
CEPA (and special/border economic zone literature more generally) Chen & Unterober-doerster (2008), Shen (2014), Shen and Luo (2013), Hsiao (2012)	**Question:** Based on previous experience with economic integration in the Guangdong region, would Qianhai actually generate benefits above/beyond the status quo? **Result:** Several poorly done studies show that regional integration has generated benefits so far. Yet, Hong Kong's institutions and rule of law explain any profit-generating innovation better than simple economic integration. Thus, if Qianhai can share some of Hong Kong's institutions, the project would be much more successful.
Innovation Systems literature Baark and Sharif (2006), Xu *et al.* (2010), Fu (2011), Fu & Li (2011), Li *et al.* (2006).	**Question:** What does it take to make an innovative area (cluster)? What parts of a Qianhai-law would lead to innovation-led profits (and thus demand for Hong Kong's financial services)?[10] **Result:** Institutions represent a key constituent for growth. Given the tension between Hong Kong's Anglo-Saxon "variety of capitalism" and Shenzhen's "Continental variety of capitalism," any Qianhai-law holds little promise of working in the medium-term. Moreover, forced growth (rather than organic growth) makes firms locating in Qianhai less likely to survive/thrive.

[7] We refer to the phrase "innovation-led profits" frequently in the text – to refer to profits that more and bigger companies could make from innovations which would not occur without agglomerating Hong Kong and Shenzhen. Any economic approach to innovation must accept to measure innovation as the probability-adjusted (weighted) long-term expected profit from companies engaged in creating new tech-related goods and services.

[8] For example, the Greater Bay Area Framework Agreement represents another example of agreements to lower tariffs and increase trade/investment. A litany of agreements, such as those underpinning the Guangdong Pilot Free Trade Zone exist already. See Framework Agreement on Deepening Guangdong-Hong Kong-Macao Cooperation in the Development of the Greater Bay Area, available online.

[9] Chen and Unteroberdoerster (2008) provide one of the most relevant studies for our purposes. They have mapped the economic clusters developing in and around the Hong Kong/Shenzen area. Shen (2014) looks imperfect flow of goods and information across the border, while Shen and Luo (2013) look at the way Hong Kong has opened up to regional integration in the Pearl Delta Region.

[10] Of course, talking about "Qianhai law" makes little sense (as the region has little if any administrative autonomy). We use this phrase as short-hand to talk about the relevant legal provisions affecting Qianhai's operation.

Finance of Innovation literature Cheung *et al.* (2015), Sharif and Huang (2010), Baark *et al.* (2011).	**Question:** Will more govt-led finance in Hong Kong and Shenzhen actually result in innovation-led profits far in excess of the status quo? **Result:** Scholars can not agree. But complementarities between the two jurisdictions likely lead to conflict rather than cooperation
Investment flow literature Girma et al. (2009), Wang & Wang (2010), Zhang (2011).	**Question:** How to encourage investors in the Qianhai region and outside to invest in Qianhai-based companies? **Result:** Such a push probably mis-guided. Capital needs to go to highest productive use. Encouraging capital to go to Qianhai without existing great ideas distorts capital, labour and goods/services markets.

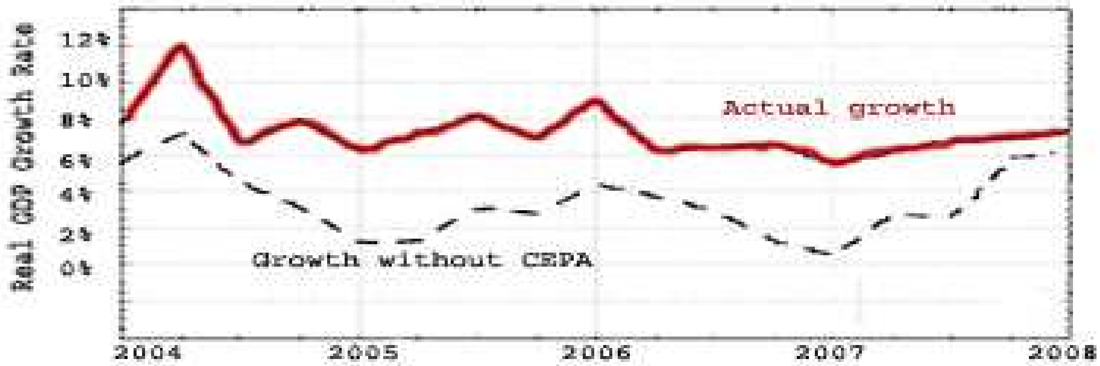
Source: See cited authors for more information on these sources.

The Special/Border Economic Zone Literature

Several studies from this first group of studies claim to show how closer union between Hong Kong, Shenzhen (and the Guangdong region in general) helps promote at least growth – if not innovation. Figure 6 shows that the Closer Economic Partnership Agreement (CEPA) supposedly has helped keep Hong Kong's GDP up during – what would otherwise be – major slowdowns in GDP growth. According to this study, the CEPA contributed around 3%-4% in GDP growth over the period the authors looked at. The figure also shows the purported effect of regional integration on generalized productivity (what economists call "total factor productivity"). The CEPA supposedly has increased such productivity. Naturally, increases in productivity necessarily frequently imply change in industrial innovation – as innovation makes production better, cheaper and so forth. Thus, the authors' results for productivity might serve as a proxy for CEPA's effect on innovation.[11] Figure 7, for its part, shows similar results – with the authors hypothesizing that Hong Kong could benefit from a "Guangdong effect" – which helps promote trade, innovation and productivity (Zhang *et al.*, 2009). As Hong Kong's manufacturing sector shrinks, Hong Kong's manufacturers reduce duplication/ competition with Shenzhen and Guangzhou. Such shrinkage also helps resources move to more productive sectors. Yet, most studies of regional integration are so badly done that they provide a flimsy base from which to draw conclusions about Qianhai.

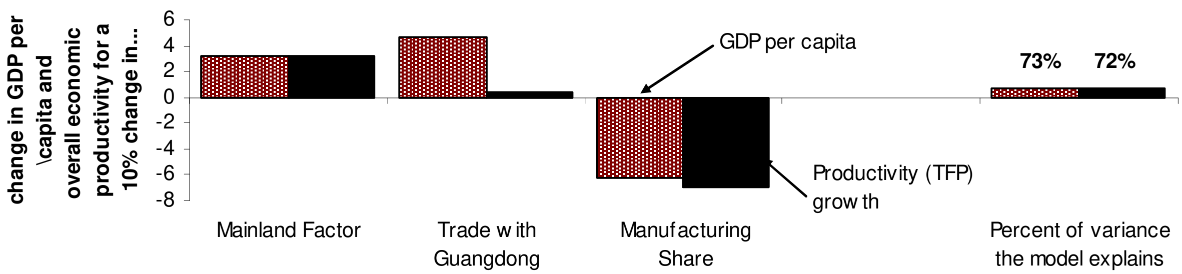
[11] Xu and Yu (2012) find, using a completely different methodology that Shenzhen's total factor productivity grew by around 5% per year.

Figure 6: A Casino Study Says that Hong Kong's Regional Integration Might Have Added an Extra 4% to GDP Growth



The figure shows changes in Hong Kong's real GDP growth for the period shown -- if the authors' Monte Carlo studies reflect reality. The authors' methodology consisted of using other countries' data as a baseline and then simulating results for the Hong Kong economy.
Source: Hsiao et al. (2012).

Figure 7: A Very Misspecified Econometric Study Finds Evidence of a "Guangdong Effect"



The figure shows the coefficients for regressions trying to explain Hong Kong's GDP per capita growth rate and general productivity (what economists call "total factor productivity" or TFP). The figure shows trade with the Mainland, trade with Guangdong, and manufacturing's share of Hong Kong's GDP as explanatory variables. We also show the misleading percent of variation the model explains (known to economists as the model's R-squared). The model's results are useless, as the authors failed to control for other factors which affect GDP growth (like labour used), they don't take into account that GDP growth affects trade as much as trade affects GDP growth (called "endogeneity bias") and other problems.
Source: Zhang et al. (2009).

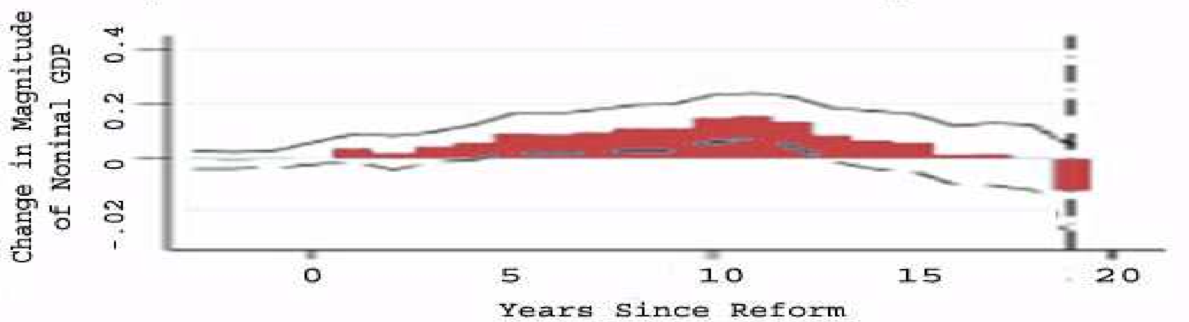
We really do not know what effect regional integration had on innovation in the Qianhai region (Hong Kong and Shenzhen).[12] The Hsiao *et al.* study created a model based on numerous other economies, in order to simulate what benefits might have accrued to the region. Based on these findings, they ran simulations – known as Monte Carlo simulations – to see what the benefits might have been, if we compared our reality with hundreds of other realities. The Zhang *et al.* (2009) study makes firm predictions about integration in the Pearl River Delta region by taking the results of a simple regression of GDP growth and total factor productivity on levels of integration (trade). Their specification suffers from problems with what economists know as

[12] The internet and journals are flooded with badly done quantitative studies looking at the effect of innovation on Chinese firm profitability. We do not have room to provide a full list, but refer the reader to authors like Zhu and Huang (2012).

“endogeneity bias”, “omitted variable bias” and other misspecification error.[13] As a more substantive critique, authors like Shen and Luo (2013) have found that political gains, more than economic gains, drove much of Hong Kong’s increased co-operation on integration with Shenzhen.

The establishment of special economic zones in the Qianhai region might account for these results far more than any gains from regional integration. Figure 8 shows the estimated effect of creating a high-tech industrial zone – like the proposed Qianhai zone – based on past experience (Alder *et al.*, 2015). Accordingly, the establishment of Shenzhen-region high tech zones (more than economic and trade integration with Hong Kong) explain growth in the region. Other authors like Jin *et al.* (2013) have shown how such zones – and especially the transport links that tie these zones together - result in productivity growth. These zones benefitted because they were already industrialized areas.[14] If Jin and co-authors’ findings reflect Qianhai’s future, creating a special economic zone *ex nihilo* will have very limited impacts on innovation. Yet, authors like Sawyer and colleagues (2015) might argue that these gains came mostly from the resource accumulation due to the central government’s orders – and not from the natural attraction of resources according to Shenzhen’s comparative advantage. Because we can not separate the innovation-creation effects from the innovation-diversion effects in these studies, we can know the extent to which Qianhai would create innovation unavailable otherwise.[15]

Figure 8: Creating a Chinese New High-Tech Development Zone Has Questionable Impacts on GDP



As in other parts of economics, numerous authors like Yang *et al.* (2011) are finding that institutions play a larger role in innovation than simple trade creation/expansion. A recent Asian Development Bank study focused on cross-border economic zones (like the proposed Qianhai scheme). The authors found that these cross-borders zones need their own special, unique policies in order to attract companies and related investment in the zone. Using relative simple statistical methods, these authors find that – contrary to the case in Shenzhen-Hong Kong region – these

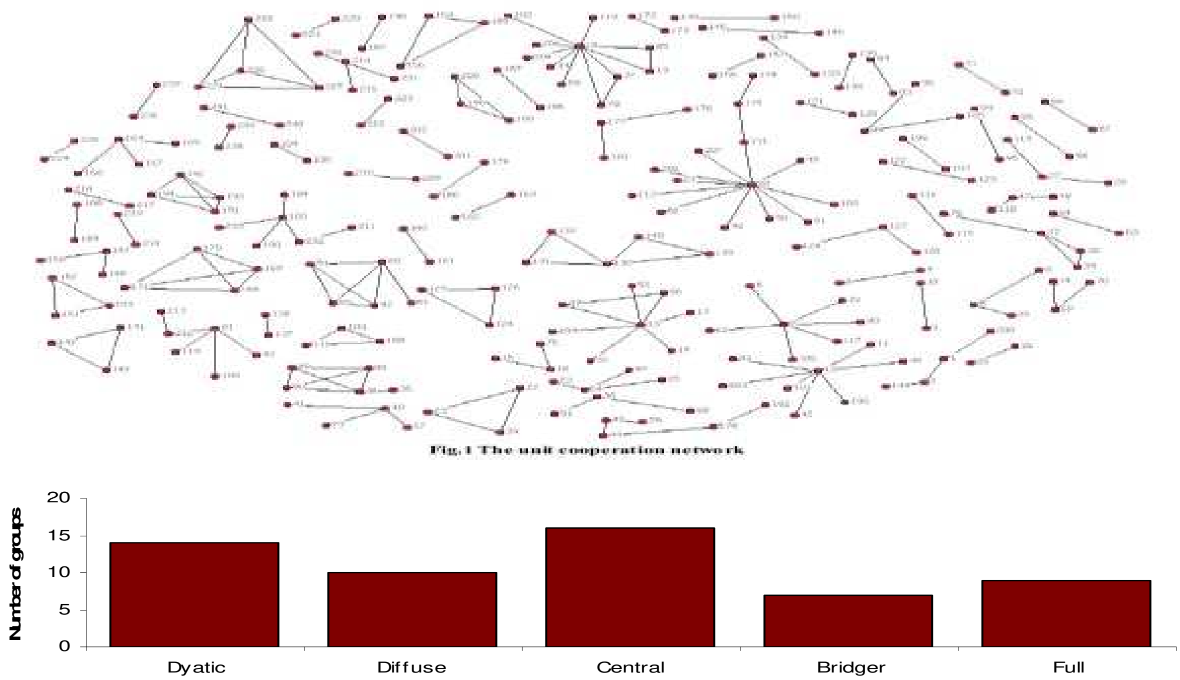
[13] We do not have space to explain what these terms mean. For non-technical readers, they/you only need to know that the problems with the study mean that the results tell us nothing about integration in the region.
[14] Barbieri and Pollio (2015) find – in an analysis of Guangdong special economic “enclaves” – that highly industrialised areas benefit the most from these zones.
[15] Zheng and colleagues (2015) use geographical data for the location of various industrial parks to look at which factors contribute to productivity growth in these parks. For the general sample – we can not separate out Shenzhen’s effects – they find that from productivity growth (or total factor productivity) comes denser output and input linkages, skill spillovers, and access to rail travel. Yet, broader industry change also plays a role.

cross-border zones *raison d'etre* revolves around importing resources and lowering production costs.[16] Qianhai would thus neither help import resources nor lower production costs significantly. Thus, governments on both sides of Qianhai's cross-border economic zone should harmonize infrastructure, labour policies, and other market institutions so as not to create a divided city/region.

Innovation Systems Literature

The second branch of the literature (which we summarised above in Figure 5) focuses on the way that "innovation systems" have developed in the Qianhai region – and how they might interact. Such innovation system studies look at the way cooperation and competition between manufacturing/IT and service firms leads to profitable innovation.[17] Figure 9 shows the constellation of innovation relationships around the Shenzhen region.[18] Accordingly, Shenzhen's innovation system revolves around university-company collaboration – with a wide range of one-to-one (called dyadic) connections. Thus, we don't know about the profitability of innovation. But we do know that universities should serve as central actors in promoting innovation in the Qianhai region.

Figure 9: The Shenzhen University-Industrial Innovation Network Highly Fragmented



[16] One might view innovative ideas or even errant RMB as a type of resource. Yet, the study most specifically focused on materials and raw materials.

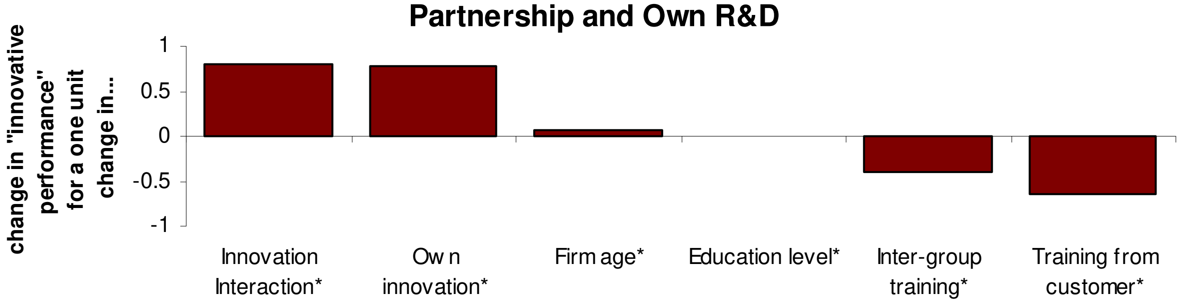
[17] Several scholars like Baark and Sharif (2006) have studied Hong Kong's innovation system – and such systems in the region overall. Baark and Sharif provide the historical background of Hong Kong's innovation system. Boeing and Sandner (2011) describe the innovation system from the China side.

[18] We focus on these relationships in Shenzhen as the Qianhai project physically sits in Shenzhen.

The figure shows the number of groups (clusters) formed when a Shenzhen-based university applies for patents with local companies. The roughly 240 institutions form highly fragmented relationships with each other (as shown by the large number of "sticks" and few "spider webs"). The bottom part of the figure shows the frequency of each type of group – from most sparse to most lush. Source: Xu *et al.* (2010).

What affects the rate at which these network relationships generate innovations? Figure 10 represents one example of a study seeking to answer that question. Innovative interaction and firms' own innovation count much more for innovation than training, education, firm experience and other factors. The authors importantly find that ownership structure and even innovation supposedly "imported" from abroad have no positive effects on the "innovative performance" of Shenzhen-based firms.[19] Yet, not all innovation (or R&D resulting in that innovation) is the same. Gau *et al.* (2015) find that when innovative firms list on an exchange, they engage in "exploitative" rather than "exploratory" R&D. To the extent that Chinese firms engage in R&D, new product development accounts for roughly 13% of such R&D expenditure (Jefferson and co-authors, 2006). Lau and colleagues (2010) found that Hong Kong based manufacturers innovate more with supplier-customer integration, when they co-develop new innovative products, and when they share information with others in the business system (suppliers, customers, etc.).

Figure 10: Shenzhen Innovation System Centres Around University-Company Partnership and Own R&D



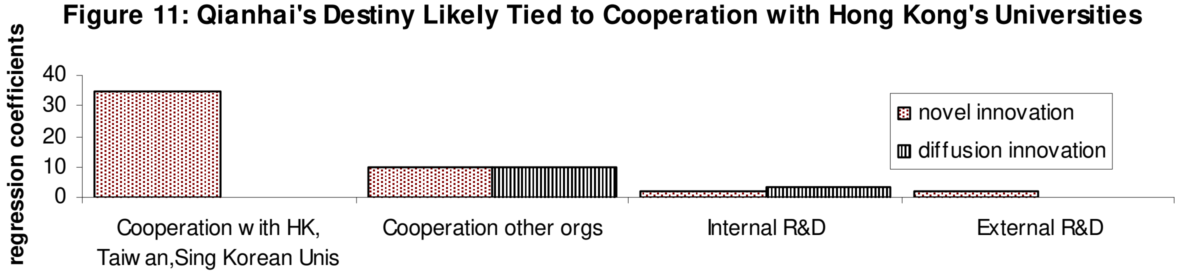
The figure shows the results of surveys, of 167 Shenzhen electronics firms, asking about the importance of various methods for producing electronics-related innovations. These results represent the b-value coefficients for a logit regression. In other words, a ten unit increase in a Shenzhen electronics firms own innovation results in 8 units of "innovative performance" (whatever that is). Intergroup training and training from the customer result in harms rather than beenfits. In Shenzhen, unlike in other Chinese cities, the ownership structure, firm size, extent of foreign-led innovation, training from a multinational's headquarters and training done via Guanxi relations have no statistically significant effect on innovative performance. Source: Fu (2011).

Yet, simply enlarging the scale of such cooperation does not ensure the broader development of profit-generating innovation. Ben and Wang (2011) find that industrial parks which are too large also result in just as inefficient production (and thus have the same lower productivity) as parks which are too small. Qianhai represents one of the largest industrial parks proposed to date. Even if local officials could grow a very large industrial park area, they have no guarantee that firms based there could profitably absorb and use innovative ideas (as Boeing *et al.* (2006) show). Authors like Yasar (2013) find a strong positive statistical relationship for Chinese firms in

[19] See original study for definitions of "innovative performance" and the other factors in the study.

general between outside investment and firms' "absorptive capacity."[20] As shown in Figure 11, collaboration with universities represents one way of developing such absorptive capacity. Chinese firms that made alliances with Hong Kong-based (and other) universities innovated more.[21] Alliances with local Mainland universities brought no such significant innovation. These data suggest that Qianhai companies would benefit more from their access to Hong Kong's universities than from the zone *per se*. These results thus imply that a Qianhai, without significant Hong Kong participation, would just remain another property development project.

Figure 11: Qianhai's Destiny Likely Tied to Cooperation with Hong Kong's Universities



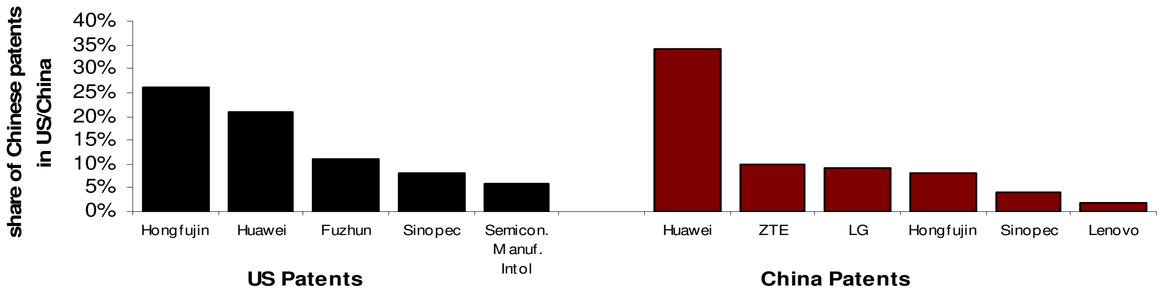
The figure show s the parameter estimates for Tobit regressions on the extent of novel innovation (as sales of new ly conceived products) and diffusion innovation (sales of improved versions of products already on the market). Cooperation w ith New ly Industrial Economies (NIEs) -- w hich w e take in this context as Hong Kong, Taiw an, Singapore and Korea (due to similar use in other papers in this literature) -- varies strongly and closely w ith such innovation. Source: Fu and Li (2011).

Numerous studies support the finding that the overall **policy environment** – rather than targeted sectoral innovation policies – unsurprisingly explains much of the performance of innovation systems in these special economic zones. Bhattacharya *et al.* (2015) for example, find that stability in the policy environment is more important than the type of innovation policy pursued. Du and co-authors (2008) find that institutions providing for contract enforcement and IP protection explain why foreign investors choose one province or city over others. Yueh (2011), for her part, shows how the protection of property rights (through patent law) explains much of the variation in output-generating innovation across Chinese regions. Eberhardt and co-authors (2011) find that a limited number of companies account for most of China's patents. As shown in Figure 12, we see that large industrial giants file for most Chinese patents. The authors don't explicit say it – but Chinese companies seemed to take out US patents when trying to protect a more commercially profitable product or process invention.[22] Cumming *et al.* (2006), for their part, show that legality affects IPO or private exits much more than factors like stock market capitalization, market conditions, the skill of the VC fund manager, fund characteristics, as well as firm and transaction attributes. Li and colleagues (2006) find, in their own statistical study of Shenzhen, that poorly defended IP rights in Shenzhen stifles industrial innovation. Studies like these tend to show that the institutional environment in Qianhai will matter far more than any tax

[20] Yasar (2013) uses the employment of knowledge workers like engineers, technicians and managers – as well as firm size -- as a gauge of these firms' absorptive capacity.
[21] Huang and company (2013) find similar results with techno-parks in and around Beijing. Local government support proved un-useful – but links with Hong Kong helped foment innovation.
[22] This argument relies on the interpretation of the authors' results concerning SIPO (Chinese) and USPTO (USA) patents. They show how Chinese IT companies which had been particularly worried about their intellectual property, would take out a USPTO patent rather than – or in addition to – a SIPO patent.

rebates or even capital account liberalisation rules Qianhai adopts. The profitability of innovation appears in none of these stories.

Figure 12: Innovation in China Relies More on Membership in Financial Industrial Group and Applicable Law More Important than Geographic Proximity



The figure shows the proportion of total Chinese patents received by the companies shown. For example, Hongfujin filed for roughly 25% of all US patents during the time period covered by the authors. The high proportion of patents going to China's industrial giants casts doubts on the ability of a Qianhai to grow a mass of entrepreneurial companies which will dominate patent filings in the future.
Source: Eberhardt *et al.* (2011).

Finance of Innovation Literature

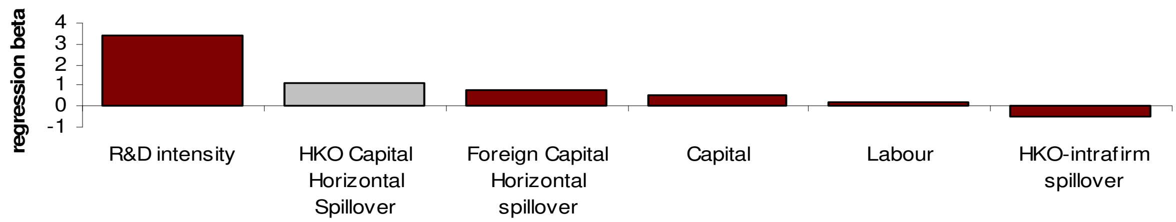
The third branch of the literature deals with the effect of finance on innovation. More spending in the Qianhai region – either by government or industry – as this argument goes, can help generate the innovation needed to boost profitability, and thus investment in Hong Kong and Shenzhen. Writers like Cheung et *al.* (2015) and Naubahar and Baark (2005), for example, erroneously argue that Hong Kong's R&D spending needs to rise in order to facilitate the development of innovative companies. Hong Kong's Commission on Strategic Development's (2015) analysis comes to much the same conclusion.[23] Zhang (2009) represents another "dim sum" style analysis – offering a wide range of potential policies – with scant empirical support. Yet, these studies imply that -- given Shenzhen's vast lead over Hong Kong in many areas of innovation policy, any policy aimed at looking at Hong Kong (or Shenzhen) in isolation is misguided.

The evidence on government support for innovation in Hong Kong and Shenzhen provides no clear cut answers. From international studies, authors like Brander and colleagues (2015), show that government funded venture capital augments—rather than replaces – private finance. When government and private start-up investors participate together, the resulting firms are more successful and more likely to list on publicly-traded equities markets. In the Hong Kong context, Sharif and Huang (2010) show that ventures on the Mainland tend to survive longer and do better when Hong Kong companies invest in their R&D more heavily. As further shown by these two researchers, shown in Figure 14, Huang and Sharif (2009) show that R&D investment represents a far more useful vector of innovation than money from Hong Kong (or abroad). These results cast doubts over the "division of labour" between Shenzhen (strong in production and innovation)

[23] Their analysis represents a hodgepodge of *ad hoc* solutions covering a wide range of policy areas. Presumably the approach they adopt consists of trying everything and see what works.

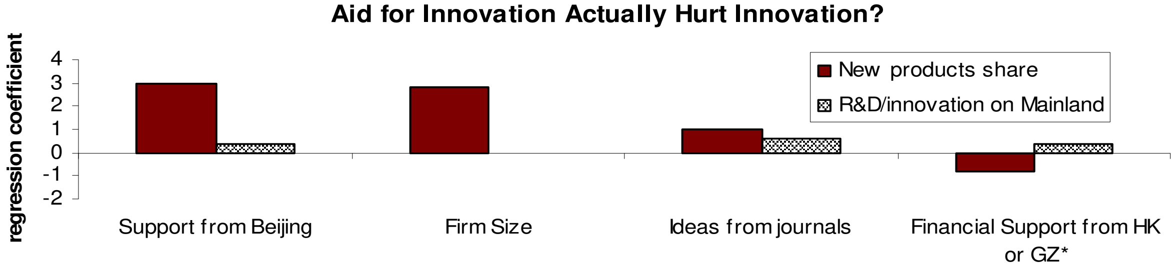
and Hong Kong (strong on finance). Worse still, these results would suggest that the Qianhai project represents a zero-sum game – where Shenzhen's gain could be Hong Kong's loss.[24]

Figure 13: R&D intensity far more important than Hong Kong Sourced Investment as Source of Industrial Growth



The figure show s the regression coefficients for innovation grow th (w ith industrial value added as the dependent variable). The original paper looked at capital from Hong Kong, Taiw an and Macau -- w hich w e can not disaggregate into Hong Kong only. We thus label the effect of this capital as from Hong Kong and Other (w ith Macau and Taiw an representing the other). We show only one model's results out of many (the most relevant model in our opinion). See the original for more details. Source: Huang and Sharif (2009).

Figure 14: Does Hong Kong and Shenzhen Government Financial Aid for Innovation Actually Hurt Innovation?



The figure show s the extent to w hich various factors explain a firm's share of a new products market and R&D/innovation on the Mainland. For example, firms w ith support from the central government in Beijing tend to capture a greater share of it's new products market-niche. The effect of financial support from local governments in the Guangzhou region (Hong Kong and Shenzhen) remains much less clear. The authors show one model w here the effect of such support hurts innovation -- and one w hich helps innovation.
Source: Sharif and Huang (2012).

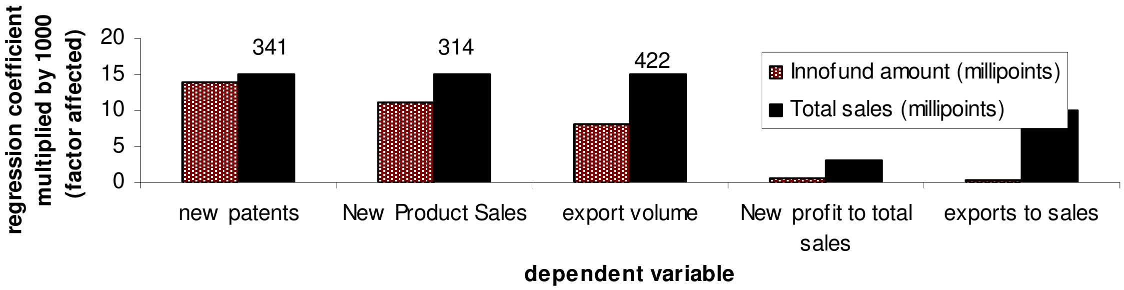
Several authors have highlighted the futility of government spending as a way of promoting innovation in the Qianhai region. Guo and co-authors (2014) find that only government funding from the central government would have a positive effect on firms in the Qianhai region. Financing for innovation from Hong Kong actually correlates with the loss of market share (albeit with increased R&D spending).[25] Yet, as shown in Figure 15, work by Guo and colleagues raise doubts about even the central government's ability to spend their way into innovation. They

[24] Such an outcome depends on income and substitution effects of R&D spending. A zero-sum game ensues if R&D funders must choose between Hong Kong and Shenzhen. If R&D spending expands profits in the longer run, then total R&D spending could rise in both places. We know of no study looking at the effect of R&D spending to generate further R&D spending.

[25] Our interpretation of this study contradicts the authors' own interpretation of their results. They argue that their finding support the view that Innofund finance improved innovation-related outcomes. We argue not always (as highlighted in the main text). We leave it to the reader with a doctoral background in economics to decide which interpretation is right, given the results reported in the paper's many figures.

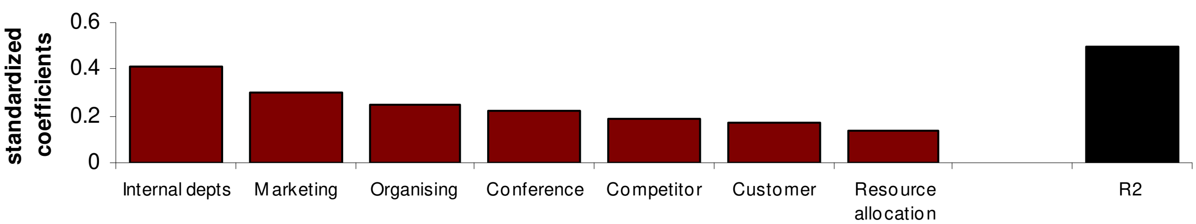
find that government support only microscopically helps regional firms improve profits and patent production. More worrying, Baark and co-authors (2011) find that such product market shares do not even depend on the typical factors often associated with innovation policy – like more machines, R&D capacity or cooperation with universities in the Qianhai region and abroad. As shown in Figure 16, internal departments' activity seems far more important for product market share than these other factors. If true, these kind of results cast doubt both on Hong Kong's ability to use finance to promote innovation at home and in the overall Qianhai region. They will need these firms' own profitability to provide the impetus for further investment.

Figure 15: Maybe Effect of Sales and Governemnt Support Is Too Small to Measure?



The figure shows the regression coefficients for the amount of Chinese innovation fund support given to firms and these firms' total sales on dependent variables like obtaining new patents, new product sales, increasing export volumes, increasing profits to sales and exports to sales. We multiplied these regression coefficients by 1000, as the effects were to small to show in a graphic. For new patents, new product sales, and export volumes, we show the true regression coefficients about the bar (namely 341, 314 and 422 out of one thousand). None of the authors' many models explained more than 5% of the variance in the original dataset.
Source: Guo et al. (2014).

Figure 16: Product Competitiveness Depends on Stakeholders More than Other Factors?



Non-statistically significant factors: acquisition of embodied technology (like machines), patent disclosure, suppliers, consultants, local universities and foreign universities, R&D capacity, manufacturing capability, and strategic planning capability.

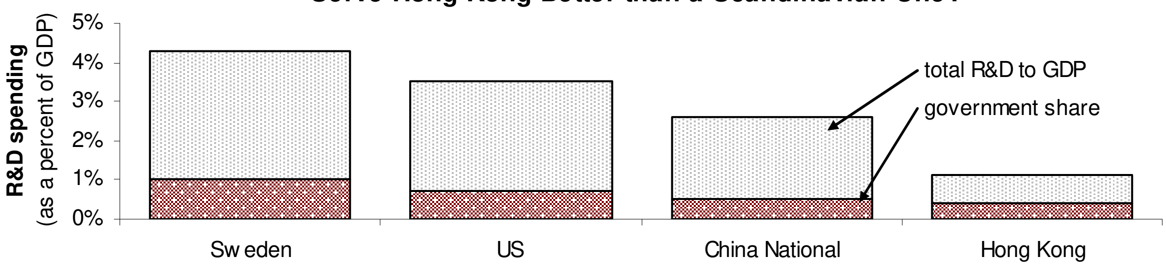
The figure shows the effect of a one standard deviation change in each of the variables shown on Hong Kong and Pearl River Delta companies' "product competitiveness." Source: Baark *et al.* (2011).

Similarly mixed evidence appears on the use of tax and other incentives to stimulate innovation-led growth. In their 20 year old paper, Tung and Cho (2000) find that tax incentives encourage investment. Alix-Garcia *et al.* (2014) show that Shenzhen (and Hong Kong), as a well-studied export zone, would likely benefit far less from a Qianhai scheme than less developed urban areas. Yet, if Shenzhen reacts to tax incentives the same way that Shanghai did, Zhu and colleagues'

(2006) data predict that tax incentives will distort investment away from profit-increasing innovation in Qianhai.

Scholars and policymakers agree that any innovation policy must hinge on funding from private sector companies themselves. Figure 17 shows Hong Kong's R&D funding compared with other jurisdictions. As shown and oft-mentioned, Hong Kong spends less on R&D than other jurisdictions. Yet, as a proportion of total spending, the private sector supplies more money for R&D than the government. As the data from these other jurisdiction imply – Qianhai's innovative companies must rely more on private sector funding than government funding. Thus, market profits - rather than government support or other measures -- will likely draw investrment into Qianhai's innovation system.

Figure 17: Does the Qianhai-Model of Innovation-System Development Serve Hong Kong Better than a Scandinavian One?



The figure show s spending on R&D as a percent of GDP. The red part show s government R&D spending (as a percent of GDP) w hile the entire bar show s total spending. Such a dichotomization highlights the role of government versus private sector in funding R&D.
Source: Cheung et. al (2015) based on OECD and Hong Kong Government data.

What about the Hong Kong's role as a financial centre? Will Qianhai encourage funds to flow from Hong Kong's financial institutions to Shenzhen-based financiers and innovative companies? Li (2007) finds that changes in Hong Kong's stock market index "causes" changes in Shenzhen's – suggesting that funds do flow from Hong Kong north. At least, he finds integration in a study looking at how share price variance in one market translates to other markets. Qiao and colleagues (2008) and others like Johansson and Ljungwall (2009) also find integration between markets – and show that the further deregulation of equity markets in Qianhai would lead to far more shareholding (depth). Zhang presciently finds that Hong Kong direct investment in the Mainland should decrease as China's low labour costs evaporate.[26] Lee (2009) finds that Mainland exchanges provide more liquidity for issuers – casting further doubts on any advantages Hong Kong can provide in channelling money to innovative firms.

Despite the linkages between Hong Kong and Shenzhen financial markets, share price changes do not provide enough information about changes in profitability inside the companies to prove useful for our purposes. Gul *et al.* (2010) for example show low levels of "synchronicity" (or the extent to which changes in share prices reflect firm-specific rather than market-specific factors)

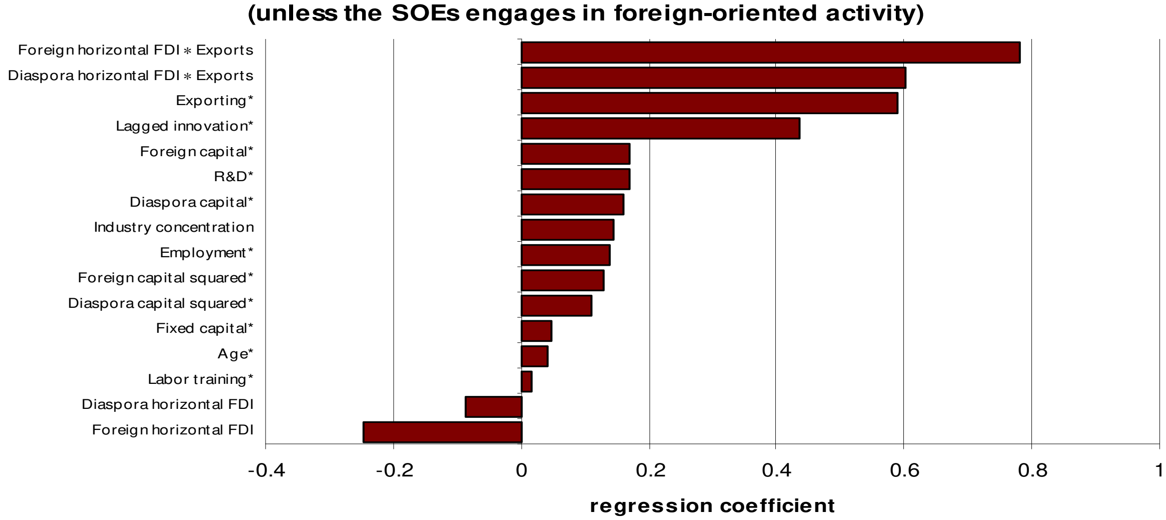
[26] Indeed, Qianhai will have the effect of helping to equity returns to labour and capital in both markets. In this way, If Zhang's findings still hold, Qianhai-related integration should remove the advantages that cause(d) Hong Kong investors to invest on the Mainland in the first place.

for Chinese equity markets. Even if share prices reflect company specific information in the short-run, they reflect economic fundamentals of China in the longer run (Liu and Sinclair, 2008). Listing through some form of Qianhai scheme – where firms list in Hong Kong, Shenzhen, both, or through some kind of "stock connect" programme – affects levels of cash at primary offering (Karreman and van der Knaap, 2012). However, changes in share prices would have a much weaker link when trading on secondary markets. Despite correlations between Hong Kong share prices and Shenzhen share prices, share prices in both jurisdictions do not contain enough firm-specific information to shed light on the relationship between innovative firm profitability and innovation.

Investment Flow Literature

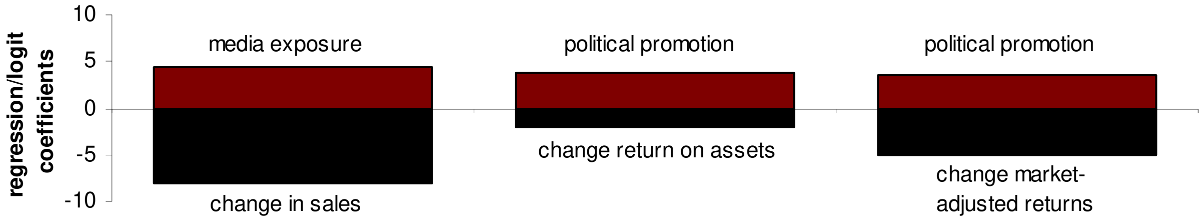
What about the other claim for Qianhai – that financial innovation (in the form of easier repatriation of RMB) could promote innovation? Beck and others (2012) find that financial innovation does indeed lead to growth. Yet, they also find that such innovation fragilizes the banking sector – making crisis more likely. Chang (2010) shows that financial innovation leads to firm innovation. The data – as shown in Figure 18 -- seem to suggest that foreign capital and foreign markets seem to encourage Chinese innovation. Local investment, according to this study, does little to foster profit-oriented innovation. Figure 19, in contrast, shows that state-owned enterprises (SOEs) would have strong incentives to locate in Qianhai – despite the fact that such a location does not increase profits or necessarily lower costs. To the extent that Qianhai might be considered as an 'overseas listing' – these SOEs which list there would do worse than private firms. Qianhai is thus likely to attract the least desirable companies for creating and sustaining new innovation – namely state-owned enterprises (SOEs). But for political reasons and loop-hole jumping reasons, rather than for profits.

Figure 18: In SOEs at least, foreign investment good and domestic investment bad (unless the SOEs engages in foreign-oriented activity)



The figure shows the effect of the variables above on Chinese innovation. As shown, foreign direct investment, export orientation and R&D play pivotal roles in promoting innovation. See original study (Table 4) for variable definitions and econometric methods used.
Source: Girma (2009).

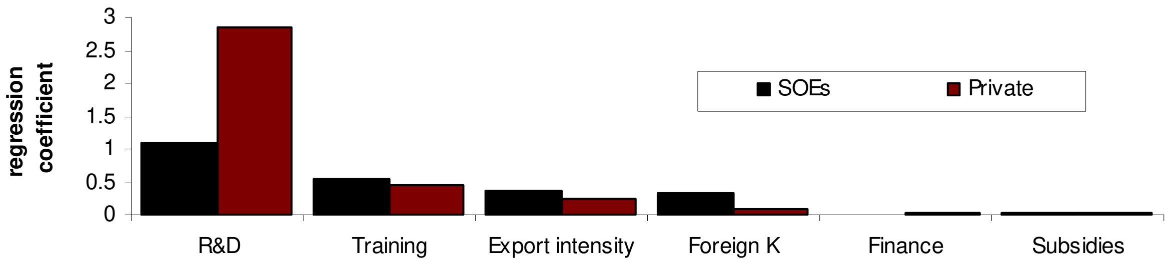
Figure 19: Poliitically Connected Would Choose Qianhai -- even if companies do worse



The figure show s the regression coefficients for each of the variables show n (above and below each bar) as the dependent variable. These coefficients refer to the effect that political connections play in deciding to list overseas. Overseas listing (if Qianhai w ould be considered like Hong Kong as "overseas") w ould help promotion prospects even if the foreign listing correlates w ith w orse financial performance (low er sales, return on assets and cumulative adjusted returns of the company's shares). The toip coefficients refer to logit coefficients and the bottom to instrumental variables estimates. See econometrics textbook for more on these procedures.
Source: Hung et al. (2012).

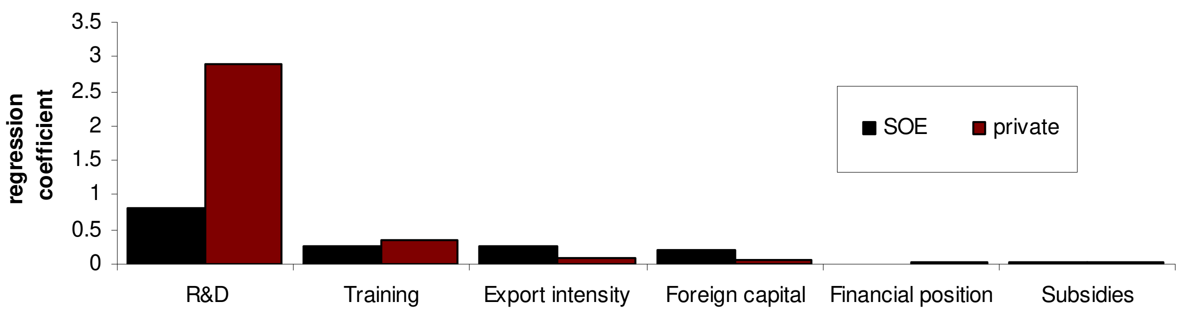
More evidence seems to point toward the futility of the present Qianhai design. The two figures below undermine Qianhai's claims to promote innovation. Figure 20 shows the effects of Chinese R&D, training, foreign capital, financial position, and subsidies on innovation levels. Figure 21 shows access to finance for Chinese innovators as a result of the same variables. As shown, internal financial position (retained earnings), foreign capital and subsidies play an extremely marginal role in both fomenting innovation and attracting money. Interestingly, as Hanley *et al.* (2011) show, even though finance does not help individual firms innovate, the overall level of finance (credit) does correspond with higher rates of innovation outside of the Qianhai region! Zhao (2016), for his part, finds that deeper credit markets (for central and western regions) and equity markets (for coastal provinces) incentivize innovation at the provincial level. Hu and colleagues (2005) also find that foreign investment fails to promote the adoption of foreign innovations. Thus, the preponderance of the evidence suggests that finance only promotes innovation indirectly – through a still undiscovered causal mechanism. Wu *et al.* (2012) -- as mentioned previously) further finds that companies with Hong Kong-based investors have less innovation than other types of investors. If true, Qianhai's tax incentives and RMB repatriation mechanisms will have marginal, indirect effects on promoting innovation in the Hong Kong/Shenzhen region – and probably no effect at all.

Figure 20: Is Access to Chinese Domestic Capital and Subsidies Useless for Innovation?



The figure shows the results of econometric analysis looking at the determinants of **INNOVATION** in Chinese companies. To the extent that Shenzhen's companies reflect the wider Chinese situation, then Qianhai would not help promote innovation by putting more finance and subsidies on offer. See source for empirical methods and variable definitions.

Figure 21: Access to Chinese Capital Doesn't Depend on Foreign Investment or Subsidies?



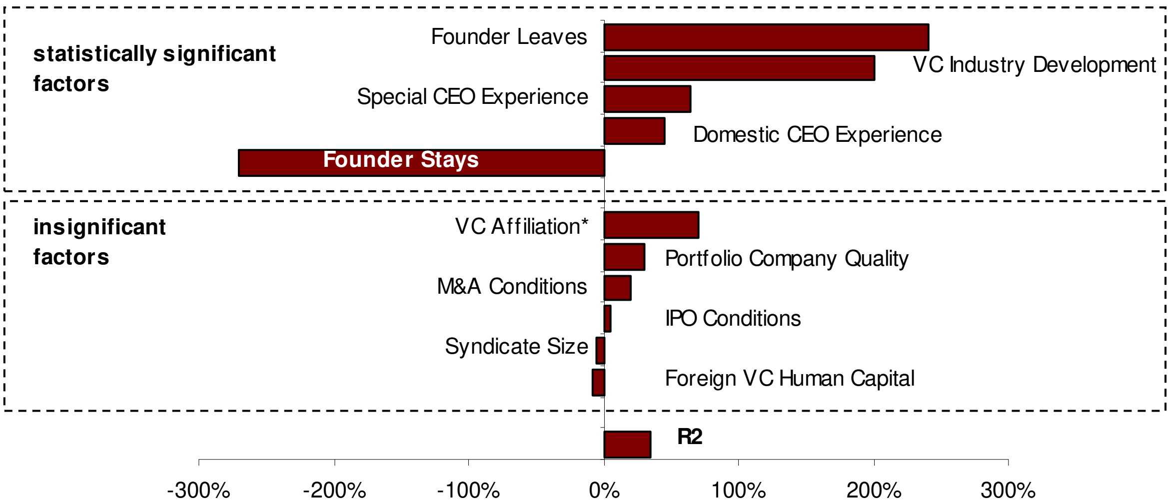
The figure shows the results of econometric analysis looking at the determinants of **FINANCE** (specifically bank loans) for Chinese companies. To the extent that Shenzhen's companies reflect the wider Chinese situation, then Qianhai would not help promote innovation by making putting more finance and subsidies on offer. See source for empirical methods and variable definitions.
Source Girma *et al.*, 2008.

What about private equity and venture capital? One might imagine that the rules of venture capital differ from other types of capital. Qianhai's focus on IT, finance, and logistics suggests that competencies can develop in these specialist areas. Yet, Liu and co-authors (2010) find that venture capitalists in the Qianhai area do <u>not</u> specialise by industry or in any other way. Using econometric analysis, they find no evidence that venture capital-funded firms under-price their IPO share offering nor do they only choose the best (most potentially profitable) companies to work with.[27] Wang and Wang (2011) find that senior management (CEO) experience in the industry in which the venture capital firm is investing remains critical to the investment's profitability. Figure 22 shows the way various factors affect the probability that a VC investment goes IPO. As shown, for companies with a former industry insider CEO-turned-venture-capitalist, the investee has about a 60% greater likelihood of going IPO. In a more recent paper, they also

[27] These results do not necessarily hold for the entire Chinese equity market. Wu and colleagues (2012), for example, find evidence of venture capitalist under-pricing during their investee companies' IPO – and delimit five conditions which affect the extent of such under-pricing.

find larger post-IPO share price increases for firms with foreign venture capitalists (He *et al.*, 2015). In the Qianhai context, one might interpret these findings in such as a way as to argue that Hong Kong venture capital can help add value to Shenzhen-based companies planning on listing (and others). Yet, profits remain conspicuously absent in all these stories.

Figure 22: Chinese Industrial Magnates, Rather than VC Specialists Make for the Best Investors

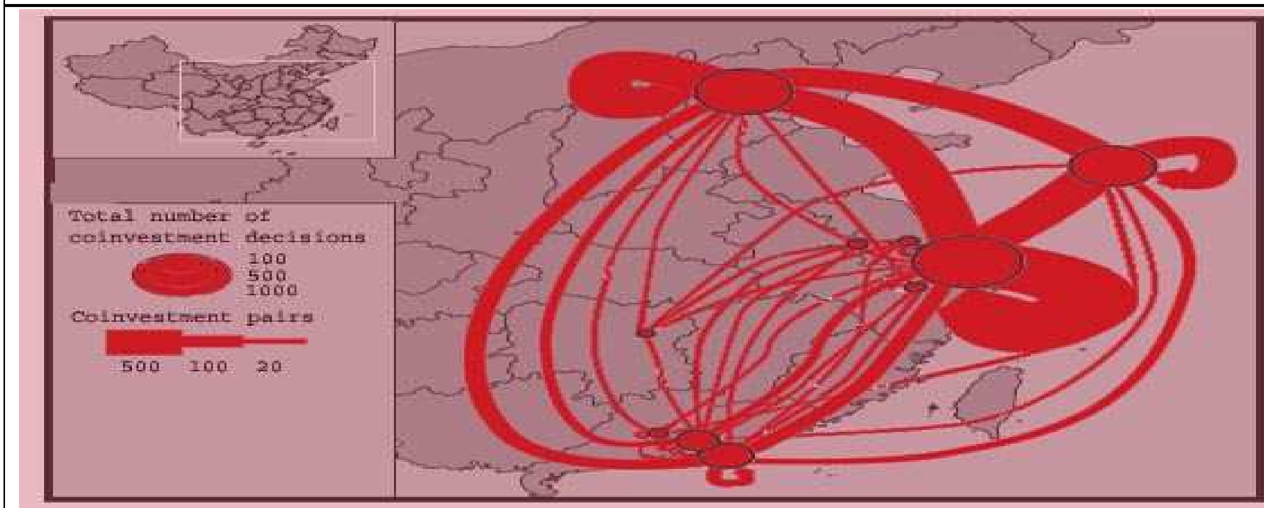


The figure shows the extent to which the factors shown affect a Chinese company's prospects of going IPO. We have changed the scale for this logit regression – to make more clear that an effect of 100% or more means that the probability of going IPO changes by one standard deviation or more.
Source: Wang and Wang (2010).

Will Qianhai add to the stock of innovation or simply displace innovation from other parts of China? Figure 23 shows the flows of venture capital funds destined for China. Authors like Fan and Wan (2006) argue that Shenzhen (and Hong Kong) can produce innovation without government support of high-tech parks – and such support results in unnecessary "inequality in innovation capacity." In other words, government policy shifts R&D geographically, rather than increasing innovation in the China region. Shenzhen has access to money and ideas – many of which may serve Shenzhen-based firms with locations outside of Guangdong.[28] Even if Shenzhen does manage to fill out (with high tech firms), several authors like Zhao and Arvanitis (2010) have questioned whether non state-owned enterprises could innovate in a policy environment hostile to them. Strong centrifugal forces tend to push finance (and thus potentially innovation) to Beijing and Shanghai.[29] If we knew the rates of profitability in these areas, we would not have to talk about centrifugal forces.

[28] See Bichler and Schmidkonz (2012) for more on the Chinese Innovation System, and Shenzhen's place in it.
[29] Even though the Zhao et al. (2004) study appeared in the early 2000s.

Figure 23: Would Qianhai Simply Divert Money Going To and Coming From China?



source → sink ↓	Beijing	Shanghai	Shenzhen	Hong Kong	Overseas
Beijing	3595	490	29	240	749
Shanghai	392	3248	123	205	973
Shenzhen	72	159	229	301	85
Hong Kong	26	16	0	60	0
Other	850	1323	334	327	226

The figure shows the paths of co-investment funding among China's and foreign venture capitalists and the amount of venture capital funding in 2008
Source: Zhang (2011).

Thus, the literature points to **three robust conclusions**. First, money spent on innovation by local governments will likely be wasted. Any design for Qianhai should encourage foreign investment – preferably using Hong Kong and a conduit for foreign investment rather than as a source of investment itself. Second, joint research projects, platforms, and university joint ventures will determine the way of promoting innovation in the region. Third, the current structure of Qianhai will likely have no effects on innovation in the region. Policymakers must pursue another design – focused on harmonizing institutions – rather than investment regimes – across the Shenzhen/Hong Kong border.

Yet, we can not trust any of these conclusions without knowing the effect of policy on profits. No amount of local government support or university incubation will keep unprofitable firms in Qianhai. Qianhai firms must not only earn profits, but earn profits higher than those available in Hong Kong, Shenzhen -- as well as in all the other financial centres (as per opportunity cost). Until we know how profits attract innovative firms to a financial centre - we will not be able to say if Qianhai will succeed or fail. Never has a future research agenda been so clear.

Conclusions

Does Qianhai – a glamorized real estate development project so far – hold the potential to radically reshape innovation policy and finance in Hong Kong and Shenzhen? To date, policymakers and analysts alike misguidedly focused on investment and innovation – ignoring the vital role of profit. Companies will move to Qianhai – just as Qianhai will 'move' into Hong Kong and Shenzhen – in search of higher profits. Governments and companies will participate in the Qianhai project if they can make more profits doing so than they do now. Yet, the literature completely ignores the profit motive in describing/predicting likely investment in innovative Qianhai-based firms.

Our paper unabashedly sets the stage for future econometric work looking innovative firms' profitability in determining whether an international financial centre, like Qianhai, succeeds or fails. We show the results of previous econometric studies finding serious fault with innovation policies in the Hong Kong – Shenzhen area (an area we optimistically refer to as the Qianhai region in this paper). Yet, these misguided studies assume that innovative firms will come and stay for every reason except the one that matters most -- profitability.

Will Qianhai's regulations and other design features (like location, access to capital and so forth) allow for the sufficiently high profits needed to improve Hong Kong's and Shenzhen's competitiveness as international financial centres? Will Qianhai even develop as an international financial centre in its own right? Further econometric study will tell.

References

Alder, Simon, Lin Shao, and Fabrizio Zilibotti. (2015). Economic Reforms and Industrial Policy in a Panel of Chinese Cities. Available online.

Alix-Garcia, Jennifer, Anne-Marie Schneider, and Na Zhao. (2014). Playing Favorites: Tax Incentives and Urban Growth in China, 1978-2010. Available online.

Arner, Douglas, David Donald, Say Hak Goo, Wei-xing Hu, Chen Lin, Bryane Michael, Frank Song, Wilson Tong, Cheng-gang Xu, Dariusz Wojcik and Simon Zhao. (2014). Assessing Hong Kong as an International Financial Centre, University of Hong Kong Faculty of Law Research Paper No. 2014/012. Available online.

Baark, Erik and Naubahar Sharif. (2006). Hong Kong's Innovation System in Transition: Challenges of Regional Integration and Promotion of High-Technology. In Bengt-Ake Lundvall, Patarapong Intarakumnerd and Jan Vang (Eds). *Asia's Innovation Systems in Transition: New Horizons in the Economics of Innovation*. Available online.

Baark, Erik, Antonio Lau , William Lo, and Naubahar Sharif. (2011). Innovation Sources, Capabilities and Competitiveness: Evidence from Hong Kong Firms. DIME Final Conference. Available online.

Barbieri, Elisa and Chiara Pollio. (2015). Industrial Development and manufacturing in Chinese Territories: The Contribution of Special Economic Enclaves Policies. *Interuniversity Centre of Applied Economics Working Paper 1/2015*. Available online.

Bas Karreman and Bert van der Knaap. (2012). The Geography of Equity Listing and Financial Centre Competition in Mainland China and Hong Kong. Journal of Economic Geography 12(4). Available online.

Beck, Thorsten, Tao Chen, Chen Lin and Frank Song. (2012). Financial Innovation: The Bright and the Dark Sides. *HKIMR Working Paper No.05/2012*. Available online.

Ben, Tai-Ming and Kuan-Fei Wang. (2011). Interaction Analysis among Industrial Parks, Innovation Input, and Urban Production Efficiency, *Asian Social Science 7*(5), 2011, available online.

Bhattacharya, Utpal, Po-Hsuan Hsu, Xuan Tian and Yan Xu, (2015). What Affects Innovation More: Policy or Policy Uncertainty? *Kelley School of Business Research Paper No. 2014-48*, Available online.

Bichler, Josef and Christian Schmidkonz. (2012). The Chinese Indigenous Innovation System and its Impact on Foreign Enterprises. Munich Business School Working Paper 2012-01. available online.

Block, Fred and Matthew Keller. (2011). State of Innovation: The U.S. Government's Role in Technology Development.

Boeing, Philipp and Philipp Sandner. (2011). The Innovative Performance of China's National Innovation System. *Frankfurt School Working Paper Series 158*. Available online.

Boeing, Philipp, Elisabeth Mueller and Philipp Sandner. (2010). What Makes Chinese Firms Productive? Learning from Indigenous and Foreign Sources of Knowledge. *Frankfurt School – Working Paper Series 196*. Available online.

Brander, James, Qianqian Du and Thomas Hellmann. (2015). The Effects of Government-Sponsored Venture Capital: International Evidence. *Review of Finance 19*(2).

Chang, Xin, Yang-yang Chen, Qian Wang, Kuo Zhang, Wen-rui Zhang. (2010). The Real Effect of Financial Innovation: Evidence from Credit Default Swaps Trading and Corporate Innovation. Available online.

Chen, Hong-yi and Olaf Unteroberdoerster. (2008). Hong Kong SAR Economic Integration with the Pearl River Delta. *IMF Working Paper 08/273*. Available online.

Cheung, Edwin, Rita Lun and Lap-chee Tsui. (2015). The Ecosystem of Innovation and Technology in Hong Kong. *Our Hong Kong Foundation Working Paper*. Available online.

Commission on Strategic Development. (2015). Promotion of Innovation and Technology Development in Hong Kong. Available online.

Cumming, Douglas, Grant Fleming, and Armin Schwienbacher. (2006). Legality and Venture Capital Exits. *Journal of Corporate Finance 12*(2). Available online.

Du, Julan, Yi Lu, Zhi-gang Tao. (2008). Economic institutions and FDI location choice: Evidence from US multinationals in China. *Journal of Comparative Economics 36*(3). Available online.

Eberhardt, Markus, Christian Helmers, and Zi-hong Yu. (2011). Is the Dragon Learning to Fly? An Analysis of the Chinese Patent Explosion. *Centre for the Study of African Economies Working Paper WPS/2011-15*. Available online.

Ezell, Stephen, Adams Nager and Robert Atkinson. (2016). Contributors and Detractors: Ranking Countries' Impact on Global Innovation, Information Technology and Innovation Foundation. Available online.

Fan, Pei-lei and Guang-hua Wan. (2006). China's Regional Inequality in Innovation Capability, 1995-2004. *United Nations University Research Paper No. 2006/153*. Available online.

Fu, Wen-ying. (2011). How is Innovation Fostered Under Different Institutional Setup: Comparing the Electronics Cluster in Shenzhen and Dongguan, China. *European Regional Science Association Conference Paper ERSA11P736*. Available online.

Gao, Hua-sheng, Po-Hsuan Hsu, and Kai Li. (2015). Public Market Listing and Corporate Innovation Strategies: Evidence from Private Firms. Available online.

Girma, Sourafel, Yun-dan Gong and Holger Gorg, (2009). What Determines Innovation Activity in Chinese State-owned Enterprises? The Role of Foreign Direct Investment. World Development 37(4). Available online.

Girma, Sourafel, Yundan Gong and Holger Gorg. (2008). Foreign Direct Investment, Access to Finance, and Innovation Activity in Chinese Enterprises. *World Bank Economic Review 22*(2). Available online.

Gul, Ferdinand, Jeong-Bon Kim, and Annie Qiu. (2010). Ownership Concentration, Foreign Shareholding, Audit Quality, and Stock Price Synchronicity: Evidence from China. *Journal of Financial Economics 95*(3). Available online.

Guo, Di, Yan Guo, and Kun Jiang. (2014). Government Subsidized R&D, Project Screening, and Firms' Innovation: Evidence from China. Available online.

Hanley, Aoife, Wan-Hsin Liu, and Andrea Vaona. (2011). Financial Development and Innovation in China: Evidence from the Provincial Data. Available online.

He, Yin, Bin Li, Yun-hua Tian, Li-jun Wang. (2015). Does Foreign Venture Capital Provide More Value ‐ Added Services to Initial Public Offering Companies in China? *China & World Economy 24*(2). Available online.

Hu, Albert, Gary Jefferson, and Jin-chang Qian. (2005). R&D and Technology Transfer: Firm-Level Evidence from Chinese Industry. *Review of Economics and Statistics 87*(4). Available online.

Hung, Ming-yi, TJ Wong, and Tian-yu Zhang. (2012). Political considerations in the decision of Chinese SOEs to list in Hong Kong, 53 Journal of Accounting and Economics 53(1). Available online.

Hsiao, Cheng, Steve Ching and Ki-Wan Shui. (2012). A Panel Data Approach for Program Evaluation: Measuring the Benefits of Political and Economic Integration of Hong Kong with Mainland China. *Journal of Applied Econometrics 27*(1). Available online.

Huang, Can, Yi-lin Wu, Pierre Mohnen, and Yan-yun Zhao. (2013). Government Support, Innovation and Productivity in the Haidian (Beijing) District. *United Nations University Working Paper #2013-058*. Available online.

Huang, Can and Naubahar Sharif. (2009). Manufacturing dynamics and spillovers: The case of Guangdong Province and Hong Kong, Macau, and Taiwan (HKMT). *Research Policy 38*.

Jefferson, Gary, Hua-mao Bai, Xiao-jing Guan, and Xiaoyun Yu. (2006). R&D Performance in Chinese industry. *Economics of Innovation and New Technology 15*(4-5). Available online.

Jin, Ying, Richard Bullock, and Wan-li Fang. (2013). Regional Impacts of High Speed Rail in China: Spatial Proximity and Productivity in an Emerging Economy: Econometric Findings from Guangdong Province. *People's Republic of China Working Paper 2*. Available online.

Johansson, Anders and Christer Ljungwall. (2009). Spillover Effects Among the Greater China Stock Markets Long-run Equilibrium, Short-Term Adjustment, and Spillover Effects Across Chinese Segmented Stock Markets and the Hong Kong Stock Market. *World Development 37*(4). available online.

Klerkx, Laurens and Cees Leeuwis. (2009). Establishment and Embedding of Innovation Brokers at Different Innovation System Levels: Insights from the Dutch Agricultural Sector. *Technological Forecasting and Social Change 76*(6), 2009.

Lau, Antonio, Esther Tang and Richard Yam. (2010). Effects of Supplier and Customer Integration on Product Innovation and Performance: Empirical Evidence in Hong Kong Manufacturers. *Journal of Product Innovation Management 27*(5).

Lee, Hing-Wah. (2009). The Price Premium of China A-Shares over Hong Kong H-Shares: A Further Visit of the Liquidity Hypothesis. *Asia-Pacific Journal of Financial Studies 38*(5). available online.

Li, Hong. (2007). International Linkages of the Chinese Stock Exchanges: A Multivariate GARCH Analysis. *Applied Financial Economics 17*:4. Available online.

Li, Ping, Rong Li and Yan-gao Xiao and Xiao-hong Cai. (2006). Empirical Research on the Competence of Intellectual Property Rights in Shenzhen Based on Regional Industrial Innovation. *Journal of Electronic Science and Technology of China 4*(4). Available online.

Liu, Yu-can, Xiao-min Gu and Jie-ting Chen. (2010). The Role of Venture Capital in IPOs: Evidence from Shenzhen Stock Market. available online.

Liu, Xiao-hui and Peter Sinclair. (2008). Does the linkage between stock market performance and economic growth vary across Greater China? *Applied Economics Letters 15*(7). Available online.

Qiao, Zhou, Thomas Chiang, and Wing-Keung Wong. (2008). Long-run Equilibrium, Short-Term Adjustment, and Spillover Effects Across Chinese Segmented Stock Markets and the Hong Kong Stock Market. *Journal of International Financial Markets, Institutions and Money 18*(5). Available online.

Reynoso, Rafael and Jordan Litner. (2015). The Global Innovation Index 2015: Effective Innovation Policies for Development. Available online.

Sawyer, Charles, Kiril Tochkov and Wen-ting Yu. (2015). Regional and Sectoral Patterns and Determinants of Comparative Advantage in China. *Texas Christian University Department of Economics Working Paper Series Working Paper Nr. 15-02*. Available online.

Sharif, Naubahar and Erik Baark. (2010). The Tamest of Tigers? Understanding Hong Kong's Innovation System and Innovation Policies. Available online.

Sharif, Naubahar and Can Huang. (2010). Innovation strategy, Firm Survival and Relocation: The Case of Hong Kong Owned Manufacturing in Guangdon province, China. *UNU Merit Working Paper Series #2010-052*.

Shen, Jian-Fa. (2014). Not Quite a Twin City: Cross-boundary Integration in Hong Kong and Shenzhen. *Habitat International 42*. Available online.

Shen, Jian-fa and Xiao-long Luo. (2013). Relationship between Hong Kong and Mainland China in Transition: From Fortress Hong Kong to Hong Kong–Shenzhen Metropolis: the emergence of government-led strategy for regional integration in Hong Kong. *Journal of Contemporary China 22*(84).

Tung, Samuel and Stella Cho. (2000). The Impact of Tax Incentives on Foreign Direct Investment in China. *Journal of International Accounting, Auditing and Taxation 9*(2). Available online.

Wang, Lan-fang and Su-sheng Wang. (2011). Cross-Border Venture Capital Performance: Evidence from China. *Pacific-Basin Finance Journal 19*(1). Available online.

Wu, Cui-feng, Shi-nong, Wu and Jing Yang. (2012). The Role of Venture Capital in China's Listed Companies on the GEM: Certification or Grandstanding? Available online.

Xu, Yan and Shu Yu. (2012). Total Factor Productivity among Cities in China: Estimation and Explanation. *Conference Board Economics Program Working Paper 12 – 01*. Available online.

Xu, Hui, Su-sheng Wang and Zhi-chao Li. (2010). Research on Shenzhen University-Industry Cooperation Based on Patent Data Analysis. *International Conference on Management Science & Engineering*.

Yang, Xian-ming, Zan-xin Wang, Ying Chen, and Fan Yuan. (2011). Factors Affecting Firm-Level Investment and Performance in Border Economic Zones and Implications for Developing Cross-Border Economic Zones between the People's Republic of China and its Neighboring GMS Countries. *Greater Mekong Subregion–Phnom Penh Plan for Development Management Research Report Series 1(1)*. Available online.

Yasar, Mahmut. (2013). Imported Capital Input, Absorptive Capacity, and Firm Performance: Evidence From Firm-Level Data. *Economic Inquiry 5*(1). Available online.

Yueh, Linda. (2006). The Determinants of Innovation: Patent Laws, Foreign Direct Investment and Economic Growth in China. Available online.

Zhang, Jun. (2010). The spatial dynamics of globalizing venture capital in China. *A Environment and Planning 43*. Available online.

Zhang, Jun-sen, Harry Wu, Wing-Sung Yun, Shao-jin Zhou and Ning Zhang. (2009). A Further Study on the Future Development of the Hong Kong Economy, Consolidation and Enhancement of Existing Core Industries and Development of Economic Areas with High Potential in Hong Kong. *Monograph for Hong Kong's Central Policy Unit*. Available online.

Zhao, Wen-feng. (2016). Financial Development and Regional Innovation Output Growth: Based on Empirical Analysis of Provincial Panel Data in China. *Modern Economy 7*(1). Available online.

Zhao, Wei and Rigas Arvanitis. (2010). The Innovation and Learning Capabilities of Chinese Firms: Technological Development in the Automobile and Electronics Industries. *Chinese Sociology and Anthropology 42*(3). Available online.

Zhao, Simon, Li Zhang and Danny Wang. (2004). Determining Factors of the Development of a National Financial Center: The Case of China. *Geoforum 35*(5). Available online.

Zheng, Si-qi, Wei-zeng Sun, Jian-feng Wu, and Matthew Kahn. (2015). The Birth of Edge Cities in China: Measuring the Spillover Effects of Industrial Parks. Available online.

Zhu, Zhao-hui and Feng Huang. (2012). The Effect of R&D Investment on Firms' Financial Performance: Evidence from the Chinese Listed IT Firms. *Modern Economy 3*. Available online.

Zhu, Ping-fang, Wei-min Xu and Nan-nan Lundin. (2006). The Impact of Government's Fundings and Tax Incentives on Industrial R&D Investments—Empirical Evidences from Industrial Sectors in Shanghai. *China Economic Review 17*(1). Available online.