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Changes in Chinese higher education: Financial trends in China, Hong Kong and Taiwan

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ABSTRACT

The cost of higher education (HE) continues to grow at an unsustainable rate in many country contexts, including in East Asia. With recent and projected HE growth in this region, HE administrators are increasingly faced with how best to provide cost-effective delivery while at the same time addressing how to meet workforce demands of increased quality, accountability, and international standards of excellence. In this article, we examine good and best practices of HE finance models in China, Hong Kong, and Taiwan. A primary objective of this article is to highlight a select number of exemplary models of HE financing that can reduce or at least help level off this unsustainable trend. We conclude with recommendations to assist policy makers, government planners, and HE administrators in their attempts to meet the financial challenges of today and in the future.

1. Higher education funding challenges in China, Hong Kong and Taiwan[1]

In the past few decades, the term "globalization" has gained popularity in shaping the academic discourse (Fukuyama, 1992; Giddens, 1990; Robertson, 1992; Sklair, 2002; Zajda and Rust, 2016), especially when researchers and policy analysts critically examine rapid social, economic, political, and cultural changes taking place in Asia due to the growing influence of the increasingly globalized economy. As McNally rightly (2001) argued, "no country is immune from the globalization process and/or its impact" (p. 96); accordingly, the overwhelming trend of globalization has significantly changed the economic, political, commercial, and educational facets around the world (Albrow, 1996; Bauman, 1998; Beck, 1992; Giddens, 1990, 2002; Gray, 1998; Hawkins, 2007; Robertson, 1992; Sklair, 2002; Yang, 2005). In order to address the changing socioeconomic and labor market needs resulting from the rise of the knowledge-based economy, a growing number of Asian countries have made serious attempts to increase the higher education (HE) learning opportunities through developing not only publicly-funded but also privately-run-and-funded higher education institutions (HEIs) (Mok and Wu, 2016). Hence, the rapid expansion in HE has inevitably transformed the HE sector from an elite to a mass system across different parts of the Asia Pacific region (Mok and Jiang, 2017a; Marginson, 2016).

When examining the major development trends of HE in East Asia and the Greater China region (including societies from China, Hong Kong, and Taiwan), it is not difficult to identify significant changes in HE governance. According to Mok (2010, p.8), these changes include

- The quest for world-class university and the stratification of universities;
- The increase in private funding sources and intensifying inequality in education;
- The tension between internationalization and preservation of local and regional uniqueness;
- The massification of HE and assurance of academic quality;
- The corporatization of universities and the impact on academic freedom; and
- The marketization of HE and the potential threat to less market-driven disciplines.

Correspondingly, as a result of globalization and privatization of HE, many Asian states are caught in a dilemma of treating HE as a

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[1] In this article, "China" refers to the "Mainland China," which means the geopolitical area of China excluding the Special Administrative Regions of Hong Kong and Macau, as well as Taiwan.

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"public good" versus a "private good," and many governments have adopted policies that favor private HE more out of compulsion than any strong conviction (Collins et al., 2016). Therefore, we can easily find competing messages regarding the nature of private HE whether it favors "privatization but not commercialization," "private participation but not privatization," or "public-private partnership" (Tilak, 2006, p. 120). The present article sets out against the wider policy context briefly outlined above to examine innovative financial models from comparative and international contexts that support optimal HE learning outcomes in China, Hong Kong, and Taiwan.

1.1. Overview of HE financing in China

Since the foundation of the People's Republic of China in 1949, its HE system has been dominated by the public HEIs. A minority of public HEIs are administrated by the China Ministry of Education (CMOE) or other ministries or commissions within the central government, and most are under the administration of provincial or municipal governments. As of 30 May 2016, China had a total of 2879 HEIs, among which 2137 were public. The private HE sector contained 469 *minban* (people-run) HEIs, 266 independent colleges, and seven Chinese-foreign cooperative HEIs[2] (CMOE, 2016a). Public HEIs in China are widely considered the most prestigious and generally provide the highest quality learning outcomes for graduates (Li and Morgan, 2011; Wang, 2014). In the wake of the tremendous HE expansion since 1998, China experienced a dramatic increase of enrollment, and currently has the largest number of HE enrollment in the world. As of 2015, 41.40 million students were studying in various types of HE programs and institutions, and the gross enrollment rate reached 40.0% of the eligible-age cohort from ages 18 to 22 (CMOE, 2016b,c).[3]

Roughly 88 universities were recognized by the central government in 1978 as national key universities. These institutions played a significant role historically and continue their prominence today buoyed by substantial policy-based preferential support from central and local governments. In the 1990s, the Chinese government implemented "Project 211" and "Project 985" to facilitate the development of national high-level and world-class universities, many of which included the national key universities. Currently, there are 122 "211" universities and 39 "985" universities. Chinese leaders promoted additional HE reforms through the "2011 Plan" to encourage greater coordinated innovation among HEIs. This project has since become an integral part of the efforts of the government to build several world-class universities (Chen et al., 2012; Li, 2011). In 2012, 100 HEIs were selected into the "Basic Ability Construction Project of HEIs in Western and Central China" and 14 into the "Comprehensive Ability Enhancement Project of HEIs in Western and Central China" to promote HE development in Western and Central China.

Among the most prominent trends at the forefront of Chinese HE is the government's effort to internationalize its domestic HEIs. International cooperation efforts are generally encouraged by the government. In 2003, the State Council of China promulgated the *Regulations of the People's Republic of China on Chinese-Foreign Cooperation in Running Schools* to standardize Chinese-foreign cooperation in HEIs, strengthen international exchanges, and establish greater collaboration opportunities in the field of education. Among the cooperation opportunities now available include establishing Chinese-foreign cooperative organizations and programs.[4] As of 28 September 2016, there were 68 undergraduate-level and 33 graduate-level Chinese-foreign cooperative organizations, and 914 undergraduate and 206 graduate-level cooperative programs (CMOE, 2016d). Among the Chinese-foreign cooperative organizations, there are seven HEIs with independent legal status recognized by the CMOE: University of Nottingham Ningbo China; Beijing Normal University-Hong Kong Baptist University United International College; Xi'an Jiaotong-Liverpool University; New York University Shanghai; Duke Kunshan University; Wenzhou-Kean University; and the Chinese University of Hong Kong, Shenzhen (CMOE, 2016a).

Governmental expenditure on education as a percentage of GDP maintained a modest increase from the mid-1990s to 2012, when a 4% expenditure of GDP goal was achieved. Roughly 20% of the total education expenditure budget has been devoted to HE since 1999 (see Table 1).

From 1949 to the early 1980s, all Chinese HEIs were entirely funded by the central government. After the implementation of the *Reform and Opening-Up Policy* in 1978, gradual market-oriented fiscal reforms began and eventually had an impact on HE. Provincial governments were granted more flexibility in raising and managing public expenditures, including those directly related to HE. This trend impacted the HE sector and resulted in the government's *Decision of the CCP Central Committee on the Reform of the Educational Structure* in 1985, which foreshadowed that some neoliberal principles would eventually be applied in the Chinese HE system (Wang, 2014). This market influence has led to significant reforms in HE (Jacob, 2004).

First, HE funding streams have become much more diversified. Public HEIs have shifted from sole dependence on government funding to other sources, including donations, tuition, miscellaneous fees, and auxiliary revenues. Table 2 and Fig. 1 show that from 1995 to 2013, the percent of governmental appropriations to Chinese HEIs decreased and reached the lowest point in 2005, while during the same period the tuition and miscellaneous fees percentage increased from 15.2% to a peak of 33.9% in 2008.

During the last decade, this trend was reversed, in that government appropriations increased while tuition and other fees were consistently lowered. One major reason for this HE financing shift is the increased government expenditure on *minban* HEIs.

The second significant transformation is the rapid development of the private HE sector, including *minban* HEIs and independent colleges. *Minban* HEIs constitute the main body of the private HE sector and have experienced a rapid development since the Chinese government implemented the *Non-State Education Promotion Law of the People's Republic of China* in 2002. *Minban* HEIs are owned and operated by civil society organizations, individuals, or other private organizations, and their funding usually comes from non-state financial aid, including tuition, fees, and donations (Standing Committee of the National People's Congress, 2002).

Independent colleges are essentially *minban* HEIs; however, they have unique funding and management models that are different from normal *minban* HEIs. Since the 1990s, and in the wake of the vast HE expansion nationwide, public HEIs began to

[2] Chinese-foreign cooperative HEIs include universities and colleges operated cooperatively by HEIs in Mainland China and Hong Kong.

[3] HE enrollment includes graduate and undergraduate students studying in regular and adult HEIs, as well as students enrolled in other formal HE programs (e.g., master's programs for on-the-job personnel and web-based undergraduate programs).

[4] "Chinese-foreign cooperative organizations" refer to the educational organizations cooperatively run by Chinese and foreign HEIs (including HEIs in Hong Kong and Macau). These organizations can be independent HEIs with legal status, which are called "Chinese-foreign cooperative HEIs" in this article. They also can attach to parent institutions without independent legal status. "Chinese-foreign cooperative programs" refer to the cooperative educational and teaching activities between Chinese and foreign HEIs (including HEIs in Hong Kong and Macau) without establishing formal education institutions. These programs mainly aim to enroll Chinese citizens.

Table 1
Governmental expenditure on education and HE in China, 1995–2015.

Year	Governmental expenditure on education as percentage of GDP	Governmental HE expenditure as percentage of total education budget
1995	2.35%	14.4%
1996	2.44%	14.1%
1997	2.49%	17.9%
1998	2.55%	18.9%
1999	2.79%	20.7%
2000	2.87%	22.0%
2001	3.19%	21.8%
2002	3.32%	22.6%
2003	3.28%	22.8%
2004	2.79%	22.6%
2005	2.81%	21.9%
2006	3.00%	20.5%
2007	3.22%	19.9%
2008	3.33%	19.7%
2009	3.59%	19.0%
2010	3.65%	20.2%
2011	3.93%	22.0%
2012	4.28%	NA
2013	4.16%	20.1%
2014	4.10%	NA
2015	4.26%	NA

Sources: Authors' calculations based on data from the National Bureau of Statistics of China (NBSC, 2015) and CMOE and NBSC (2016).

Table 2
Composition of Chinese HE institutional revenue, 1995–2013.

Year	Governmental appropriation for HE	Social organizations and individual funding sources[a]	Funding for *minban* HEIs[a]	Donations and fund raising	Auxiliary revenue[b]	Tuition and miscellaneous fee	Other revenues
1995	69.5%	NA	NA	1.5%	9.1%	15.2%	4.6%
1996	68.2%	NA	NA	1.6%	8.3%	16.3%	5.6%
1997	76.5%	0.4%	NA	1.4%	NA	16.3%	5.4%
1998	64.2%	0.4%	NA	2.0%	NA	14.3%	19.2%
1999	61.8%	0.5%	NA	2.1%	NA	18.0%	17.5%
2000	57.3%	0.9%	NA	1.6%	NA	22.0%	18.1%
2001	53.4%	2.0%	NA	1.4%	NA	25.0%	18.1%
2002	49.7%	2.6%	NA	1.8%	NA	26.9%	18.9%
2003	46.8%	4.1%	NA	1.4%	NA	29.3%	18.4%
2004	44.7%	5.8%	NA	1.0%	NA	30.7%	17.8%
2005	42.5%	6.8%	NA	0.8%	NA	31.5%	18.4%
2006	42.6%	7.7%	NA	0.6%	12.6%	29.6%	6.9%
2007	43.8%	NA	0.8%	0.7%	14.4%	32.5%	7.7%
2008	47.4%	NA	0.7%	0.7%	10.5%	33.9%	6.7%
2009	48.7%	NA	0.7%	0.6%	10.2%	33.3%	6.5%
2010	52.7%	NA	0.5%	0.5%	9.8%	30.6%	5.9%
2011	58.3%	NA	0.5%	0.6%	8.5%	26.5%	5.5%
2013	60.3%	NA	0.4%	0.5%	8.5%	25.0%	5.2%

[a] After 2007, the line item "Funds of Social Organizations and Individuals" was changed to "Funding for *minban* HEIs," which refers to only funding from individual sources.
[b] From 1997 to 2005, the "Auxiliary Revenue" was included in the item of "Other Revenues."*Sources:* Calculations of data from CMOE and NBSC (1996–2012, 2014); 2012 data is not available from these sources.

cooperate much more with industrial organizations and individuals to establish and manage second-tier colleges, which are largely operated as independent private institutions using non-governmental funding. This unique funding partnership model includes the use of public HEI faculty members and facilities. In 2003, the CMOE issued the *Opinions on Regulation and Promotion of Running Independent Colleges by Regular Higher Education Institutions in the New System and Models* to regulate second-tier colleges, and the name "independent college" was proposed and accepted in this official document. In 2008, CMOE issued the *Measures for Establishment and Administration of Independent Colleges*, which formally recognized independent colleges as HEIs with independent legal status. This policy document clearly defined the nature of independent colleges as "higher education institutions engaging in undergraduate education which are established by regular higher education institutions, or jointly with organizations or individuals with funding from non-governmental sources" (CMOE, 2008, Article 2). Regular HEIs that manage or cooperate in the oversight of independent colleges must be highly-ranked in both teaching and research. The 2008 regulation provides national standards regarding the quality assurance of the education provided by independent colleges (CMOE, 2008). In 2008, there were 322 independent colleges recognized by the CMOE, but the number has steadily dropped since 2010 when some independent colleges were granted regular *minban* HEI status (see Fig. 2).

Compared with public colleges and universities, private HEIs, including *minban* HEIs and independent colleges, are not allowed to provide postgraduate courses. Most of them focus on providing vocational education. Only a few *minban* HEIs and independent colleges are accredited to award bachelor's degrees (Wang, 2014). It is noteworthy that the private HE sector in China is not entirely "private" or autonomous because it is still under the

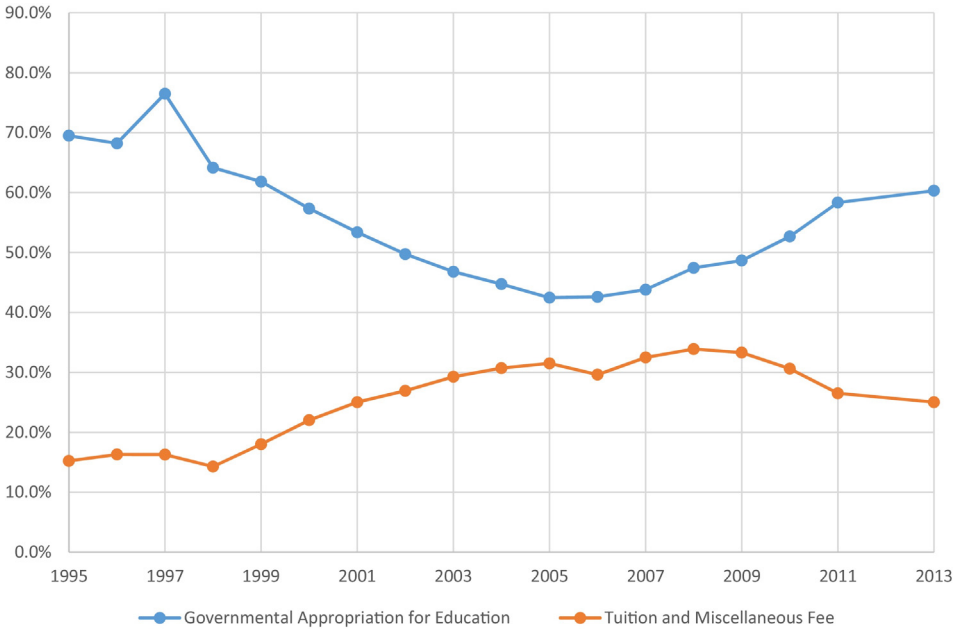


Fig. 1. Percent of government appropriations and tuition and miscellaneous fees in Chinese HEIs revenue streams.
Sources: Authors' calculations of data from CMOE and NBSC (1996–2012, 2014); 2012 data is not available from these sources.

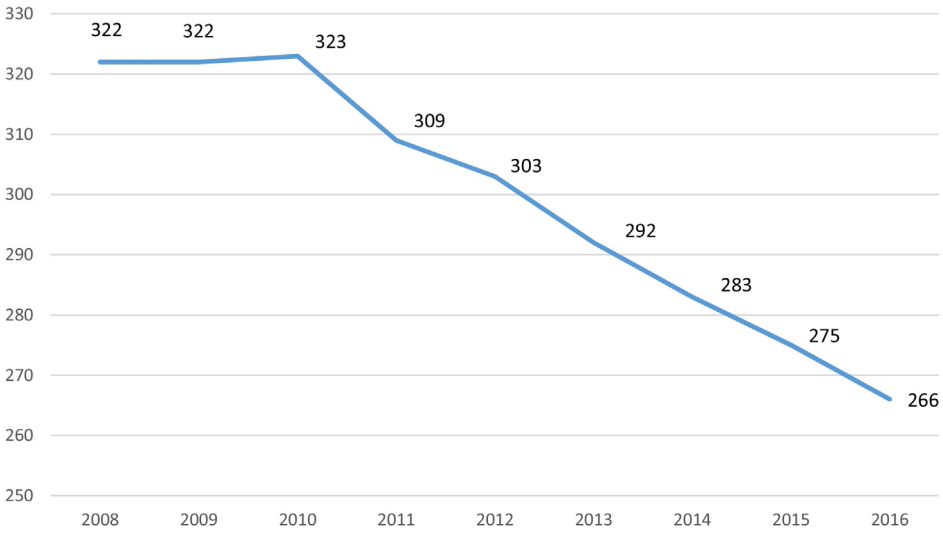


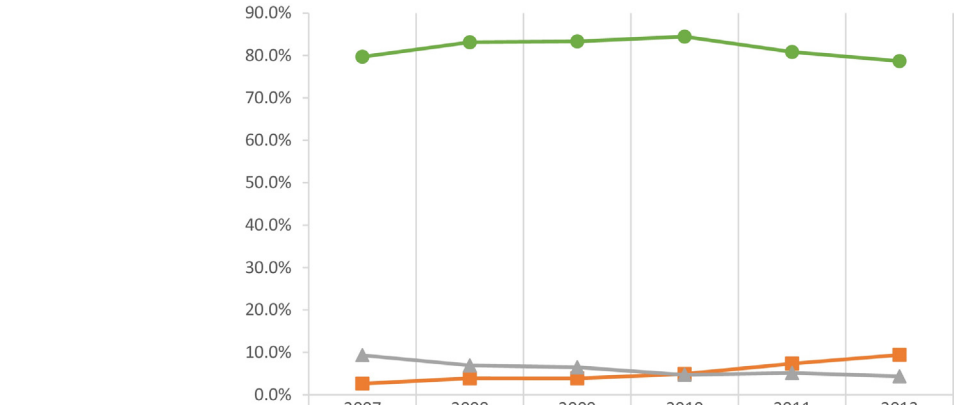
Fig. 2. The number of independent colleges in China, 2008–2016.

Source: CMOE (2016e).

administration of provincial and municipal Department of Education (Mok and Han, 2017). Meanwhile, private HEIs are also eligible to receive funding from local governments. Since 2007, the proportion of government funding has increased dramatically in support of *minban* HEIs from 2.6% to 9.4% in 2013, while the funding support from founding organizations and individuals has consistently decreased over the same period. Tuition and miscellaneous fees remain the primary source of *minban* HEI financing (see Fig. 3). There also exist debates about whether central and local (provincial and municipal) governments should increase the amount of funding they allocate to the private HE sector to better facilitate the development of high-level *minban* HEIs (Zhou, 2011).

1.2. Overview of HE financing in Hong Kong

Although the Hong Kong Special Administrative Region Government (HKSAR, hereafter) is keen to expand HE to better cope with the rapid social, economic and labor market needs resulting from the rise of the knowledge-based economy, the HKSAR realizes depending upon the government alone and primarily on public funding sources would be insufficient to meet the pressing education demand from the citizens. Calling for diversification in HE, the HKSAR Government has therefore encouraged more non-government actors, including the private sector, to get involved in running HEIs to offer a wider range of choices for students. Against this particular background, Hong



	2007	2008	2009	2010	2011	2013
Governmental Appropriation	2.6%	3.9%	3.9%	4.9%	7.3%	9.4%
Funding from Founding Org. and Individual	9.3%	6.9%	6.5%	4.7%	5.2%	4.4%
Tuition and Miscellaneous Fee	79.7%	83.1%	83.3%	84.5%	80.8%	78.7%

Fig. 3. Percent of revenue from government appropriations, funding from founding organizations and individuals, and tuition and miscellaneous fees of *minban* HEIs, 2008–2013.
Sources: Authors' calculations based on data from CMOE and NBSC (1996–2012, 2014); 2012 data is not available from these sources.

Kong's HE system has transformed from a relatively elite system toward a mass one, with both public and private sectors offering different types of HE learning opportunities (Mok, 2013; Mok and Chan, 2016).

Located at the Southern coast of China, HKSAR is a highly urbanized and modern city, with a population of over 7 million. Between 1842 and 1997, it was under the colonial rule of Britain, during which period its HE system was established. 1989 is an important turning point in the history of Hong Kong's HE system when the government decided to increase the enrollment rate of tertiary education from around 6% to 18%. Through establishing the Hong Kong University of Science and Technology in 1991, together with upgrading and conferring the university title to the existing polytechnics or colleges of higher learning, the number of publicly funded HEIs increased from two to eight, representing the core sector of Hong Kong's HE system. After reverting to Chinese sovereignty in 1997, Hong Kong was conferred with Special Administrative Region status and allowed to continue its long-standing economic system (i.e., operating the capitalist system with free market ideology and enjoying a relatively high autonomy in various aspects under the principle of "One country, Two Systems").

The expansion of HE continues, especially when the newly established HKSAR Government was alarmed by the Asian financial crisis and acknowledged the importance of HE to improve and sustain Hong Kong's global competitiveness (Education

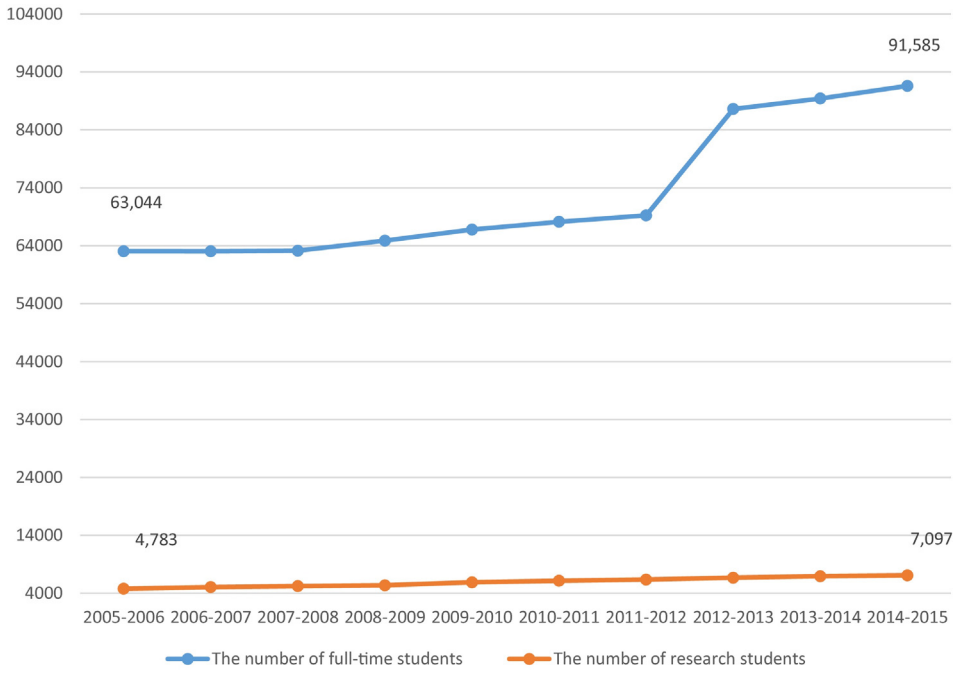


Fig. 4. The number of students in UGC-funded HEIs (2005–2015).

Source: UGC (2016).

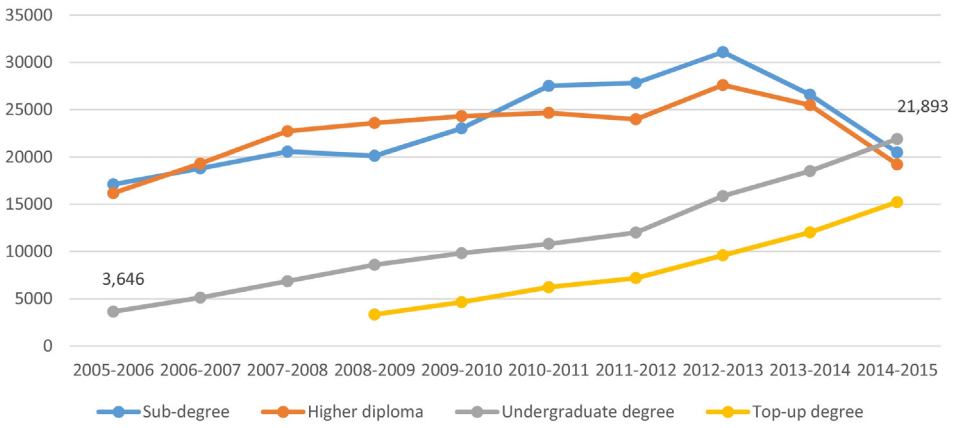


Fig. 5. The number of self-financed students in Hong Kong (2005–2015).
Source: iPASS (2016). *Note:* The data for top-up degree is available since 2008/09 academic year.

Commission, 2000). Recognizing that an elite system of tertiary education cannot provide a sufficiently high-quality labor force to convert the economy from a manufacturing to a knowledge-based one (Kember, 2010, p. 170), the government planned to offer 60% of secondary school graduates opportunities to receive HE within ten years (Education and Manpower Bureau, 2001, p. 4). More ambitiously, the goal to "provide opportunities for everyone who aspires to HE to attend programs appropriate to their abilities" has guided the HE development in the city-state in the last decade (Education Commission, 1999, p. 18). Since 2000, the size of students enrolled in eight institutions funded by the University Grants Committee (UGC) has been expanding. For instance, in the academic year 2005–2006, the number of full-time undergraduates in the public HE sector was 63,044 while in 2014–2015, the number rose to 91,585. During the same period, the number of full-time students in Research Postgraduate Programs (RPg) in the aforementioned HEIs has increased from 4783 to 7097 (Fig. 4).

In order to achieve the policy objectives outlined above to create more HE opportunities for meeting the pressing demand for education, we have witnessed the emergence and rapid expansion of the private HE sector, as a complementary sector of Hong Kong's HE system, running on a number of self-financing programs. In the academic year 2001–2002, there were 11 institutions (including UGC-funded institutions and their extension arms) providing 38 accredited, self-financing, sub-degree programs. This figure surged to 348 programs with 22 institutions in 2014–2015 (iPASS, 2016). In order to meet the growing demand for undergraduate education generated by the sub-degree graduates, a significant increase of full-time undergraduate programs on a self-financing basis has been realized, from 3646 in 2005–2006 to 21, 893 in 2014–2015 (Fig. 5).

In line with the policy supporting the development of more private HEIs or universities in Hong Kong, in 2008 Shue Yan College was granted university status as the first private university (Lee, 2014). As of 2015, there are 20 degree-awarding HEIs in Hong Kong consisting of eight HEIs funded by UGC and 11 private (self-financing) universities/HEIs, as well as one publicly-funded Hong Kong Academy for Performing Arts (Table 3).

Another noticeable turning point in Hong Kong's HE sector was the call made in 2004 to develop Hong Kong as a regional education hub. Through inviting non-local HE providers and increasing non-local students, the government aims to become a regional student hub as well as skilled workforce/talent hub (Lai & Maclean, 2014). To serve this purpose, the government has relaxed immigration and employment regulations and raised the proportion of non-local students in the eight UGC-funded HEIs. As a

Table 3
Twenty degree-awarding HEIs in Hong Kong, 2015.

Nature	Institutions
UGC-funded	The University of Hong Kong (HKU)
	The Chinese University of Hong Kong (CUHK)
	The Hong Kong University of Science and Technology (HKUST)
	City University of Hong Kong (CityU)
	Hong Kong Baptist University (HKBU)
	Lingnan University (LU)
	The Hong Kong Polytechnic University (PolyU)
	The Hong Kong Institute of Education (HKIED)
Publicly funded	Hong Kong Academy for Performing Arts
Self-financing	Caritas Institute of Higher Education
	Centennial College
	Chu Hai College of Higher Education
	Hang Seng Management College
	HKCT Institute of Higher Education
	Hong Kong Nang Yan College of Higher Education
	Hong Kong Shue Yan University
	Tung Wah College
	Technological and Higher Education Institute of Hong Kong, Vocational Training Council
	The Open University of Hong Kong
	Gratia Christian College

Note: Hong Kong Academy for Performing Arts is not funded through the University Grants Committee. *Source*: Education Bureau (2016).

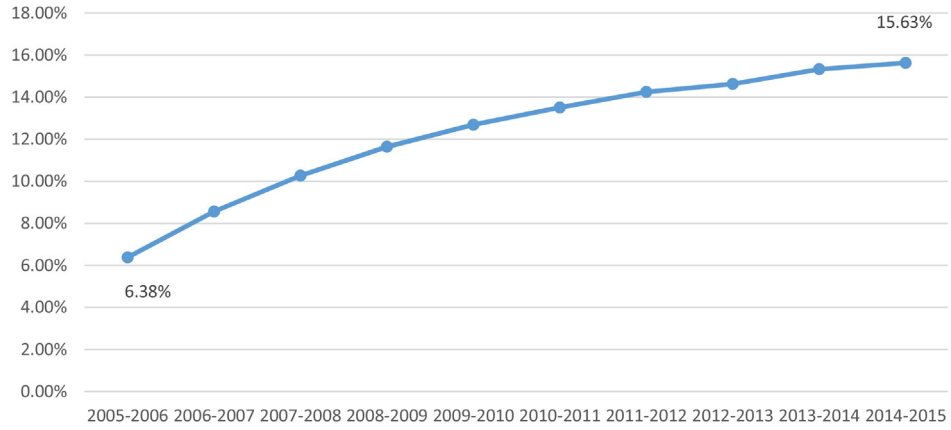


Fig. 6. Increasing rate of non-local students in UGC-funded HEIs (2005–2015).

Source: UGC (2016).

result, the ratio of non-local enrollments in the UGC-funded sector has significantly grown from 6.38% to 15.63% between 2005–2006 and 2014–2015 (see Fig. 6).

Our above discussions and statistics suggest a significant expansion of HEIs no matter whether they are public or private in orientation. The growth in terms of quantity of HEIs, as well as the increase of students enrolling in tertiary education programs, has raised social concerns as to whether the massification of HE would negatively affect academic quality. The table below provides the details regarding governmental expenditure on education in Hong Kong, indicating a steady source of funding from public financing in support of education in the city-state. Most important of all, the HKSAR has invested over 20% of the total public expenditure on education, with about a 43.1% increase in HE finance from the allocation of HK$12.487 billion in 2005–2006 academic year to HK $17.867 billion in 2014–2015 academic year (UGC, 2016) (Table 4).

In addition to the increase of public expenditure, the rapid growth of the HE sector in Hong Kong is also related to the growth of non-governmental funding through different kinds of fund raising activities. These include fund raising through donations, diversifying funding sources through providing self-financed programs and recruitment of non-local fee-paying students, taking up more commissioned projects, and engaging in various forms of income-generating and entrepreneurial activities. Table 5 shows different sources of funding obtained by the UGC-funded HEIs in the city-state. Government funding accounts for over half (51.9%) of all financing for these eight institutions; another third (31.5%) is derived from tuition, programs, and other fees. Donations comprise roughly 5% of their finance model. One point that deserves attention here is that for those non-governmental funded HEIs, they have to rely on private sources of funding, and tuition fees therefore constitute a very significant part of their finance model.

1.3. Overview of HE financing in Taiwan

Since 1949 when only one university and two junior colleges existed in Taiwan, the number of HEIs has grown dramatically to 164 as a peak in 2007, which included 149 universities and 15 junior colleges (Cheng, 2009; Hung and Cheng, 2008; Yang and Cheng, 2011). According to Martin Trow's typology (1973, 2001), HE in Taiwan has proceeded from an elite type to a mass type, and finally has achieved a universal type. However, along with the current low birthrate crisis, the development of HEIs in Taiwan faces an unprecedented challenge. Between 2011 and 2015, the number of HEIs declined to 158 including 145 universities and 13 junior colleges (see Table 6). Likewise, the birthrate in Taiwan has consistently declined overtime from 15.7% in 1991 to 11.65% in 2001, 7.21% in 2010, and 8.99% in 2014. This declining birthrate has significantly influenced enrollment and funding trends in HEIs (Taiwan Ministry of Education [TMOE], 2014a).

Taiwan HE achieved an enrollment rate of more than 1,320,000 college students between 2007 and 2015. The number of HE student enrollments reached a peak of 1,355,290 in 2012 and has decreased ever since. The 18-to-21-year-old population has maintained an enrollment rate of near 1,300,000, changing at a modest rate. Conversely, a decline of approximately 28,000 enrollments occurred among the non 18-to-21-year population from 2012 to 2015 (a decrease of nearly 40% over four years). In terms of international students who study in Taiwan, enrollment

Table 4
Governmental expenditure on education in Hong Kong.

Year	Percentage of GDP (%)	Percentage of expenditure of UGC-funded HEIs of expenditure on education
2003/04	4.45	25.50
2004/05	4.03	22.90
2005/06	3.72	23.90
2006/07	3.34	24.10
2007/08	3.14	23.20
2008/09	4.50	17.10
2009/10	3.41	22.00
2010/11	3.27	23.40
2011/12	3.44	24.10
2012/13	3.75	24.30
2013/14	3.53	22.80
2014/15	3.41	24.10

Source: UGC (2016).

Table 5
The funding sources of eight UGC-funded HEIs, 2014–2015 (in thousands, HKD).

	Government subventions	Tuition, programs and other fees	Donations and benefactions	Auxiliary services	Other income	Interest and/or investment income	Total
HKU	4,456,845	2,584,004	681,949	312,090	702,768		8,737,656
CUHK	4,456,000 (including 10,000 matching grant)	1,979,000	480,000	259,000	539,000	367,000	8,080,000
HKUST	2,241,000	1,030,000	86,000	567,000 (including the reserve fund)	−96,000	3,828,000	
CityU	2,300,000	1,854,000	166,000	218,000		4,538,000	
PolyU	2,964,000	2,207,000	168,000	825,000	189,000	6,353,000	
HKBU	1,186,400	1,143,300	106,900	231,100	37,700	39,300	2,744,700
LU	453,613	268,311	25,997	31,531	6347	28,493	814,300
HKIED	914,824	458,935	26,805	36,424	15,410	19,262	1,471,660

Table 6
Numbers of HEIs in Taiwan, 2007–2015.

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Universities (pub/pvt)	100 (42/58)	102 (42/60)	105 (42/63)	112 (45/67)	116 (46/70)	120 (47/73)	122 (47/75)	124 (48/76)	126 (48/78)
Colleges (pub/pvt)	49 (10/39)	45 (8/37)	44 (9/35)	36 (6/30)	32 (5/27)	28 (4/24)	25 (3/22)	21 (1/20)	19 (1/18)
Junior colleges (pub/pvt)	15 (3/12)	15 (3/12)	15 (3/12)	15 (3/12)	15 (3/12)	14 (2/12)	14 (2/12)	14 (2/12)	13 (2/11)
Total	164	162	164	163	163	162	161	159	158

Note: "Pub" refers to "Public," and "Pvt" is the abbreviation of "Private."*Source:* TMOE (2015e).

has been dramatically increasing since 2007. For instance, the number of enrollments in 2015 was three-and-a-half times more than that in 2007. The changes concerning nontraditional and international HE students have an impact on the financing of HEIs in Taiwan (Table 7).

The percent of governmental expenditures on education maintained more than 4% of GDP during 2000 and 2014 with the exception of the years 2000, 2007, 2013, and 2014 (see Table 8). Since 2000, governmental expenditures on education peaked at 4.59% in 2009, while it reached the minimum of 3.09% in 2013. More than 30% of the total education expenditure budget has been devoted to HE since 2000. An increasing trend concerning educational expenditures on HE has emerged until 2007, when there was a gradual decrease in educational expenditures on HE. In other words, the Taiwan government invests more in compulsory education. Instead of relying entirely on governmental funding, Taiwanese HEIs need to seek more funds from other sources.

The sources of self-help funds in Taiwanese HEIs are diverse. Public HEIs receive more funds from the Taiwan government, while private HEIs obtain more money from tuition fees. Table 9 illustrates the financial structures of public HEIs in Taiwan in 2012. In public universities, 37.1% of their revenues come from TMOE grants, 18.8% from tuition, 1.5% from extension programs,[5] 30.7% from cooperation programs,[6] 11.9% from other suppliers,[7] and 0.9% from other funding sources. As to public polytechnic universities, TMOE grants and students' tuitions take a bigger part of the revenue than public universities, which respectively are 45.7% and 31.3%. Moreover, 1.0% of their revenues are from extension, 16.0% from cooperation programs, 8.4% from other supplies, and 0.2% from others funding sources (TMOE, 2012).

In the private sector—inclusive of private universities and polytechnic universities—student tuition plays a more central funding role than in public institutions, accounting for 54.1% and 69.3% of their respective revenue generation (see Table 10). Such reliance on tuition could highly influence the development of private HEIs as enrollment declines due to Taiwan's sustained low birth rate.

In Taiwan, many students attend private HEIs rather than public ones. Among recently established HEIs in Taiwan, public universities have been much slower to develop than private ones. As previously shown in Table 5, during 2007 and 2015, private universities increased from 58 to 78, at a growth rate of 34%, approximately two and half times more than the growth rate of public universities (14%). Similar to China, public HEIs in Taiwan are uniformly considered more reputable and often provide higher quality teaching and learning activities than private institutions, which are generally recognized for their high tuition fees, low-quality learning environment, and lower reputation (Cheng, 2009; Hung and Cheng, 2008; Yang and Cheng, 2011). Furthermore, Hung and Cheng (2008) selected 20 universities and 6519 freshmen from the Taiwan HE Database and found that high school graduates whose mothers have master degrees, and whose family annual income is more than 1,150,000 NTD (approximately US$38,000) have the highest chance to access top universities in Taiwan—most of which are public universities. Thus, while private universities have quickly multiplied to expand access to HE overall, inequality of higher educational opportunity persists in Taiwan culture (Cheng and Jacob, 2012).

1.4. Comparison of HE financing among China, Hong Kong, and Taiwan

There are many similarities that exist between HE financing models in the region, but there are also some clear distinctions. In terms of similarities, HE is highly regarded in China, Hong Kong,

[5] Extension programs refer to continuing education programs that are designed to help individuals explore their interests and professional development skills.

[6] Cooperation programs in Taiwan involve the holding of domestic and international conferences and the implementation of research activities between HEIs and central/local governments, between HEIs and governmental and private businesses, and between Taiwanese HEIs and foreign HEIs.

[7] Other suppliers include campus bookstores and other campus-based revenue-generating ventures.

Table 7
College student enrollments, 2007–2015.

Year	HE Enrollment	18-to-21-year Students	Non 18-to-21-year Students	International Students
2007	1,326,029	1,254,395	71,634	30,509
2008	1,337,455	1,288,994	48,461	33,582
2009	1,336,659	1,298,852	37,807	39,533
2010	1,343,603	1,278,504	65,099	45,413
2011	1,352,084	1,294,620	57,464	57,920
2012	1,355,290	1,282,767	72,523	66,961
2013	1,345,973	1,288,966	57,007	79,730
2014	1,339,849	1,291,581	48,268	93,645
2015	1,332,445	1,288,787	43,658	110,182

Source: TMOE (2015b,c,e).

Table 8
Governmental expenditure on education in Taiwan, 2000–2015.

Year	Government expenditure on education (NT$1,000)	Government expenditure on education as a percentage of GDP	Total educational expenditures at all levels (NT$1,000)	Total educational expenditures at junior college, university & college (NT$1,000)	Expenditure on HE as a percentage of total educational expenditures
2000	381,937,815	3.95	529,491,875	177,668,224	33.55
2001	406,886,944	4.33	519,806,125	178,411,266	34.32
2002	423,036,518	4.27	536,860,385	194,645,435	36.26
2003	424,811,457	4.22	555,898,915	203,849,294	36.67
2004	441,251,948	4.14	575,367,011	210,569,731	36.60
2005	457,296,815	4.16	593,858,139	221,580,703	37.31
2006	469,392,790	4.09	606,562,896	228,263,975	37.63
2007	476,822,193	3.93	625,449,441	238,539,798	38.14
2008	481,068,268	4.06	616,518,676	225,944,084	36.65
2009	532,325,154	4.59	620,564,260	226,716,196	36.53
2010	516,804,324	4.14	625,905,609	225,910,088	36.09
2011	537,799,401	4.22	671,481,300	237,831,086	35.42
2012	548,815,737	4.23	711,297,900	247,095,253	34.74
2013	553,419,602	3.09	707,963,490	241,880,190	34.17
2014	558,453,855	3.90	843,744,692	241,660,010	34.13
2015	566,254,160	3.79	848,212,021	243,117,658	34.22

Source: Extracted from Table A3-1 and Table A3-3 released by TMOE (2015a, 2016b).

and Taiwan as a key area for short- and long-term economic sustainable development. It is also an area that can help provide equal social justice and economic opportunities to citizens, regardless of their socioeconomic and ethnic backgrounds to help provide opportunities to citizens. In order to accommodate for the massification of HE in these three regions, multiple funding schemes have been implemented. Private HE expansion has also been a means of expanding access, while at the same time decreasing the percentage of government funding.

The differences include demographic trends in the region, and the growing influence each location has on expanding its international network through student, faculty, and scholarly exchanges. Taiwan has a higher percentage of governmental expenditure on HE of the total educational expenditure (around 35%) than China (around 20%) and Hong Kong (around 22%). The quality of private HE delivery and offerings in Hong Kong and Taiwan are generally much higher than what has been realized to date among Chinese *minban* HEIs. Due to the unique characteristics and growth of *minban* HEIs in China—where these institutions receive funding from both government and private sources—the percentage of government funding in HE has increased in recent years. Sustained low birthrates in Taiwan has forced the closure of some HEIs, a trend that is likely to continue in the foreseeable future.

Finally, China's HE system is so much larger than either Hong Kong or Taiwan, making it difficult for some of even the most successful finance models to have relevance in a location-by-location comparison. Successful HE financial models in Taipei and Hong Kong, may be very difficult to replicate in the rural and remote hinterland locations of the Mainland.

Table 9
Financial structures of public HEIs in Taiwan, 2012.

Budget/revenue	Public universities	Public polytechnic universities
TMOE grants	37.1%	45.7%
Tuition	18.8%	31.3%
Tuition waived	−0.9%	−2.6%
Extension	1.5%	1.0%
Cooperation program	30.7%	16.0%
Other supplies	11.9%	8.4%
Others	0.9%	0.2%
Total	100.0%	100.0%

Source: TMOE (2012).

2. Research design

The goal of this article was to examine innovative financial models that facilitate the development of HE in China, Hong Kong,

Table 10
Financial structures of private HEIs in Taiwan, 2012.

Budget/revenue	Private universities	Private polytechnic universities
Tuitions	54.1%	69.3%
Extension	3.6%	1.6%
Cooperation program	12.4%	5.9%
Other teaching programs	0.1%	0.2%
Grants and donations	15.7%	12.6%
Affiliated institution income	4.4%	0.1%
Financial income	4.5%	5.6%
Others	5.2%	4.7%
Total	100.0%	100.0%

Source: TMOE (2012).

and Taiwan. Each HE system is backed by government financial policies to help deal with the many changes and challenges mentioned in the introduction session. Among these policies, some have been in practice for decades, yet remain relevant in providing a foundation for innovative practices today. Where the policies fall short, others will need to emerge to help each location meet the growing demands of globalization. In this article, we collect data about several innovative HE financial models and provide recommendations for policy reform and practice. The data collected and presented in this paper address how these innovative financial models contribute to (1) improving HE quality, (2) providing HE opportunities to under-representative populations, (3) solving problems caused by rising tuition, (4) decreasing the HE gap between different areas and groups of populations, and (5) meeting the growing demands of globalization and internationalization.

2.1. Methods for data collection

Data collected in this article followed two approaches. The first is a review of existing literature and policies on HE financing in China, Hong Kong, and Taiwan. The second approach followed a qualitative data collection method through conducting oral-interviews with content area experts (CAEs) on HE financing in China, Hong Kong, and Taiwan. Research team members designed the study in accordance with standard procedures and approval processes at the University of Pittsburgh Institutional Review Board (IRB).

2.2. Participants

CAEs are the major participants of this study, and initial CAEs were identified through an extensive literature review and asked to be interviewed. Additional CAEs were recruited according to the recommendations of interviewed experts at the onset of the study until our research team was able to find sufficient information that led to a significant conclusion. CAEs were contacted by phone, email correspondence, or in-person by one or more members of our research team. Interviews generally lasted between 30–60 min and were conducted according to the schedule and availability of the researchers and interviewees. In all, 25 CAEs were consulted and interviewed for this study and provided substantial insights to help inform this study.

2.3. IRB approval process

This study followed a strict ethical process that obtained institutional review board approval through the University of Pittsburgh. Interviewees were given the opportunity to voluntarily participate and could withdraw from participation at any time during the interview process. While no identifying information was required from participants, each individual had the opportunity to voluntarily provide their contact information.

2.4. Analyses

Data collected from the review of literature and policies was systematically stored, organized, cleaned, and analyzed under the guidance of sub-themes covered in this research. Most of the data we collected from the oral-interviews was digitally recorded and transcribed, cleaned, coded, and analyzed using NVivo qualitative analysis software. The following procedure was followed to decode qualitative responses from the CAE interviews:

(1) Participant codes: CHT05 indicates that the participant is the fifth interviewee or CHT16 indicates that she/he is the 16th CAE to participate in our study.

(2) Section codes: the 7 of CHT11-07 represents the question number response from the 11th CAE respondent. For instance, CHT18-11 indicates that this data came from the eighteenth CAE interviewed, and the referenced section came from the response to Question 11.

3. Unique funding models

The HE systems HEIs in China, Hong Kong, and Taiwan are dominated by the public sector, which can be demonstrated by top-ranked HEIs from each location listed in three major global ranking systems—Academic Ranking of World Universities (ARWU) of Shanghai Jiao Tong University, *Times Higher Education (THE)*, and Quacquarelli Symonds (QS). In the 2015/16 ranking lists, all selected HEIs from China and Hong Kong are public. Only two private HEIs in Taiwan rank in the top 500 in ARWU and QS; and only one Taiwan private HEI is among the top 500 according to THE (see Table 11).

3.1. China

Based largely on global neoliberal influences and trends, the Chinese government reconsidered its approach to funding HE. As a result, a cost-sharing model was established that included charging students tuition and other fees in public HEIs for the first time in 1989. The authority to decide tuition amounts was given to the provincial-level governments (CMOE et al., 1989). At the beginning, this cost-sharing model was implemented at select HEIs in various locations throughout the country. By 1997, it had been implemented nationwide (Li, 2012). Similar to many other countries, tuition costs in China have risen at a much faster rate than the average household income level and inflation. The disproportionate rise in HE tuition costs remains a point of heated debate within Chinese society. The CMOE (2015a) reaffirmed the principle that HE tuition and other fees should not exceed 25% of the average annual cost per student by the government, which was first proposed by the CMOE in 1996.

Because the local governments are responsible for determining tuition costs, the cost of tuition at public HEIs varies from province to province. Local governments are also responsible for setting tuition caps for each type of HEI, including independent colleges and *minban* HEIs. However, since 2014, some provinces (e.g., Hubei, Shandong, and Jiangxi) and municipalities (e.g., Shanghai) allow private HEIs to set their own tuition based on the market (Table 12). Table 13 demonstrates the tuition cost comparison for each type of HEI based on select disciplinary areas. Besides tuition, HE students are also charged dormitory fees because they are required to live on campus. Key universities also have the latitude of a preferential policy that enables them to increase their tuition rates by 10–30%. Because the government provides the Chinese public HEIs with

Table 11
Comparison of HEIs rank in China, Hong Kong, and Taiwan, 2015/16.

	ARWU		*THE*		QS	
	Top 100	Top 500	Top 100	Top 500	Top 100	Top 500
China	0	32	2	11	4	25
Hong Kong	0	5	2	6	4	6
Taiwan	0	7 (2)	0	7 (1)	1	11 (2)

Note: Within the parentheses are the numbers of private HEIs. *Sources:* Shanghai Jiao Tong University (2015), *THE* (2015), Quacquarelli Symonds (2015).

Table 12
Undergraduate student costs of top-ranked HEIs in China, Hong Kong, and Taiwan, 2015–2016 (US$).[a]

Institution	Location	Ranking				Type	Tuition	Accommodation cost[b]	Cost of living
		ARWU	*THE*	QS	QSA				
Peking University	China	101–150	42	41	7	Public	770–924	116–231	1,386
Tsinghua University	China	101–150	47	25	11	Public	770–1,540	85–231	1,294
Fudan University	China	151–200	201–250	51	16	Public	770–1,001	185	1,478
University of Science and Technology of China	China	151–200	201–250	113	23	Public	739	154	1,663
Nanjing University	China	201–300	251–300	130	26	Public	801–1,152	185	1,848
Zhejiang University	China	101–150	251–300	110	35	Public	816–1,386	185	2,772
Shanghai Jiao Tong University	China	101–150	301–350	70	24	Public	770–1,540	46–185	1,478
Sun Yat-sen University	China	151–200	351–400	307	48	Public	702–1,540	77–277	1,478
East China University of Science and Technology	China	401–500	401–500	471–480	101	Public	770–1,540	77–231	1,478
Wuhan University	China	301–400	401–500	273	58	Public	116–1,055 +15.4/credit	77–231	2,217
Xiamen University	China	301–400	401–500	401–410	76	Public	841–1,441	123–185	1,663
China Agricultural University	China	301–400	501–600	NA	111	Public	462–770	139–185	1,478
Harbin Institute of Technology	China	201–300	501–600	291	68	Public	616–1,386	123–185	1,848
Huazhong University of Science and Technology	China	201–300	501–600	441–450	88	Public	693–1,594	203	2,217
Renmin University of China	China	NA	501–600	441–450	82	Public	770–1,540	100–185	1,478
Soochow University	China	401–500	501–600	NA	181–190	Public	385–1,047	77–231	1,848
South China University of Technology	China	301–400	501–600	551–600	151–160	Public	702–1,540	77–231	1,478
Tianjin University	China	301–400	501–600	421–430	96	Public	647–1,540	92–231	1478
Tongji University	China	301–400	501–600	345	63	Public	770–1,540	92–185	1,478
Xi'an Jiao Tong University	China	201–300	501–600	331	55	Public	593–1,525	100–185	1,848
Beijing Institute of Technology	China	NA	601–800	401–410	80	Public	847–1,540	100–231	1,478
Capital Medical University	China	401–500	601–800	NA	NA	Public	770–924	116–185	1,478
Dalian University of Technology	China	301–400	601–800	NA	129	Public	585–1,540	77–185	1,848
Jilin University	China	201–300	601–800	451–460	85	Public	644–1,694	92–185	1,663
Shanghai University	China	NA	601–800	411–420	75	Public	770–1,540	185	1,478
Sichuan University	China	301–400	601–800	491–500	92	Public	678–1,848	185	1,848
Peking Union Medical College	China	401–500	NA	NA	NA	Public	739–924	116–231	1,478
Nanjing Medical University	China	401–500	NA	NA	NA	Public	708–1,047	123–231	1,848
Southeast University	China	301–400	NA	461–470	85	Public	801–1,047	92–185	1848
Beijing Normal University	China	201–300	NA	232	40	Public	739–1,540	100–139	1,478
Shandong University	China	301–400	NA	551–600	89	Public	616–1,848	92–185	1,848
Nankai University	China	301–400	NA	277	52	Public	647–1,540	92–231	1,478
Beihang University	China	301–400	NA	381	90	Public	770–1,540	85–139	1,663
Central South University	China	301–400	NA	NA	146	Public	554–1,725	185	1,478
Lanzhou University	China	301–400	NA	601–650	128	Public	647–1,078	123–185	1,201
University of Hong Kong	HK	151–200	44	30	2	Public	5,427	1,290–3,870	11,320
Hong Kong University of Science and Technology	HK	201–300	59	28	5	Public	5,427	1,290–3,870	11,320
Chinese University of Hong Kong	HK	151–200	138	51	6	Public	5,427	1,290–3,870	11,320
City University of Hong Kong	HK	201–300	201–250	57	9	Public	5,427	1,290–3,870	11,320
Hong Kong Polytechnic University	HK	301–400	201–250	116	27	Public	5,427	1,290–3,870	11,320
Hong Kong Baptist University	HK	NA	351–400	281	51	Public	5,427	1,290–3,870	11,320
National Taiwan University	Taiwan	151–200	167	70	22	Public	1,514–2,374	569–927	7,757
National Tsing Hua University	Taiwan	201–300	251–300	155	31	Public	1,462–1,718	478–845	7,455
National Chiao Tung University	Taiwan	301–400	301–350	182	31	Public	1,516–1,769	414–933	7,455
National Cheng Kung University	Taiwan	301–400	401–500	224	36	Public	1,513–2,373	462–749	7,532
National Taiwan University of Science and Technology	Taiwan	NA	301–350	260	45	Public	1,460–1,703	480–528	7,757
National Yang-Ming University	Taiwan	NA	401–500	338	50	Public	1,667–2,134	569–1,279	7,757
National Taiwan Normal University	Taiwan	NA	501–600	376	64	Public	1,415–1,656	454–889	7,757
National Sun Yat-Sen University	Taiwan	401–500	501–600	379	69	Public	1,484–1,736	432–1,020	6,478
National Central University	Taiwan	NA	501–600	397	60	Public	1,471–1,720	259–816	3,060
Taipei Medical University	Taiwan	NA	601–800	421–430	47	Private	3,183–4,351	480	7,757
Chang Gung University	Taiwan	401–500	601–800	461–470	78	Private	2,320–3,567	384–498	3,060
China Medical University, Taiwan	Taiwan	301–400	401–500	NA	NA	Private	2,292–4,336	249–309	2,880

[a] As of 31 December 2015, the exchange rate of CN¥ to US$ was 0.1540; The exchange rate of HKD to US$ was 0.1290; and the exchange rate of NTD to US$ was 0.0303 (OANDA, 2015).

[b] The accommodation cost column refers to on-campus accommodation costs. Sources: Shanghai Jiao Tong University (2015), *THE* (2015), Quacquarelli Symonds (2015). Tuition, fees, and cost of living of Chinese HEIs were retrieved from the official institutional websites or from the admission offices, and for those HEIs without cost of living information, the data was estimated by that of other HEIs located in the same city. Tuition and accommodation costs of Hong Kong and Taiwan HEIs were retrieved from each institution's website. Cost of living in Hong Kong and Taiwan was calculated by the authors from Numbeo (2016) data.

Table 13
Average tuition and dormitory fee in Chinese HEIs, 2015 (US$).[a]

	Average tuition	Natural sciences & engineering[b]	Social sciences & humanities[c]	Foreign languages	Medicine[d]	Art[e]	Dorm. fee
Public HEIs (Bachelor's Degree)	785	662	648	656	748	1,211	141
Public HVCs	802	720	708	714	764	1,105	140
Minban HEIs (Bachelor's Degree)	2,270	2,251	2,122	2,205	2,213	2,560	221
Minban HVCs	1,356	1,325	1,261	1,335	1,373	1,488	190
Independent Colleges	2,142	2,065	1,960	2,038	2,124	2,521	179

[a] Tuition and dormitory fees of public HEIs and HVCs are calculated from tuition standards set by provincial governments. Those for *minban* HEIs, *minban* HVCs, and independent colleges are calculated from the actual tuition and dormitory fees. The exchange rate was 0.1540 (CN¥ to US$) as of 31 December 2015 (OANDA, 2015).
[b] Natural Sciences and Engineering include agricultural programs.
[c] Social Sciences and Humanities include business programs.
[d] Medical programs include basic medicine, preventative medicine, clinical sciences, oral medicine, Chinese traditional medicine, forensic science, and nursing science.
[e] Art programs include fine arts and design, performing arts, music, and movie and television production, direction and broadcast.*Sources*: Data for public HEIs and HVCs is from the Development and Reform Commissions of provinces, municipalities, and ethnic minority autonomous regions in China. For *minban* HEIs, *minban* HVCs, and independent colleges, data was obtained from institutional websites.

Table 14
HE financial aid system in China (undergraduate level), 2015.

Financial Aid	Introduction	Amount (US$)[a]
National Scholarship	For 50,000 full-time students nationwide with excellent academic performance.	1,232 per yr.
National Endeavor Scholarship	For full-time students from low-income family with excellent academic performance. Covering 3% of enrollment of each HEI.	770 per yr.
National Grant	For full-time students from low-income family. Covering 20% of enrollment of each HEI.	462 per yr.
National Student Loan	For students from low-income family.	No more than 1,232 per yr.
Tuition and Student Loan Compensation	For graduates who have worked more than three years in the remote rural areas in Central and Western China.	No more than 1,232 per yr.
Tuition and Student Loan Compensation, and Tuition Waiver	For full-time students or graduates who have completed the compulsory military service.	No more than 1,232 per yr.
Free Normal Education Program	For full-time students enrolled in Free Normal Education Program.[b]	Tuition and fees waiver, and living allowance of 92.4 per month
Education Financial Aid for Veterans	For full-time veteran students who have been veteran no less than one year.	Tuition assistance of no more than 1,232 per yr., plus other financial aid
Freshman Scholarship	One time commute and living allowance for freshman from low-income family in Central and Western China.	77 (in-province students); 154 (out-province students)
Work-Study Program	For full-time students, especially for students from low-income family.	Local minimum hourly wage, and no more than eight working hours per week.
Institutional Financial Aid	HEIs are required to allocate a part of revenue from auxiliary services and donations to offer financial aid programs.	NA
"Green Channel" Program	For admitted students who cannot afford the tuition and fees. They can enroll without paying, and HEIs will design the particular financial aids based on their situations.	NA

[a] The exchange rate of CN¥ to US$ was 0.1540 as of 31 December 2015 (OANDA, 2015).
[b] National-level Free Normal Education Programs are offered in six CMOE-administrated HEIs: Beijing Normal University, East China Normal University, Central China Normal University, Shaanxi Normal University, and Southwest University. Some provincial-level HEIs also offer this program.*Source:* CMOE (2015b).

subsidies on food in the campus restaurants, and students are required to live in on-campus dormitories. The average student cost of living is much lower than that of most people who live in the same Chinese urban locations. As to *minban* HEIs, including independent colleges and Chinese-foreign cooperative HEIs, without these governmental subsidies, students would spend much more on food and living sustenance in addition to their tuition costs.

The Chinese government has established a comprehensive HE financial aid system ranging from institutional to the national level. National financial aid programs play the most significant role to help guarantee the equality of HE opportunities in China through providing merit- and needs-based financial aid to HE students (see Table 14). In addition, local governments in each province have additional financial aid programs, which often meet the particular needs of local HE students.

3.2. Hong Kong

Hong Kong has developed a comprehensive funding system for students to support their studies. More specifically, for students enrolled in post-secondary or tertiary level education, there are seven schemes (four are shown in Fig. 7) targeting different student groups.

- Tertiary Student Finance Scheme (TSFS) provides means-tested financial assistance for applicants who take up an exclusively University Grants Committee (UGC)-funded or publicly-funded student place of a recognized course. In the form of a grant and/or loan, this funding could cover tuition fees, academic expenses and compulsory union fees.
- Non-means-tested Loan Scheme for Full-time Tertiary Students (NLSFT), as a complement to TSFS, also aims to provide financial assistance to eligible students to cover tuition fees.[8]

[8] To apply for TSFS and NLSFT in 2016/17, students are required to "be registered as a full-time student; take up an exclusively UGC-funded or publicly-funded student place of one of these recognized courses at one of the recognized institutions in the 2016/17 academic year; and have the right of abode in the Hong Kong Special Administrative Region (Hong Kong) or have resided or have had your home in Hong Kong continuously for three complete years prior to the commencement of the course" (Student Finance Office, HKSAR, 2016b,c).

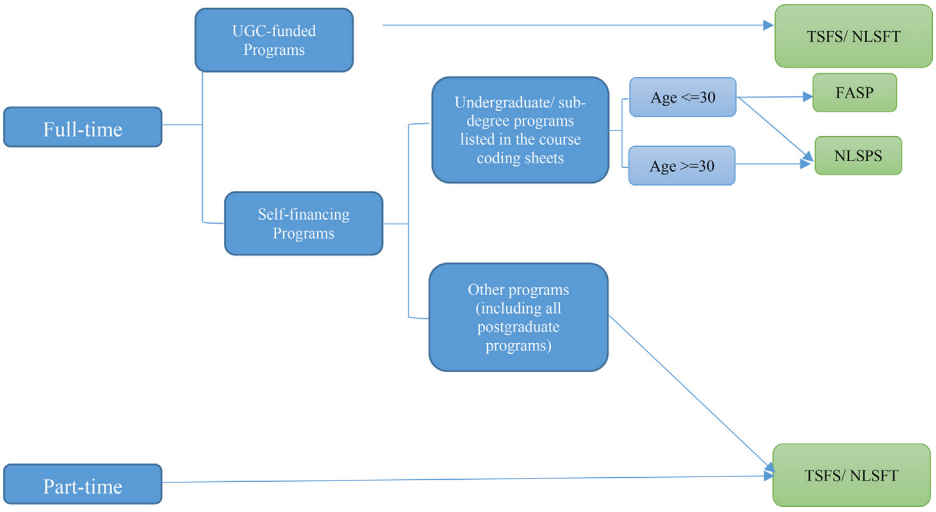


Fig. 7. The financial supporting programs in Hong Kong, 2016 (post-secondary or tertiary level).
Source: Student Finance Office, HKSAR (2016a).

- Financial Assistance Scheme for Post-secondary Students (FASP) offers means-tested support to full-time students admitted by locally-accredited, self-financing post-secondary education programs at the level of associate degree, higher diploma or degree. It also appears in the form of a grant and/or loan, including grants for tuition fees and academic expenses, and loans for living costs.
- Non-means-tested Loan Scheme for Post-secondary Students (NLSPS) are a complement to the FASP and provide loan(s) to eligible students for tuition fees in locally-accredited, self-financing full-time post-secondary education programs at the level of associate degree, higher diploma or degree.
- Extended Non-Means-Tested Loan Scheme (ENLS) offers funding as loan(s) to eligible students in order to cover their tuition fees of specific post-secondary, continuing, and professional education courses in Hong Kong.
- The Student Travel Subsidy (STS) for Tertiary or Post-secondary Students offers travel support to students who attend a full-time day course in the first degree level in an acceptable institution. Public transport is required for students to use.
- Community Care Fund aims to provide a hostel subsidy for undergraduate students, increase the academic expenses grant for post-secondary students, and enhance the academic expenses grant for post-secondary students with special educational needs.

There are also other types of scholarships such as the Agricultural Products Scholarship Fund and the Marine Fish Scholarship Fund, Japanese Government Scholarships (for undergraduate students), and the Li Po Chun Charitable Trust Fund–Overseas Postgraduate Study and Professional Training Scholarship, as well as grants/loans other than the ones we have listed above. Fig. 7 selects some major funding schemes and lists the eligibility for applying.

3.3. Taiwan

A specific, competitive funding scheme has been introduced into HE in Taiwan. According to a recent from the TMOE (2015f), the Taiwan government hopes to encourage the academic autonomy and excellent governance of HEIs, covering areas of institutional competition, enrollments, organizational adjustments, student affairs, and financial autonomy. Regarding resources allocation, TMOE adapts the accountability index to improve the quality of teaching and research, and the efficiency of financial affairs in public HEIs. As to private HEIs, the government hopes to lead them to set up their missions, and transform financial audit procedures from pre-audit to post-audit after considering the development environment, unique feature, and academic autonomies of private HEIs. In addition, TMOE (2015f) seeks to combine comprehensive and polytechnic universities, as well as integrate teaching and research. In order to accomplish this goal, the government has released a series of competitive funding plans including “Toward the World-Class University Plan,” “College Teaching Excellence Plan,” and “Benchmarking Polytechnic Universities Plan” (see Table 15). The first two plans started in the mid-2000s, and the third plan is relatively new. All HEIs in Taiwan are eligible to apply for the first two plans, while the third plan focuses on polytechnic HEIs. The distribution of funding depends on the review of university plans and power point documents (e.g., Benchmarking Polytechnic Universities Plan). Although some differences exist among these three plans, the competitive funding scheme is similar across all three.

To help students with diverse needs access to HE, the Taiwan government provides a financial aid system. First, the interest rate for post-secondary student loans steadily decreased since 2003 and changes along with the market rate (Table 16). After the year 2009, the interest rate was less than 2%. Between 2002 and 2009, the number of student loan applicants increased and reached a peak in 2009. However, student loan applicants have since decreased. Although declining interest rates and number of applicants may be viewed positively, the causes of this decreasing trend in applicants merit exploration.

Second, as previously discussed, students from low income families in Taiwan are more likely to register in low prestige universities, especially in the expensive private HEIs. In order to provide more financial supports to disadvantaged students, TMOE (2014a) released a grant plan titled The Disadvantaged Students’ Grants to help targeted students whose family income statuses are among the bottom 40% of the family income distribution in Taiwan. The Taiwan government by reallocating existed grants to private universities provided direct financial support to disadvantaged students. These grants can be divided into four categories including

Table 15
A comparison among three government initiatives.

	Toward the World-Class Univ. Plan	College Teaching Excellence Plan	Benchmarking Polytechnic Universities Plan
Starting year	2006	2005	2013
Funding scheme	Competitive	Competitive	Competitive
Applicant	All HEIs	All HEIs	Polytechnic HEIs
Application process	1. Provide document plans to review 2. Determination and distribution of funding		1. Provide document plans to review 2. Provide PowerPoint to review Determination and distribution of funding
Frequency of the declaration of recipients	Every five years	Depends on plan review results and budgets	Every three years
Implementation (Recipients)	First stage: 2006–2010 (12 HEIs) Second stage: 2011–2016 (12 HEIs)	First stage: 2005 (13 HEIs) 2006 (28 HEIs) 2007 (30 HEIs) 2008 (30 HEIs) Second stage: 2009–2012 (31 HEIs) Third stage: 2013–2016 (33 HEIs)	First stage:2013–2016 (12 polytechnic HEIs and 4 R&D centers)
Funding	First stage: NT$50 billion Second stage: NT$57.8 billion	First stage: NT$6.2 billion Second stage: NT$5.3 billion Third stage: NT$6.3 billion	First stage: NT$1.18 billion

Sources: Compiled by the authors from TMOE (2011, 2013, 2014b, 2016a).

tuition waiver, living expense, emergency aids, and housing services (see Table 17).

Third, Taiwan's government makes an effort to aid students from low income families in obtaining tuition waivers. Table 18 presents five tiers of tuition waivers based on students' family incomes and the HEIs they attend (TMOE, 2014a). This Grant can be a great benefit for disadvantaged students striving to enter HEIs in Taiwan.

4. Select case exemplars showcasing financial trends in China, Hong Kong, and Taiwan

4.1. Local and national examples in China

The financial trends in Chinese HE can be considered as products of the development of the market economy and the governmental efforts to realize a balanced development of HE in China. In addition to the rapid development of independent colleges—which often reflects the trend of diversified funding sources occurring in China's private HE sector—the influence of the market economy on HE has also deepened the engagement of Chinese public HEIs in the economic development of local communities and even the whole country. On the other side of balanced development of HE in China, the Chinese government has made a significant financial effort to reduce the inequalities that exist in HE between rural and urban areas. This effort is to help bridge the inequality gaps that exist between the Eastern and other regions of the country, as well as provide disadvantaged groups (such as children of migrant workers and ethnic minority students) with greater HE opportunities (Jacob, 2005; Hawkins et al., 2008). This concerted effort is demonstrated by government policy reforms on HE funding, including establishing ethnic minority HEIs and the Free Normal Education Program.

4.1.1. Community engagement of public HEIs: Zhongguancun Science Park

Inspired by the success of Silicon Valley in the United States, the Chinese government established the Beijing New Technology Industrial Development Trial Zone in 1988, which developed into the first Science and Technology Park in China (Jacob et al., 2015). In 2009, the government confirmed the significant role Zhongguancun Science Park plays in partnering with local Chinese HEIs and established several policy initiatives to help build its global influence.

Table 16
Applicants and student loan interest rates, 2001–2014.

Year	Applicants	The interest rate of student loan (%)
Before 2001	–	7.00–8.13
2002	583,995	3.18–7.13
2003	679,200	2.93
2004	694,433	3.00–3.07
2005	698,408	3.17–3.43
2006	728,077	3.48–3.60
2007	759,595	3.45–3.64
2008	800,809	1.60–3.70
2009	817,406	1.55–1.61
2010	777,305	1.55–1.83
2011	709,981	1.83
2012	664,895	1.83
2013	621,476	1.83
2014	575,353	1.83

Source: TMOE (2014c).

Table 17
Disadvantaged college students' grants.

Items	Contents
Tuition waiver	Divided into five levels from US$150 to US$1,100
Living expanse	Providing disadvantages students US$200 per month and work-study activities
Emergency aids	Depending on the demands of the students in need
Housing services	Providing opportunities of no dormitory fee payment for students from low income families, and giving priority to students from middle and low income families in dormitory services.

Source: TMOE (2014a).

Table 18
Tuition waivers and family income levels, 2014 (in US dollars).

Family income		Tuition Waiver from the TMOE Grants	
		Public HEIs	Private HEIs
Level 1	Less than $10,000	$500	$1,100
Level 2	$10,000–$13,000	$410	$900
Level 3	$13,000–$16,000	$330	$730
Level 4	$16,000–$20,000	$250	$550
Level 5	$20,000–$23,000	$150	$400

Note: The exchange rate of NTD to US$ was 0.0303 as of 31 December 2015.*Source:* TMOE (2014a).

In its nearly 30-year history, Zhongguancun has formed a high- and innovative-technology industrial cluster where businesses have emerged in the areas of information technology, biomedicine, energy and environmental protection, advanced manufacturing, aerospace, research and development (R&D), and other service-oriented industries. Nearly 20,000 enterprises are gathered in Zhongguancun, including Lenovo and Baidu, which have greatly facilitated the development of science and technology in China.

Zhongguancun Science Park boasts the largest concentration of scientific, education, and talent experts in China. It is comprised of 40 HEIs, including Peking University and Tsinghua University, which play similar leadership roles as counterpart world-class universities Stanford University and the University of California, Berkeley do in the development of Silicon Valley. There are also more than 200 national (municipal) scientific institutions, such as the Chinese Academy of Social Sciences and the Chinese Academy of Engineering, 67 state-level laboratories, 27 national engineering research centers, 28 national engineering and technological research centers, 24 National University Science Parks, and 29 overseas student pioneer parks housed included in this development.

Unlike the Silicon Valley model (Jacob et al., 2015), Peking University and Tsinghua University established their own Science Parks to connect better with Zhongguancun Science Park and serve their many stakeholders. The establishment of National University Science Parks (NUSP) aims to engage the top research universities in the development of high-tech industries and the social services, transfer many scientific achievements into aligned industries, and foster the development of high-tech companies and entrepreneur talent. The Chinese government also provides the NUSP with a preferential tax policy to facilitate their development. From 2001 to the end of 2014, 115 NUSPs have been established in China. As of August 2014, 14 NUSPs[9] united to establish a research institute to discuss inter-university cooperation and further development of the NUSPs.

4.1.2. Independent colleges

Chinese independent colleges were established based on many different innovative financial models. As mentioned previously, independent colleges are HEIs run by public HEIs using non-state funds, or jointly administered by a public HEI and one or more private organizations or individuals. Tuition is the primary revenue source of independent colleges, which often results in high tuition costs compared to what is found in most public HEIs. There are two basic types of Chinese independent colleges, which are differentiated by ownership. One is public-owned independent colleges that are entirely owned and operated by the public organizations, including public HEIs and local governments. The other is public-private independent colleges that are supported and operated by both a public HEI and one or more private partners. In both models, public HEIs provide instruction, quality assurance, and brand recognition, while the partner(s)—local government or private partner(s)—provide land, infrastructure, and facilities management. The parent public HEIs can potentially benefit from establishing independent colleges through administrative fees which amount to 20–40% of the tuition price (Wang, 2014). For example, Zhejiang University City College as a public-owned independent college is jointly operated by Zhejiang University, the People's Government of Hangzhou, and the Zhejiang Telecom Industry Group. Xi'an Jiaotong University City College is an example of public-private independent colleges, which is operated by Xi'an Jiaotong University and the Xi'an But'one Information Corporation. The Gengdan Institute of Beijing University of Technology is mainly operated by its parent institution but currently also has a close relationship to the largest private educational group in China, the New Oriental Education and Technology Group, because the CEO of this group is now serving as the president of the Gengdan Institute.

Independent colleges contribute to the development of Chinese HE in two primary ways. First, this expansion model has helped to meet the needs of the massification of HE in China. And second, they have engendered trust from the Chinese people in public-private partnerships or *minban* HE, which previously developed at a much slower pace. This public-private partnership leverages the brand recognition of the well-established public HEIs, which in essence guarantees for quality of the curriculum and instruction delivery offered by independent colleges.

There are three options for the future development of independent colleges. First, they can maintain their current status as independent colleges. Second, they also have the option to transfer their status to become a regular *minban* college or university. Finally, independent colleges can merge to form other HEIs. The second option is the most common option pursued to date, because independent colleges that successfully transfer to regular *minban* HE institutional status will have more autonomy in terms of their institutional management. Notably, they will be able to recruit high school graduates with higher scores in the National Higher Education Entrance Examination. In addition, once the transition to *minban* status is completed, they are no longer required to provide the parent public HEI the large administrative fee. Critics of this second option often cite the potential loss of national property and sacrifice of educational quality as key reasons against this move (Yu, 2015).

The quality of student learning outcomes remains a major concern of independent colleges. Like all public HEIs, independent colleges regularly help students prepare for the job market by providing career development services and holding career fairs to invite public and private enterprises onto their campuses. Providing space and support to students establishing their own business is also a trend among independent colleges:

> [We] encourage entrepreneurship among our graduates. We have built up an Entrepreneurship Center and Pioneer Park to help and encourage our graduates to establish their own business. Currently, the central government encourages entrepreneurship among higher education graduates, so my college tries to catch up with this trend by providing a physical space and guidance to help our graduates realize their business dreams. (CHT01-14)

Furthermore, independent colleges can take advantage of the cooperation they have with private partners, and introduce their partners' resources into the curriculum development, instruction, learning, and career development of their students. For example, the Gengdan Institute of Beijing University of Technology applies the English training system and materials from the New Oriental Education and Technology Group in their English classes. Also, independent college students can receive internship and employment opportunities through their cooperative partner enterprises.

However, two barriers often stand as obstacles that prevent independent college students from achieving success in their job hunting and career paths. An interview with the President of an independent college in Shandong Province reveals that the first obstacle is the high expectation of the students upon graduation, and the second is that independent colleges generally struggle to establish a competitive advantage in providing innovative programs to meet the niche social needs, as well as in talent

[9] Peking University, Tsinghua University, and Zhejiang University were among the 14 universities to sponsor this research institute.

training, which could help their students stand out in the job market.

> Independent colleges, like many other HEIs, have to develop their unique characteristics and meet the many different social needs of their students. We still have a long way to go because the initial establishment of independent colleges was to fulfill the government's mass higher education requirement instead one that is based on [job market] needs. All independent colleges must consider how to develop unique characteristics in competency-based disciplines and talent training. (CHT01-16)

In conclusion, the independent college model has now been tested and has largely gained a reputation of trust from students and parents on the merits of their educational quality. However, much work remains for these institutions to provide programs and cultivate students in ways that differentiate them from other types of HEIs, to strengthen their reputation, and insure that students are ultimately able to secure jobs upon graduation.

4.1.3. Ethnic minority HEIs

Ethnic minority HEIs are chosen as an exemplary case of Chinese HE financial trends because they offer HE opportunities to some of the most disadvantaged students nationwide—those from the many recognized ethnic minority groups (Xiong et al., 2016). In this section, we outline several ways in which ethnic minority students receive HE financial assistance, including through special appropriations, financial support from partner HEIs, and tuition waivers.

To better help minority students receive quality HE and cultivate their talents, as well as preserve ethnic minority cultures and languages, the central government implemented several policies since the 1950s. One of these key policies led to the establishment of ethnic minority HEIs. As of May 2015, there were 243 ethnic minority HEIs in China, of which six were administered by the State Ethnic Affairs Commission of China; the remaining were administered by local governments (Meng, 2016).

Besides the ethnic minority HEIs, the regular colleges and universities in the ethnic minority autonomous regions or prefectures also provide preferential policies to ethnic minority students. For example, Yanbian University in Jilin Province provides quality HE to Korean Chinese students, and Inner Mongolian University for the Nationalities is serving as an important HEI in Tongliao City where a significant number of the Mongol Chinese population resides. Besides waiving the tuition for students who pursue certain ethnic minority language studies, regular HEIs also provide ethnic minority prospective students with preparatory courses before entering colleges or universities. In some provinces (e.g., Guangxi Zhuang Autonomous Region), certain ethnic minority students can receive tuition waivers of these preparatory courses (People's Government of Guangxi Zhuang Autonomous Region, 2015).

At the institutional level, to facilitate the development of regular and ethnic minority HEIs located in the remote areas of China, the central government implemented the Partner Assistance Program between HEIs located in economically developed regions and those in ethnic minority regions. One interviewee shared an example of this program:

> Taking Yanbian University as an example, its partner assistance higher education institution is Nankai University. . . . Universities from economically developed regions will provide those from ethnic minority regions with financial support for professional development training, undergraduate education, and research. The assistance can be in the form of either money or technology transfer. (CHT04-13)

It has been a focus of the central government to facilitate the development of ethnic minority HEIs to help meet the unique needs of ethnic minority students. In general, the central and provincial governments continue to increase financial support and enact preferential policies to improve ethnic minority students' access to HE in China.

4.1.4. Free Normal Higher Education Program

In May 2007, the State Council of China decided to institute the free normal HE Program in six CMOE-administrated normal HEIs (Beijing Normal University, Central China Normal University, East China Normal University, Northeast Normal University, Shaanxi Normal University, and Southwest Normal University). With this decision, high school graduates who meet the admissions score requirement can apply for this four-year program. Admitted students are required to sign a contract agreeing to serve as primary or middle school teachers upon graduation. In certain areas, this teaching commitment is for more than ten years. Qualifying students can receive a financial waiver covering all tuition and dormitory fees; at the same time, they will also receive a monthly allowance of 600 *yuan* (US$92). In spite of these common regulations, each participating university has distinct characteristics. For example, program graduates from Central China Normal University can continue on in pursue of a master's degree instead of being a teacher, and Beijing Normal University graduates can obtain opportunities to study abroad.

Led by these CMOE-administrated HEIs, another three normal universities joined this program in 2013: Fujian Normal University, Jiangxi Normal University, and Minnan Normal University. In addition, some local-government-administrated universities and colleges also offer fully-financed normal education programs to qualifying applicants. These programs have also expanded to the higher vocational colleges in Hainan, Guangxi, and Tianjin to cultivate teachers for vocational education purposes. As another expansion policy of the Free Normal HE Program, in some provinces such as Guangdong and Gansu, graduates who choose to serve as primary and middle school teachers in rural areas will receive a refund of their paid tuition for HE (Yan and Yu, 2015; CHT25-10).

Notably, the Free Normal HE Program also serves ethnic minority students. Yanbian University is a comprehensive public university located in the Yanbian Korean Autonomous Prefecture of Jilin Province. It was jointly established by the CMOE and the Jilin Provincial Government in 1949 and now is under the administration of the latter. Due to its geographic location, Yanbian University serves as a major institution to provide quality HE to Korean Chinese students. In 2014, the Faculty of Normal Education started to provide Free Normal HE Program for ethnic minority students. In 2016, there were 80 ethnic minority students enrolled in this program. The program has six concentrations covering pre-school education and major disciplines taught in Chinese primary and middle schools, such as math, physics, and chemistry.

The Free Normal HE Program faces challenges that are manifested in the conflict between the intended policy objective to prepare teachers for service in China's rural and remote areas and participating students' concerns about working far from home and in areas where their quality of life and career development opportunities may be limited (CHT24-11). As a result, a number of students choose to withdraw from the program, which they can do by paying contract withdrawal penalty fees (Yan and Yu, 2015).

4.2. Local and national examples in Hong Kong

In view of uncertain times, Hong Kong, aspiring to maintain its status as a renowned international city in Asia, has confronted increasing economic, social, and political challenges since it

became a special administrative region of China in 1997. In the 2014–2015 budget, the Financial Secretary of the HKSAR government remarked that Hong Kong had reached a critical juncture, and thus people in the city-state should work together to prepare for the future. Such preparation involves further strengthening the solid foundation of Hong Kong's "four traditional economic pillars," including financial services, trade and logistics, tourism, and professional and other producer services. Yet these industries are facing ever-mounting competition from regions like Shenzhen, Shanghai, and Singapore in recent years. Hong Kong's effort to remain a leader in an increasing global knowledge economy has become even more acute after the 1997 handover and the Asian Financial Crisis in 1997–1998, when the sustainability of Hong Kong's finance-centered economy was called into question. Being too heavily dependent on finance and trade, the role of the government in promoting R&D has been criticized for being insufficient to compete with other nearby countries. Since the past decade, government investment in R&D activities has increased, especially to promote more regional innovation cooperation with mainland China. Most recently, the Hong Kong government has reiterated its ambition to restructure its economy in response to the growing challenges after the global financial crisis. One major strategy the HKSAR government is adopting is to encourage more university-industry cooperation by turning research findings into commercial products.

Since the 2000s, the government has become more active in formulating public policies and launching public projects to promote innovation and technology. Inspired by the successes of South Korea and Taiwan, the government completed the construction of the Hong Kong Science Park in 2000. Like other science parks across the world, the Hong Kong Science Park is located next to the Chinese University of Hong Kong, emphasizes "industry-university collaboration," establishing networks to facilitate partnerships among enterprises, strengthening the talent pool, bringing expertise together into academia and industry, organizing training seminars, promoting successful research outputs, and developing sustainable products.

One of the key functions of the Hong Kong Science Park is to incubate business start-ups. Since 1992, the incubation programs have nurtured 277 start-ups, nearly 80% of which (216 out of 277) were still in operation as of 2011. Since April 2003, angel/venture capital investment initiatives have amounted to HK$699 million, 444 IP registration applications filed, 204 technical/design and management awards, and 16 IPO/merger and acquisition/joint venture/spin-off transactions (Hong Kong Science and Technology Parks Corporation, 2011, pp. 30–31). The Science Park also aims to serve as a platform linking the academy and industry. To help enterprises search for R&D personnel, it organized recruitment talks and set up an online Talent Pool Career Platform to help job seekers and students better locate their desirable jobs in partner companies as well as at the Science Park. In 2010, the recruitment day attracted 2000 candidates to apply for 400 jobs offered by 60 partner companies in the Park, and the Talent Pool Career Platform registered over 1000 job opportunities.

Moreover, the Park aims at building talent pool networks through partner universities, such as the Chinese University of Hong Kong's MBA Program, Hong Kong University of Science and Technology's Business School, and the final-year program of the University of Ontario Institute of Technology, to access experienced pools of working executives (Hong Kong Science and Technology Parks Corporation, 2011, p. 39). In terms of liaising with potential entrepreneurs and capital investors, in 2010, the Science Park co-established the Hong Kong Business Angel Network (HKBAN) with four local universities (HKU, HKUST, CUHK, and HKPU) and the Hong Kong Venture Capital and Private Equity Association, which aims to conduct funds matching between entrepreneurs and investors for potential R&D projects (HKBAN, 2016).

After forming the Science Park in 2000, the government continued to promote R&D over the following decade. In 2000, it established the Hong Kong Applied Science and Technology Research Institute (ASTRI), as the public research institute of Hong Kong. By 2010, the tenth anniversary of its establishment, ASTRI had completed over 360 technology transfers and had 130 patents granted. More than HK$160 million in income was received from the industry sector. The Industry Collaborative Project scheme, which at that time involved ten projects, was expected to receive a committed income of about HK$47 million (ASTRI, 2011, p. 2). Also in 2000, the government established the Innovation and Technology Commission (ITC) to devise and implement government policies to promote innovation and technology, as well as to run the Innovation and Technology Fund (ITF), which comprises a number of financial supporting programs and training schemes. Since the majority of companies in Hong Kong are small and medium-sized enterprises (SMEs), their needs should be core to the government's innovative policies. Hence the Hong Kong government has set up various research funds for which the SMEs may apply.

Since the inception of these programs, the government has continued to invest in them to help more SMEs. Taking the Small Entrepreneur Research Assistance Program as an example, in 2007 the government relaxed the eligibility of applicants from companies of less than 20 employees to less than 100, so that the Program could cover up to 99% of the companies in Hong Kong (Legislative Council Panel on Commerce and Industry, 2007). Approved projects were offered with a grant of up to HK$6 million on a dollar-for-dollar matching basis. The government's support measures offered to SMEs include not only more funding for their own research, but also training schemes to upgrade their employees and incentive measures to encourage them to cooperate with the universities. In regard to the upgrading of employees, ITC launched the New Technology Training Scheme, which is administered by the Vocational Training Council (VTC), to assist companies in training their staff to acquire skills in using a new technology. The different forms of support include overseas training courses or working attachments, pre-approved local training courses, and tailor-made training courses for individual companies.

After a few years of operation, the government further allocated HK$369 million from the Innovation and Technology Fund in 2009 for the continued operation of the four R&D centers up to 2013–2014. However, the government was not satisfied with the performance of these centers and hinted that its longer-term commitment would be contingent upon several factors: cost-effectiveness, the performance in technology transfer and commercialization, and whether the centers could meet the targeted level of industry contributions. Originally, the government set the target at 40% in 2005; however, it lowered the expectation to 15% in 2009 because of the unsatisfactory performance of the centers (Legislative Council Panel on Commerce and Industry, 2011a). The government proposed that unless the centers could achieve the industry contribution target it would consider ceasing the funding (Legislative Council, Panel on Commerce and Industry, 2011b). Therefore, it is clear that the Hong Kong government has taken a more active role investing in R&D activities in the past decade and has acted as an initiator to promote R&D activities through building a platform for the private sector to run their own businesses.

In addition to the promotion of university-industry cooperation discussed above, we have also observed a growing importance of entrepreneurship in the HE sector, engaging not only faculty members but also university students in exploring opportunities to

set up new businesses or commercialize research products. The government's commitment to knowledge transfer activities has a huge impact on the universities' organizational structure, finances, rules and regulations (particularly those regarding R&D activities), and the promotion of entrepreneurship education (Mok, 2015). When assessing performance of publicly-funded HEIs, the UGC also significantly weights the performance of knowledge transfer and evaluates the social and economic impact of research projects conducted by the public universities. However, compared to counterparts in South Korea and Taiwan, universities in Hong Kong were relatively late in engaging in entrepreneurial activities. It was not until the 1990s that they began to seek ways to explore the potential of university-industry partnerships, mainly through setting up spin-off companies and technology transfer offices (Sharif & Baark, 2008).

Most recently, the HKSAR Government set up a new Innovation and Technology Bureau in 2015 to oversee and coordinate the city-state's future development in terms of innovation and technology, particularly through promoting more cross-border cooperation between Hong Kong and Shenzhen, as well as other parts of Mainland China. According to the strategic goal of the Bureau:

> the Government is determined to develop Hong Kong into a knowledge-based economy and an innovation hub for technology and its application in the region. The Innovation and Technology Bureau is responsible for policy matters on the development of innovation and technology and information technology which are the key drivers in this endeavour. We aim to create a vibrant ecosystem for the government, industry, academia and research sector to interact under a favourable environment with excellent software and hardware support for developing and applying innovation and technology. (Innovation and Technology Bureau, HKSAR, 2016)

Most recently, the HKSAR Government and the Shenzhen Municipal Government signed an MOU on jointly developing the Lok Ma Chau Loop in Hong Kong, with an 87-hectare Hong Kong/Shenzhen Innovation and Technology Park promoting university-industry-business collaboration (Mok and Jiang, 2017b). With such new government initiatives, we would expect more funding will be drawn from engaging academia, industry, and business to work together in promoting knowledge transfer activities.

4.3. A Local and national example in Taiwan: CTBC Financial Management College

Although the declining enrollment crisis caused largely to Taiwan's low birthrate is projected to jeopardize the development of HEIs for many years, it is also a chance to renew HE institutional management to better fit the needs of Taiwanese society and compete with other HEIs around the world. In 2015, through initiating the Innovation and Transformation in Higher Education Project, Taiwan's government proposed a vision of the potential outlook for HE in the future (TMOE, 2015d). This project intends to achieve goals regarding the transformation of HEIs, the reconfiguration of resources, and the development of human resources through the industry-university collaboration and restructuring of HEIs countrywide. The following section illustrates the story about the CTBC Financial Management College, a successful example of the transformation of Taiwanese HEIs.

CTBC Financial Management College is a private HEI in Taiwan. The original title of this college was Hsing-Kuo University founded in 2000. Recently, it has fallen into a crisis of student recruitment with low enrollment. In 2015, because of the lack of faculty members and the damage of students' rights to education, the TMOE forced it to give up student recruitment and its operation (Lin, 2015). Several months later, this HEI was renamed as CTBC Financial Management College with direct support from CTBC Financial Holding Co., Ltd. (Huang, 2015), a company engaged in the finance industry. To fulfill its social responsibilities to promote HE quality in Taiwan, CTBC Financial Holding's subsidiary will invest NT$300 million from 2015 to 2018 in improving the quality of CTBC College (CTBC, 2016). The mission of this College prioritizes the public welfare and serving students with different needs, and it endeavors to become the most professional and practical financial college in Asia. In 2015, the student admission rate at this college was 37% (Shin, 2015). According to the College's website (CTBC, 2016), 49 high schools in Taiwan have built strategic alliances with the CTBC College through the Hope Partnerships Program.

The case of the CTBC College has several features of note according to Shin (2015). First, despite its small size, CTBC College aims to educate its students to become international financiers. The College has three departments including banking and finance, business administration, and business and economic law; 50 students are recruited per department. In 2016, the newly-established Graduate Institute of Financial Management received TMOE's approval to recruit 15 graduate students (CTBC, 2016).

Providing job opportunities are guaranteed to CTBC College students; during their schooling, CTBC's graduates have chances to obtain internships provided by domestic and overseas branches of the CTBC Financial Holding Co., Ltd., and the human resource office of this company provides opportunities to work at CTBC and its branch offices to graduates following their graduation. The College has close linkages with the finance industry, and its curriculum is competency-based to respond to current industrial needs. Then, patterned after the CTBC Financial Holding company promotion system for its employees, the College carries out a similar training program with its students. This program is designed to train students with six competencies: autonomy, responsibility, service, leadership, execution, and communication.

In addition, students with financial needs and students with outstanding performance will receive support through Hope financial aid. Finally, the College is establishing a college-based high school, which enrolled its first 45 student cohort group in September 2016. The CTBC High School will serve as a feeder school to the College (CTBC, 2016).

5. International partnerships in China, Hong Kong, and Taiwan

5.1. China

There were seven Chinese-Foreign Cooperative HEIs in China as of December 2015. This type of institution aims to introduce advanced HE resources and ideas into China, and allow Chinese students to attend foreign world-class universities in China with much cheaper tuition. According to the Chinese government regulation on the Chinese-Foreign Cooperation in running schools, both of the cooperative sides can be either public or private HEIs. Among the seven Chinese HEIs, only the University of Nottingham Ningbo China has a private partner. And among the foreign HEIs, six are public (the University of Nottingham, New York University, Hong Kong Baptist University, the Chinese University of Hong Kong, University of Liverpool, Kean University); Duke University is the only private one.

Founded in 2004, the University of Nottingham Ningbo China (UNNC) was the first recognized HEI of this type by the CMOE. UNNC is jointly run by the University of Nottingham and Zhejiang Wanli University. The latter is a private university run by the Ningbo government and Zhejiang Wanli Education Group. The University of Nottingham invested 600 million *yuan* (US$92.5 million), as well as intangible assets of brand effect and intellectual property. The Zhejiang Provincial government invested 50 million *yuan*, while the local Ningbo government invested 100 million

yuan (US$15.4 million), together with additional funding coming from the Wanli Education Group (Gu, 2008). As a private HEI, tuition is the major funding source for UNNC. Meanwhile, it also receives funding of 18,000 *yuan* (US$2774) per student in science and engineering from the Ningbo government (Sun, 2014). The diversified funding sources have played a significant role in facilitating the initial development of UNNC. Having achieved an annual student enrollment of 3500 to 4000 has allowed UNNC to balance its budget, thereby guaranteeing its sustainable development.

During its 12-year development, UNNC has established three undergraduate faculties: Faculty of Arts and Education, Faculty of Science and Engineering, and Faculty of Social Sciences. They offer 29 undergraduate courses and 15 postgraduate courses. Its Graduate School was accredited to award doctoral degrees in December 2008 (UNNC, 2015). UNNC is well-known for its success in cultivating high-quality graduates with international competencies and skills. Fifty percent of the undergraduate graduates are admitted into world top 200 universities for graduate studies, and many of the remaining graduates are employed in Fortune 500 companies (Sun, 2014).

Student graduates from UNNC benefit from a University of Nottingham instruction style, and accompanying extracurricular activities. The UNNC students are well-trained and grounded in a relevant 21st-century workforce curriculum: “Our instructional model containing various teaching methods is different from the traditional teacher-oriented and spoon-feeding model, and puts emphasis on students’ critical thinking, data collection and analysis, skeptical inquiry, and team work” (CHT03-16). UNNC students also have high English language proficiency, which is polished in the classroom environment, as English is the only language of instruction. While UNNC students build global competencies through multicultural classroom training and inevitable international experiences, they also attain a first-hand understanding of the Chinese context because they are studying and living in China. “It is also a good choice for those students who are not good at being independent [to live abroad alone], and for those families in which the parents are afraid their children will disconnect to the Chinese social and economic development [if they study abroad for several years]” (CHT03-15).

Taking UNNC as an example, the Chinese-Foreign Cooperative HEIs have helped fill a void that exists in the Chinese HE system. Chinese students can benefit from them by receiving quality HE with less money than if they attended many world-class universities abroad. Furthermore, these HEIs are not only an important component of the internationalization of Chinese HE, but are also viewed by some as a paradigmatic shift from the traditional HE instruction and learning styles. Accordingly, the educational outcomes they yield will not only benefit their own students, but also the entire Chinese HE system.

5.2. Hong Kong

Unlike China, where the national government shows a supportive attitude toward introduction of transnational higher education while gradually standardizing its regulation, the Hong Kong government relies heavily on market mechanisms; thus, transnational education in Hong Kong is mainly provided in the form of joint programs, distance learning, and twinning programs. The government does not directly curb or regulate the content, level, or cost of courses offered by foreign educational institutions. Instead, it simply provides sufficient information for various consumers to use in choosing a program of HE (Yang, 2006, pp. 41–42). More specifically, except for the courses offered in collaboration with selected local HEIs (8 UGC-funded HEIs as well as the Hong Kong Academy for Performing Arts, Hong Kong Shue Yan University, and the Open University of Hong Kong), all the courses leading to non-local higher academic qualifications (i.e., associate degree, degree, postgraduate, or other post-secondary qualifications) or professional qualifications are required to be properly registered. In addition, any overseas institution is required to obtain accreditation or other formal permission from the Education Bureau (EDB)[10] prior to its operation. The EDB will normally seek the independent expert advice of the Hong Kong Council for Accreditation of Academic and Vocational Qualifications (HKCAAVQ)[11] as to whether a course can meet the criteria for registration or be exempted from registration.

As of 1 March 2016, a total of 1179 non-local courses have become available to both the local and overseas students, with the breakdown of 460 (39%) registered courses and 719 (61%) exempted courses. Among them, 60.9% of registered courses and 80.7% of exempted courses are offered by institutions from the United Kingdom, whereas Australian institutions take up another 16.1% and 10.8% correspondingly (iPASS, 2016). There are also some branch campuses established in Hong Kong, including the University of Chicago, Upper Iowa University, and Savannah College of Art and Design, signaling the new development of TNHE in this city-state. However, as we have discussed before, the free market principle has obviously set no obstacle for foreign universities to join or quit the Hong Kong market. On the other hand, it offers no encouraging policies to attract overseas educational providers. This is why some scholars argue that even though Hong Kong has claimed to become an education hub since 2004, there is, until now, no coherent and cohesive policy framework to support this claim (Cheng et al., 2009; Lai and Maclean, 2014).

5.3. Taiwan

Taiwan's government is promoting Free Economic Pilot Zones (FEPZ) and trying to create an enabling environment to facilitate innovation and transformation in HE as one of five new industries in this area (Executive Yuan, 2014). Although this initiative concerning HE innovation and transformation is criticized by some (Wang, 2013), it is still expected to advance the collaboration between Taiwanese universities and foreign HEIs and to introduce international scholars, curriculum, and other educational resources that will enhance HE quality in Taiwan (Hou et al., 2015).

Compared to other Asian countries, introducing the Chinese-foreign cooperative programs is a new HE issue in Taiwan. In 2014, the TMOE proposed a plan regarding international programs built by Taiwanese universities and HEIs outside Taiwan (TMOE, 2014d). Based on benchmarking, this plan is likely to improve or renew Taiwanese HEIs’ management, connect to international academic communities, and compete with other HEIs around the world. An example of this international program is the University of Texas at Arlington's EMBA program in Taiwan, currently the only international program approved and recognized by the TMOE (UTA in Taiwan, 2016).

As displayed on its website, the mission of the UTA EMBA program is to help in-service professionals and managers earn a graduate business degree on campus. Taiwanese students of this

[10] EDB was previously called the Education and Manpower Bureau. Its manpower portfolio was transferred to the new Labor and Welfare Bureau in July 2007, and thus it was streamlined to become the Education Bureau.

[11] HKCAAVQ is a rather new statutory body established under the HKCAAVQ Ordinance (Chapter 1150) which came into effect on 1 October 2007. It was previously called the Hong Kong Council for Academic Accreditation (HKCAA). The new HKCAAVQ was appointed by the Secretary for Education as the Accreditation Authority and Qualifications Register (QR) Authority under the current Qualifications Framework (QF).

program must complete 36 credit hours of coursework, after which—like UT Arlington students in the U.S.—they will earn the AACSB-accredited EMBA degree. In contrast to a traditional one-size-fits-all educational model, this international program is specifically designed for professionals and managers in Chinese contexts; moreover, Asian students can choose where they will attend class so that they can experience different cultures (UTA in Taiwan, 2016).

6. Conclusion

In today's global HE environment, governments in Asia (particularly in China, Hong Kong, and Taiwan) clearly recognize that national competitiveness is driven by the innovation and transformation of HEIs. This study commenced by noting that there are many similarities, as well as some distinct differences in financing HE in these three locations. For example, almost all countries have experienced dramatic periods of growth; yet this growth has not been sustained in all contexts, with enrollments declining due to sustained low birthrates in Taiwan. Since 2000, each location has experienced increased attention to the privatization of HE. HEIs in these countries are increasingly required to seek after alternative sources of financing instead of continued dependence solely on government funding. There is also an increased need for university-industry partnerships and recruiting high-caliber human resources. These Asian governments are trying to lighten the burden of tuition fees for disadvantaged students through various scholarships and student loans schemes (Hawkins and Mok, 2015; Mok, 2013).

One factor in explaining these changes may be the globalization and internationalization in HE. The 21st century reality focuses on a knowledge-based world economy through internationalized activities, such as international academic exchanges; study abroad opportunities; the establishment of overseas branch campuses; institutional partnership engagements; and community engagement initiatives, especially with industry (Jacob et al., 2015; Sutin and Jacob, 2016). Since the internalized activities implemented in China, Hong Kong, and Taiwan are similar in many ways, the various approaches of financing HE systems represent a resemblance even in the midst of select distinctions. For instance, the establishment of Chinese-foreign cooperative HEIs has more attention in China than in Hong Kong. Still, all three governments show clear support toward the innovation and transformation of HEIs and the diversity of HE institutional financing. Their initiatives and actions produce some implications and contribute to future studies (Ong and Chan, 2014; Mok and Han, 2016; Mok and Jiang, 2017b).

Findings form this article highlight several policy implications that should be considered by researchers, policy makers, and government planners. First, critics of the Chinese-foreign cooperative HEIs claim that they are heavily dependent upon governmental funding, which harms their long-term and sustainable development. Additional sources of funding will help sustain this type of international HE partnership.

Second, in China, tuition fees differ province by province, while in Hong Kong and Taiwan, they are standardized. Whether tuition fees depend on market prices or government regulations is a controversial issue. Hence, under the realities of addressing university autonomy, governments need to propose a fair, equitable scheme of tuition fees.

Third, HEIs are increasingly key drivers of national economic strength and competitiveness. Even during periods of economic recession, governments needs to maintain robust financial support for its HE system, rather than increased investment in other education subsectors (e.g., at the primary and/or secondary levels).

Fourth, HEI-industry partnerships and other forms of community engagement are a common strategy for expanding HE institutional development, but this strategy still needs more government support to better encourage faculty and students to participate in more meaningful entrepreneurial activities. Besides, financial support from public- and private-sector businesses and organizations are important alternative sources of financing.

Fifth, although establishing overseas branch campuses benefits the increase of institutional reputation and revenue generation, there are also criticisms. Issues related to quality assurance, governance, and dual degree recognition often complicate such cross-education ventures.

Additional support for some of the most disadvantaged students is a continued need for ethnic minority and low-socioeconomic status students in China, Hong Kong, and Taiwan. Providing support mechanisms at each milestone[12] in the student pipeline needs to be considered and improved upon.

Finally, all three governments propose their own system of student financial aid, but a stable financial support structure and increasing employment opportunities for students are also needed.

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[12] These milestones include high school training, HE recruitment, admissions processes, student counseling and mentoring, indigenous cultural and language support where applicable, internship opportunities, job placement, and alumni support services.

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