

# HEALTHY AND PRODUCTIVE AGING

Also in this issue:

- **Changing Nature of Jobs**
- **Where is the Belt and Road Headed?**
- **Lessons from China's Reforms**
- **Curbing Fishy Business in Chile**
- **Financial Inclusion in Mexico**
- **Risk of Technology Lock-In**



## DIRECTOR'S MESSAGE



During the second half of 2018, HKUST IEMS organized events that continue active dialogue on key research themes emphasized by the Institute. Building upon our past collaboration with the World Bank as a member of the Network for Jobs and Development, we hosted a launch event for the Bank's 2019 World Development Report on "The Changing Nature of Work." IEMS also hosted a major research conference on population aging, an annual event of the Asia Pacific Rim Universities (APRU), as well as the 4<sup>th</sup> Asian Population Association conference in Shanghai, activities which build upon the major conference on population aging in Asia the Institute organized with the World Bank in 2014. Addressing development challenges facing China, IEMS continued to co-sponsor the China Economics Summer Institute, hosted a talk by well-known reform thinker Cai Fang, Vice President of the Chinese Academy of Social Sciences, on lessons from China's 40 years of reform and opening up, and organized an Emerging Markets Insight Series panel discussion on "Where is China's Belt and Road Headed?" featuring perspectives from research, business, and policy-makers. Our academic seminars continued the dialogue on topics of longstanding interest to Institute Faculty Associates, such as financial inclusion, regulatory enforcement, and innovation. Through these activities, IEMS furthers its mission to lead thinking about the major challenges facing emerging markets.

## THE CHANGING NATURE OF WORK

In October 2018, HKUST IEMS hosted the launch of the 2019 World Development Report (WDR) titled "The Changing Nature of Work" at HKUST Business Central. The World Development Report is the World Bank's flagship analytical publication, providing in-depth analysis and policy recommendations on a topic of special relevance to less-developed and emerging market economies.

At the report launch, **Simeon Djankov**, Director of the WDR 2019, argued that technological progress is expanding job opportunities and reshaping the skills needed for work. The demand for less advanced skills that can be replaced by technology is declining. At the same time, the demand for advanced cognitive skills, socio-behavioral skills, and skill combinations associated with greater adaptability is rising. He argued that investing in human capital is the priority to make the most of this evolving economic opportunity. Governments should invest in human capital, particularly early childhood education, to develop high-order cognitive and socio-behavioral skills in addition to foundational skills.

**Simon Cox**, Emerging Markets Editor at The Economist offered his comments on the report. Whilst he agreed that technology is indeed changing the nature of jobs, he rebuked an overall sentiment of pessimism around the automation of jobs and cited examples of parts of Japan that embrace technology. He also argued that deindustrialization in developed countries is attributed

to a shift in manufacturing employment, not a decline as the report would suggest.

**Sujata Visaria**, then IEMS Acting Director, focused comments on Hong Kong's fourth position on the Human Capital Index. Hong Kong's low mortality rate, expected years of schooling and high life expectancy rates mean that a child born in HK today will achieve a productivity equal to 82% of his/her full potential. However, the socio-behavioral skills needed to adapt to future changes in work are not valued in early education. Referring to the "Educating for the Future" index developed by the Economist Intelligence Unit, Hong Kong features highly on "Teaching environment" but fares poorly in "Socio-economic" and "Policy environment". Should Hong Kong want to continue to rank highly on the Human Capital Index, there needs to be a focus on early education and on developing the socio-behavioral skills needed for the future.

"The Changing Nature of Work" Launch of The World Development Report 2019 by the World Bank Hosted by HKUST IEMS 2018.10.19

Watch the event video and download the report at <http://iems.ust.hk/wdr2019>



Simeon Djankov (World Bank), Sujata Visaria (HKUST) and Simon Cox (The Economist)

## WHERE IS THE BELT AND ROAD HEADED?

China's Belt and Road Initiative (BRI) may play a transformative role in the future development of China and much of the world. 5 years after the BRI was announced in 2013, we invited three leading experts to an Emerging Market Insights panel discussion to share what has been learned to date about the implementation of the BRI from the perspectives of research, policy and business.

**Albert Park**, Director of HKUST IEMS presented early findings from a Hong Kong government-supported research project on trade and investment under the Belt and Road. Quantitative analysis of China's outbound Foreign Direct Investment based on project level data showed that greenfield investments in Belt and Road countries had increased substantially since 2013 especially in countries with better governance. Construction projects also were the main focus of Belt and Road activity. Qualitative findings from country case studies highlighted the importance of government coordination and leadership for the success of Belt and Road projects. On the other hand, a tendency to politicize Chinese investments, concern over hiring and treatment of workers, and limited local governments capacity have challenged the implementation of Belt and Road projects.

**Biliang Hu**, Director of the Belt and Road Research Institute, and Dean of the Emerging Markets Institute at Beijing Normal University, argued that China's plans and objectives for the Initiative are five-fold. He explained that China aims to strengthen trade policy and relations in order to drive sustainable economic growth for the country. Hu also highlighted the importance of investing outside of the country and to make use of foreign reserves. Thirdly, the original mission for improving economic zones in order to benefit all countries remains a priority for the BRI. Hu also argued that supporting supply side structural reform in order for China to strengthen production capacity in other countries was on the BRI agenda, as well as improving global governance and driving globalization.

**Loletta Chow**, Global Leader, EY China Overseas Investment Network, Belt and Road Taskforce Leader and Asia-Pacific Growth Markets Leader, came back to a previous point regarding the over-politicization of the BRI and called for a need to consider Belt and Road projects from China's perspective. She argued that China is using the BRI to drive the fulfillment of corporate social responsibility (CSR) initiatives and that Chinese companies are increasingly committed to improving economic and social conditions for all countries associated with the Belt and Road. Looking forward, China will continue to prove that the BRI is committed to promoting the mutual development of China and other countries in order to build a more open and inclusive world.



"Where is the Belt and Road Headed" Hosted by HKUST IEMS, IPP and EY as part of the Emerging Market Insights Series 2018.12.13

Watch the event video at <https://iems.ust.hk/insights>



## LESSONS FROM CHINA'S REFORM

China's reform, opening-up and resultant economic growth over the past 40 years have led to the accumulation of an immense array of experiences, which economists are keen to analyze and theorize upon. In his academic seminar, **Cai Fang** (Chinese Academy of Social Sciences) discussed the unique features of China's experience and its relevance for the general themes of economic development.

Fang explored the rich literature that has assessed and documented China's successful experiences. Many Western theories have been applied to evaluate China's experiences. He argued that this tends to understate the success of the reform and the sustainability of the Chinese growth. China's economic reform and opening up period overlapped with a demographic transition period that helped drive economic growth. He explained that China's demographic dividend was characterized by rapid growth of the working age share of the population. This window supported a high potential growth rate during China's reform period by exploiting growth factors such as the abundant labor force and human capital accumulated during the socialist planning period.

However, the potential to exploit the demographic dividend is vanishing rapidly. Labor scarcity is boosting wages at a speed that is outpacing labor productivity growth, leading to a sharp decline in the return to investment. Previous high growth factors are weakening, therefore, China's potential growth rate is bound to fall.

Fang concluded that China needs now to shift from the demographic dividend to a reform dividend in order to continue to spur growth. Areas in which China could gain a reform dividend

include: diminishing the household registration system to promote labor motility and increase labor supply, privatizing state-owned enterprises, investing in the education and training system, population policies to increase fertility and balance population development, and reforming the fiscal system and the banking system. Reform dividends and the potential growth generated by these reforms should be shared among all participants.



"Perceiving Truth and Ceasing Doubts" Hosted by HKUST IEMS and the Division of Social Science, HKUST 2018.07.26

Watch the event video at <https://iems.ust.hk/caifang>



# 9<sup>TH</sup> ANNUAL APRU RESEARCH CONFERENCE ON POPULATION AGING



The Asia Pacific is aging faster and on a larger scale than any other region in the world. An aging population impacts almost every area of government policy and presents a number of socio-economic challenges. To address the challenges posed by this demographic phenomenon, The Population Aging Hub of the Association of Pacific Rim Universities (APRU), which includes more than 50 universities in 17 Pacific Rim economies, organizes academic events and contributes to policy dialogues in the Asia Pacific Region.

Hosted by the HKUST Institute for Emerging Market Studies, the 9<sup>th</sup> APRU Research Conference on Population Aging was held on December 7-8, 2018 at HKUST. The theme of this year's conference was "Dementia, Cognition, and Healthy and Productive Aging". HKUST welcomed over 90 participants from more than 40 institutions around the world for a 2 day conference of presentations from 11 distinguished scholars and papers selected from over 140 submissions.

Welcome remarks from Dr **Christopher Tremewan** of the Association of Pacific Rim Research Universities and **Sabrina Lin** (HKUST) were followed by the first plenary session on the theme of "Dementia". **Karl Herrup** (HKUST) explained the biology of Alzheimer's disease, and argued the drivers of aging are understudied and it is time to put aging back into models of Alzheimer's disease. This is especially important for identifying ways to delay or reduce the onset of Alzheimer's given that a cure for the disease is many years away. **Karin Anstey** (University of New South Wales) addressed the urgent need for strategies to prevent or delay dementia as we expect to see more than 65 million people worldwide living with dementia by 2030. She provided global evidence that the trajectory of cognitive decline is impacted by a wide range of modifiable factors such as low education, a sedentary lifestyle and exposure to air pollution. Wide scale population level approaches to promote cognitive health are required, as well as a range of culturally appropriate and targeted interventions. **A.B. Dey** (All India Institute of Medical Services) provided a diagnostic assessment of dementia using an ongoing cohort study titled Longitudinal Ageing Study of India (LASI), which aims to survey 60,250 Indians over 45 years of age for next 25 years. Funded by the Government of India, National Institute of Health (USA) and United Nations Population Fund (UNFPA), LASI aims to shape and guide an integrated healthcare system required to sustain this large ageing population.

The second plenary session was on "Work and Retirement". **Axel Boersch-Supan** (Technical University of Munich) dispelled the belief that older workers are less productive than younger workers. Using a large data set from an insurance company to study the relationship between age and productivity, Boersch-Supan and coauthors found no decline in productivity. Instead, they found variation according to task complexity. Productivity increased in teams with more demanding tasks whilst teams with medium complex tasks exhibited a flat profile. Routine tasks were shown a decline in productivity with age, however, this was not particularly significant for the oldest employees.

Is it feasible, from a health perspective, to tackle China's rapidly aging population by postponing the retirement age? In the second plenary session of the conference, **Yaohui Zhao** (Peking University) argued that analysis of survey data finds that concerns about health should not stand in the way of extending the retirement age. Zhao and co-authors found that delaying the retirement age will utilize the large unused work capacity among the older population. A pension system that encourages the population to work longer is needed, as well as one that allows for retirement for health reasons that reduce work capacity.



Dr Ching Choi Lam, Executive Committee Member and Chair of Elderly Commission of the Hong Kong SAR

The second day of the APRU conference featured a plenary session on the theme of “Caring for the Elderly”. In his keynote lecture, Dr **Ching Choi Lam**, Chair of Elderly Commission of the Hong Kong SAR, discussed the challenges of population aging in Hong Kong. He argued that Hong Kong’s infrastructure is built based on conventional thinking that our society will continue to grow in spite of a decline in human resources, an increase in the demand of services, a lack of land supply and financial instability. Choi proposed a number of measures to tackle these challenges including encouraging elderly employment, increasing the healthcare workforce, introducing public-private services to improve the sustainability of social security schemes and encouraging property developers to build a diverse range of housing for the elderly. **Angelique Chan** (Duke NUS Medical School) addressed the concept of resilience to maintain a disability free life which will in turn reduce the mortality rate. Chan and coauthors found that improving financial awareness and social support improved resilience amongst a panel of 50-59 yearolds in Singaporeans. **Hiroki Nakatani** (Keio University) followed with a lecture on the “Transformation of Public Health in the Super Ageing Society in Japan”.

In the final plenary session of the conference, **Hidehiko Ichimura** (University of Arizona) quantified health shocks over the life cycle in Japan in order to evaluate individual behaviors and social policies. Data from the Japan Medical Data Center (JMDC) shows that the size of health shocks do not change very much until age 60, but the probability of experiencing a health shock decreases until age 10 after which it remains flat until gradually increasing after the age of 40. **Yi Zeng** (Peking University) investigated whether genetic associations with longevity were stronger in females compared to males. Zeng and coauthors studied sex specific polygenic risk scores (PRS) and found that the genetic constitution of women favors longevity substantially more than in men. In Zeng’s view, these findings may reflect human genetic evolution in which females gain and accumulate advantages in genetic constitution to meet their reproductive and offspring caring duties as mothers and grandmothers.

The older population, defined by the UN as those aged 60 and above, is expected to rise from 962 million globally in 2017, to 2.1 billion in 2050 and 3.1 billion in 2100. While population aging is poised to become one of the most significant social transformations of the 21<sup>st</sup> century, **Sergei Scherbov** (International Institute of Applied Systems Analysis) argued that there is no reason to exaggerate resulting challenges due to mismeasurement. Scherbov presented a new approach to measure to aging not by biological age, but rather in relation to their lengthening life expectancies. “Prospective age” presents a forward-looking measure of age based on the health characteristics of people and allows the construction of new multidimensional measures of aging.

In addition to the 4 plenary sessions, 8 parallel sessions of 23 presentations were held throughout the conference. These presentations covered a wide range of topics such as sensory impairment, pension system design and migration. A poster session was held for PhD students. Best Poster Prizes were awarded to **Akayo Baba** (University of Tokyo) for her study of “Care Burden and Other Attitudes in Mother-Daughter Residential Caregiving Relationship”, **Man Li** (East China Normal University) for her study of “The Causal Effect of a Transition to Co-residence with Adult Children on the Parental Subjective Well-being”, and **He Zhu** (Osaka University) for her research on “Does the Absence of Adult Children Migration Influence the Health of Parents Left Behind?”.

“9<sup>th</sup> Annual APRU Research Conference on Population Aging” Hosted by HKUST IEMS 2018.12.07-08

Watch the event video at <http://iems.ust.hk/apru-aging-conference>



Snapshots from the PhD Poster Session.

## ENFORCING REGULATION UNDER ILLICIT ADAPTATION



Correcting market failures and improving economic efficiency often requires curbing undesirable behaviors of market agents who act to maximize their private benefits. Enforcing regulations gets complicated when agents react to the new regulatory regime in unanticipated ways to circumvent enforcement. **Ahmed Mushfiq Mobarak's** (Yale) academic seminar investigated the effects of enforcement in the context of illegal sales of the critically endangered Pacific hake fish in urban markets in Chile. The government of Chile instituted a ban on fishing and sales of hake during September each year when the fish reproduces. Catching hake during this period is especially ecologically destructive. Mobarak and coauthors implemented interventions that were designed to reduce over-fishing of the critically endangered Pacific hake by either monitoring and penalizing vendors that sell illegal fish or discouraging consumers from purchasing using an information campaign.

Most of the fish were sold in ferias, which are local markets regulated by the municipality. Vendors move around between ferias during different days of the week and are therefore organized into circuits. The interventions included 106 circuits containing 280 ferias, in 70 municipalities. The enforcement assignment aimed to reduce the supply of hake fish during the ban period and was randomized at the circuit level. Whilst the information campaign aimed to

reduce the demand for hake fish through a consumer information campaign and was assigned at neighborhood level. They found that vendors attempted to circumvent the ban through hidden sales and selling "frozen" hake, which were tracked using mystery shoppers. Instituting random monitoring visits were found to be much more effective in reducing true hake availability by limiting such cheating, compared to visits that occurred on a predictable schedule. They also found that monitoring at a higher frequency backfires, because targeted agents learn faster and cheat more effectively.

Mobarak suggested the information campaign was more cost effective than the enforcement strategy. Partly because enforcement becomes less effective as vendors learn to hide and freeze fish to circumvent regulation. Enforcement was found to cost US\$6.05 per saved fish, compared to \$4.98 under the information campaign. However, under the enforcement strategy, they found that sending monitors on an unpredictable schedule was an even more cost effective way to protect hake. The cost of "saving" a hake via unpredictable enforcement drops to \$4.51. They also found that a less frequent monitoring schedule was most cost-effective at only \$4.13 per saved hake. Mobarak concluded that enforcement can be the most cost-effective strategy for the Chilean government to pursue to curb illegal sales of hake fish, but that details of the enforcement policy design matter. Without sophisticated monitoring and design-thinking such as an unpredictable enforcement schedule, attempts at enforcement can backfire. Designing and implementing a consumer information campaign is a much less complex task, and many regulators may rationally choose to proceed with this approach.

"Enforcing Regulation under Illicit Adaptation"  
Hosted by HKUST IEMS and the The Division  
of Social Science, HKUST  
2018.09.14

Watch the event video at  
<https://iems.ust.hk/mobarak>



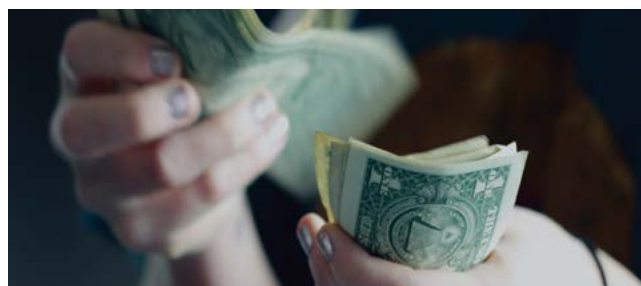
## CAN LARGE BANKS HELP EXPAND FINANCIAL INCLUSION?

More and more research findings show that financial development leads to improved economic outcomes. In response, developing country governments and international development institutions have made financial inclusion a key policy priority. The World Bank has called for Universal Financial Access by 2020. In Mexico, a 2011 presidential decree established the National Council for Financial Inclusion to expand financial access to underserved populations.

To unveil the role of large formal financial institutions in expanding financial access in developing countries, **Aprajit Mahajan** (UC Berkeley) and his co-authors examine a large Mexican bank's efforts to expand financial access with a credit card specifically targeted towards borrowers with limited credit histories. They focus on uncollateralized credit card debt which is the most common formal borrowing instrument in the country, from a credit card targeted at "new to banking borrowers" (NTB borrowers). In 2010, this card accounted for approximately 15% of all first-time formal sector loan products nationwide. They used bank data, credit bureau data, social security data and survey data to document market facts that are relevant for understanding the challenge of financial inclusion in Mexico.

Mahajan showed that NTB borrowers were credit constrained in the formal credit market and that informal credit market terms were markedly more onerous than formal sector terms. Despite this, they found high card exit rates, around one-third of the sample defaulted or cancelled their card over the 26-month study period. Large experimental changes in interest rates and minimum payments did little to mitigate default risk. Using payment and purchase data,

they also found that bank revenue per card was low and highly variable. What's more, NTB borrowers who generated good credit histories with their first lender, were more likely to obtain other cards and leave the bank compared to borrowers who did not generate comparable histories. Mahajan argued that these results were the reason for the bank's eventual discontinuation of the card. These findings highlight the difficulty of increasing financial access using large formal sector financial organizations.



"Financial Inclusion and Contract Terms:  
Experimental Evidence from Mexico" HKUST  
IEMS Academic Seminar, co-organized  
with the Department of Economics, HKUST  
2018.10.11

Watch the event video at  
<https://iems.ust.hk/mahajan>



# GRID-SCALE ENERGY STORAGE AND ELECTRIC VEHICLES



Low-cost energy storage, particularly batteries, and electric vehicles are key technologies for the transition to a low-carbon energy system. International competition is quickly emerging in these interconnected domains, which could accelerate the vital processes of innovation and diffusion and hasten the energy transition. In North America, Europe, and Asia, governments and companies are jockeying to position themselves for advantage in these emerging industries. **David Hart** (George Mason) argued that the threat of climate change, and the difficulty of reducing carbon emissions, means that power sector emissions must fall to near zero. Grid-scale energy storage has the potential to make this challenging transformation easier, quicker, and cheaper.

The technology for grid-scale energy storage based on lithium-ion (Li-ion) batteries now accounts for more than 90% of the global and domestic markets and benefits from large-scale use in electronics including electric vehicles (EVs). Hart argues that this industry faces a threat of “lock-in”. “Lock in” is a common phenomenon, in which a technology that meets immediate needs boxes out alternatives that have the potential to meet future needs better. “Lock-in” may be beneficial because it accelerates process innovation and drives down costs for the dominant technology, which in turn expands adoption. However, Hart explains that one of the risks is excessive market concentration. East Asian producers, notably Chinese

entrants backed by government policies that seek to advantage local industries, are the most likely to dominate the market in this industry. He argues that this can strand innovation by blocking the entry of more optimal alternative technologies that could improve on the dominant design.

To mitigate the risks of technology “lock in” Hart suggests that public policy makers expand funding for research and development (R&D), create tax incentives that focus on emerging technologies, support national and international processes that will lead to open standards, and counter unfair international trade practices. The objectives for these policies should include growing the grid-scale energy storage market overall, creating niches within the market in which a range of technologies have opportunities to establish their cost and value characteristics, and ensuring that R&D continues in order to expand the portfolio of technology options.

“Grid-Scale Energy Storage and Electric Vehicles” Hosted by HKUST IEMS and the Department of Economics, HKUST 2018.10.05  
 Watch the event video at <https://iems.ust.hk/hart>

## Thought Leadership Briefs

The Institute published Thought Leadership Briefs to disseminate research results effectively to business leaders, policy makers, the media and the public. Latest additions include the following which can be read in full at <http://iems.ust.hk/tlb>

Issue #	Topic	Author(s)
21	<b>Can Chinese Manufacturing Firms Cope with Rising Labor Costs?</b>	Cheng Hong (Wuhan University), Albert Park (SOSC, ECON, PPOL)
22	<b>Pathway to a Low-Carbon Transport Future: The Case of Shenzhen</b>	Jimin Zhao (SOSC)
23	<b>Seoul Searching: How to Move Beyond the Export-oriented “Asian Development Model”</b>	Joon Nak Choi (MGMT)
24	<b>Can China Stay Ahead in the Global Patent Race?</b>	Naubahar Sharif (SOSC, PPOL)

## Also in Fall/Winter 2018

**Amber Yao Li** (HKUST) delivered an academic seminar examining revenue and physical productivity in the Chinese manufacturing industry and how these relate to firms' trade activity. Using a detailed production survey, Li and coauthors found that exporters appear less efficient when looking at revenue productivity, but more efficient when considering physical productivity. This difference is explained by pricing differences between firms as exporters charge on average lower prices by a margin of around 20%.

More about Li's seminar here:  
<https://iems.ust.hk/amber>



**Guojun He** (HKUST) gave an academic seminar examining the evaluations process for state employees. Using a large-scale field experiment, He and coauthors found that introducing uncertainty in who evaluates state employees' performances reduced influence activities and improved overall performance.

In contrast, providing mid-term feedback did not significantly impact performance.

More about He's seminar here:  
<https://iems.ust.hk/guojun>



Mark Rozenzweig (Yale) delivering the keynote speech at the China Economics Summer Institute 2018.

HKUST IEMS co-sponsored the 11<sup>th</sup> China Economics Summer Institute (CESI) between 17-19 August 2018 at the Chinese University of Hong Kong. **Mark Rosenzweig** (Yale) delivered a keynote speech exploring the effects of schooling on health using evidence from young twins in China. Researchers also presented on a range of topics from the effect of air pollution on migration in China to protests as strategic games from Hong Kong's anti-authoritarian movement.

Find out more about CESI 2018 here:  
<https://iems.ust.hk/cesi2018>



HKUST IEMS co-sponsored the 4<sup>th</sup> Asian Population Association (APA) Conference at Shanghai University. IEMS Faculty Associate, **Stuart Gietel-Basten**, explored the relationship between age and voting propensity in various East Asian regions. He used the Asia Barometer Survey to identify whether there is an age gradient, and projected voter turnout rates up to 2050.

Find out more here:  
<http://iems.ust.hk/apa>



HKUST IEMS co-hosted the 5<sup>th</sup> Annual Meeting of the International Consortium of China Studies entitled "China's Developmental Challenges and Opportunities after the 19<sup>th</sup> Party Congress". Researchers presented on a range of topics from city-town relations in China to transformations of the state owned economy for China's technological "Great Leap".

Find out more about the consortium here:  
<http://iems.ust.hk/ICCS>



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