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SARGENT INSTITUTE OF
QUANTITATIVE ECONOMICS AND FINANCE | NEWSLETTER

2021 / ISSUE 03

SIQEF | NEWSLETTER



PHBS
Peking University
HSBC Business School

2021
ISSUE 03

SARGENT INSTITUTE OF
QUANTITATIVE ECONOMICS AND FINANCE

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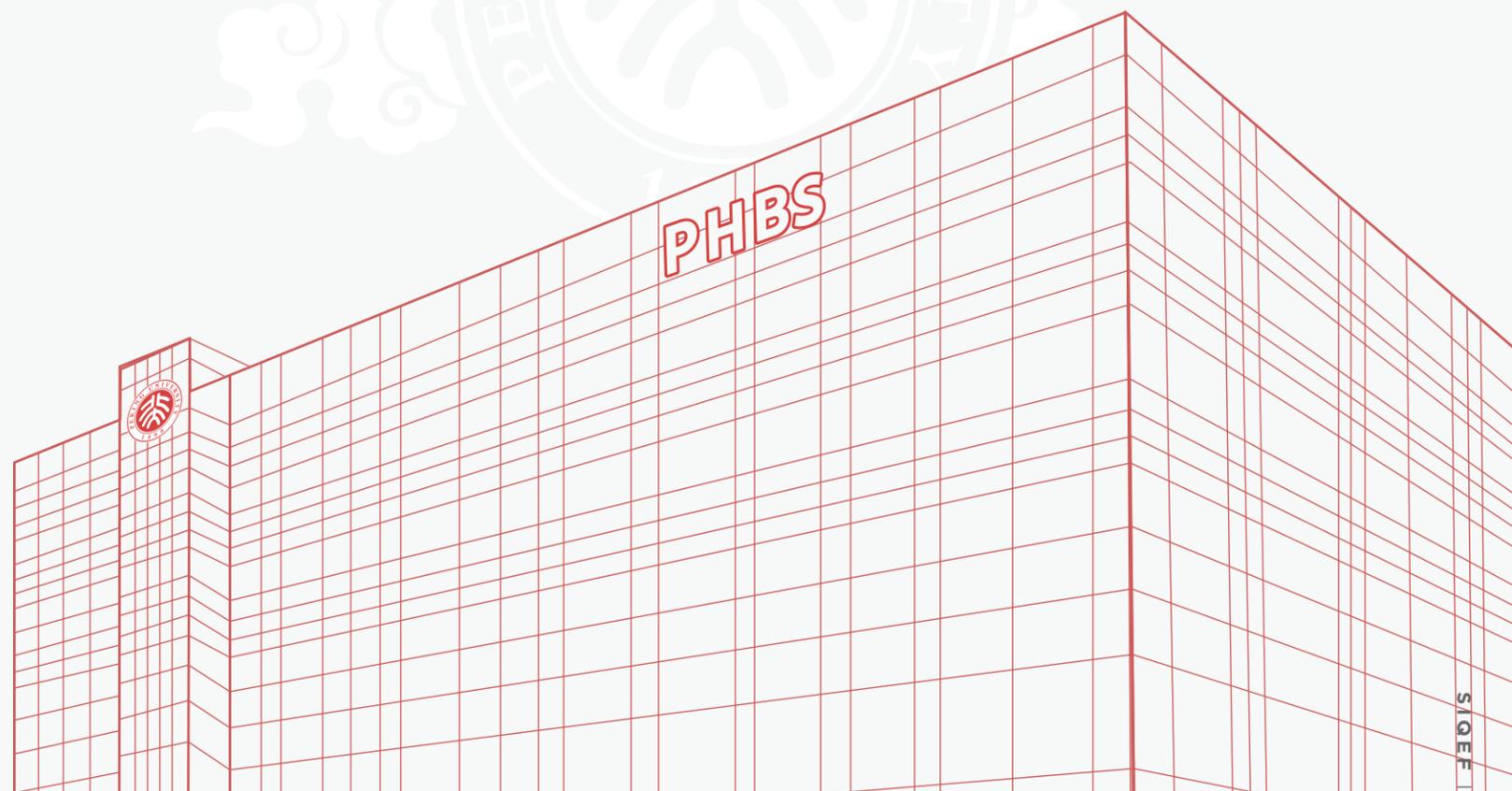
Mission Statement

“Our institute strives to put mathematics and statistics at the service of quantitative analysis of questions about economics, finance, and government policy. Scientists use mathematics because we want our models to be coherent. We use statistics because we want our models to describe data well. Our purpose is to learn, teach, and apply an array of methods made possible by the availability today of powerful and inexpensive computational methods and large data sets. We provide a platform for developing computational economics and finance based on user friendly and powerful open source languages, especially Python and Julia.”

— *Thomas Sargent*



SARGENT INSTITUTE OF QUANTITATIVE ECONOMICS AND FINANCE



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PHBS HOLDS THE THIRD INTERNATIONAL WORKSHOP ON MACROECONOMICS AND FINANCE

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PHBS

2021

The Third PHBS Workshop in Macroeconomics and Finance

第三届北京大学汇丰商学院宏观经济与金融国际会议

2021. 4. 22-24

Keynote Speakers

Conference Presenters



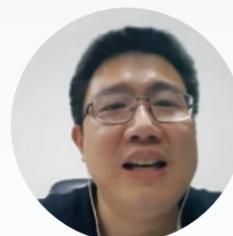
Adriano Rampini
Duke University



Thomas Philippon
New York University



Pete J. Klenow
Stanford University



Kai Li
Peking University



Jaroslav Borovicka
New York University



Yunzhi Hu
University of North Carolina
at Chapel Hill



Xiaoming Cai
Peking University



Winston Wei Dou
University of Pennsylvania



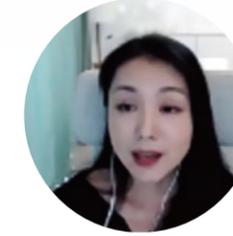
Sebastian Di Tella
Stanford University



Jun Li
University of Texas at Dallas



Lars-Alexander Kuehn
Carnegie Mellon University



Jiao Shi
Peking University

PHBS Holds the Third International Workshop on Macroeconomics and Finance

Written by: Annie Jin

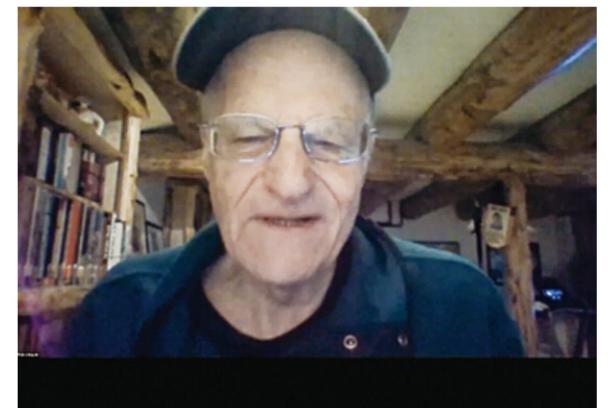
Peking University HSBC Business School (PHBS) recently held the 3rd International Workshop on Macroeconomics and Finance. More than 200 scholars attended the online workshop to discuss cutting-edge issues such as capital mismatches, asset pricing, and risk premiums, with renowned scholars from top universities at home and abroad, including Stanford University, University of Pennsylvania, Duke University, New York University, University of Connecticut, University of North Carolina (Chapel Hill), London School of Economics, Carnegie Mellon University, University of Texas at Dallas, Indiana University, University of Minnesota, Peking University, Tsinghua University and Shanghai Jiaotong University.

The event aims to promote academic exchanges between domestic and overseas macroeconomics and financial research institutions and enhance the understanding of China's macroeconomic and financial issues. A total of 12 papers were presented at this year's three-day workshop.

Professor Thomas J. Sargent, 2011 Nobel laureate in economics and the director of the Peking University HSBC Business School Sargent Institute of Quantitative Economics and Finance, gave the opening remarks. He pointed out that the workshop reminded him of two questions: Why are there periodic economic crises? What kind of economic system is more effective? He said that the responses to the two questions constituted the basic part of modern economics. John Maynard Keynes, Paul Samuelson, and other economists introduced macroeconomics into economics, which could allow the government to adopt policies to keep the economy close to full employment and alleviate the impact of the economic cycle. And the theorem of welfare economics mathematically proves the equivalence of market economy and planned economy at a certain level. He hopes that the younger generation of researchers can use more advanced tools to study economic issues and make breakthroughs.



PHBS Associate Dean Pengfei Wang gives welcome speech



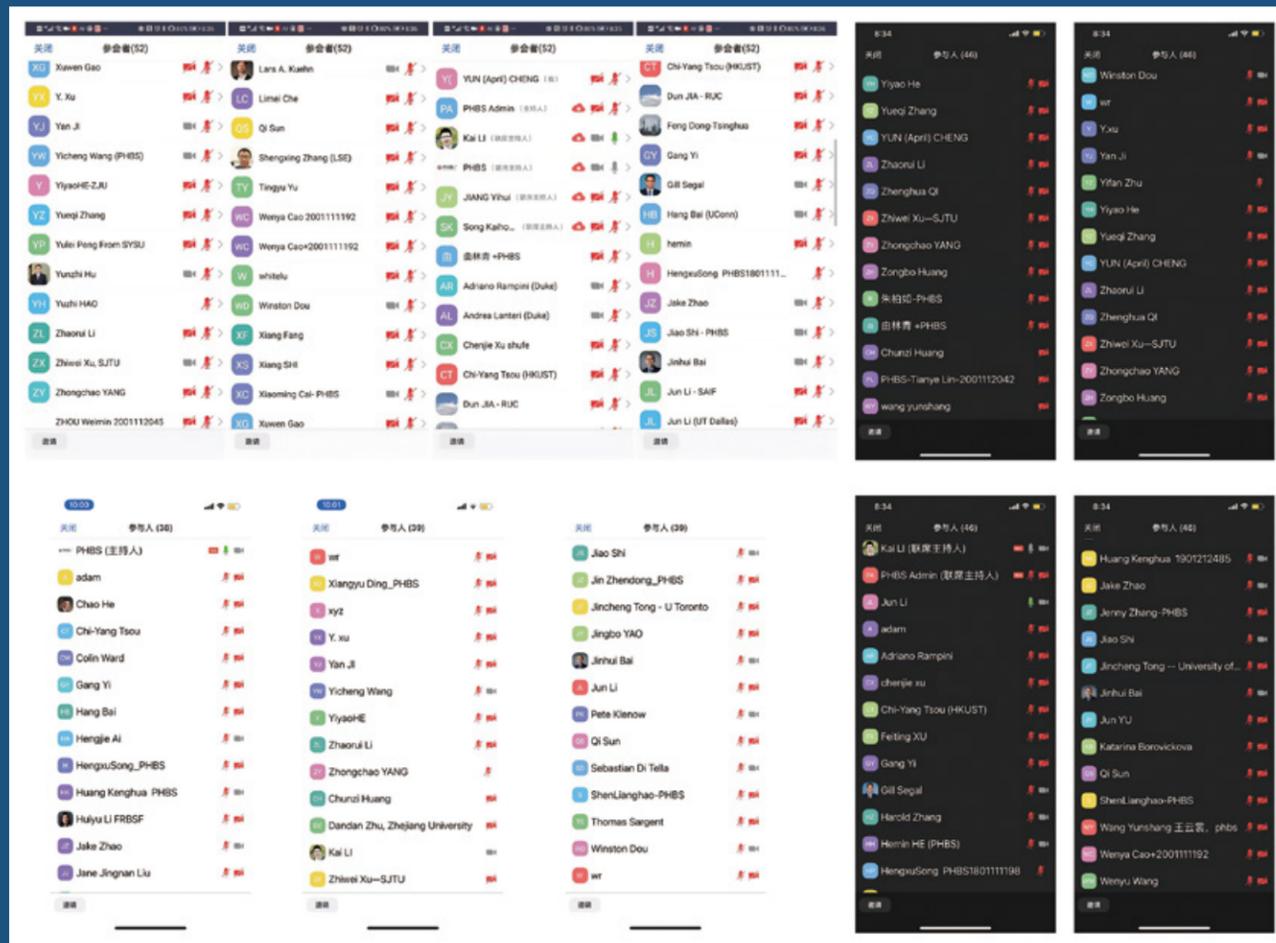
Professor Thomas J. Sargent delivers the opening remarks

“Why are there periodic economic crises? What kind of economic system is more effective?”

In the keynote speech, Professor Adriano Rampini of Duke University introduced the paper “Constrained-Efficient Capital Reallocation”, co-authored with Dr. Andrea Lanteri. He held that financial frictions, such as collateral constraints, would distort the level of aggregate investment and capital allocation among enterprises, and subsidies on new capital could help increase the supply of old capital in the future, therefore reducing the price of old capital and optimizing resource allocation.

Professor Thomas Philippon from New York University presented the paper “Let the Worst One Fail: A Credible Solution to the Too-Big-To-Fail Conundrum”, co-authored with Professor Oliver Wang. He incorporated the tournament mechanism into the design of government bailouts during the economic crisis, and linked the distribution of government bailouts to the performance of banks, effectively alleviating the problem of “too-big-to-fail”.

Professor Pete J. Klenow from Stanford University talked about his paper “A Theory of Falling Growth and Rising Rents”. He elaborated the innovation-driven growth model based on the inherent heterogeneity of enterprises from various aspects, including the endogenous growth theory of heterogeneous companies, boundary expansion of high-efficiency companies, innovation and long-term growth. They find that the rise in market share of more efficient firms outweighs the drop in long-run growth, leaving welfare modestly enhanced by the fall in overhead costs.



Scholars attend the workshop online

The Fifth PKU-NUS International Conference on Quantitative Finance and Economics Successfully Held Online

Written by: Annie Jin



Professor
Yi-Chun Chen



Professor
Pengfei Wang



Professor
Jingping Yang

“
The PKU-NUS International Conference on Quantitative Finance and Economics has been successfully held to provide a communication platform for academics and the industry”

The fifth PKU-NUS International Conference on Quantitative Finance and Economics was held online on May 22 and 23. Jointly organized by Peking University HSBC Business School (PHBS), the Risk Management Institute (RMI) of the National University of Singapore (NUS), and Key Laboratory of Mathematical Economics and Quantitative Finance (Peking University), it provided a platform for more than 300 scholars and researchers to discuss new methods and present latest findings in the field of quantitative finance and economics.

Opening remarks were delivered by Yi-Chun Chen, Director of RMI, National University of Singapore; Pengfei Wang, Associate Dean of Peking University Shenzhen Graduate School and PHBS; Jingping Yang, Deputy Director of Key Laboratory of Mathematical Economics and Quantitative Finance. They hoped that conference could not only enhance the relations between PKU and NUS, but also promote more in-depth and extensive inter-university academic exchanges and cooperation.



Keynote Speakers:

- Left: Professor Paul Glasserman

- Bottom left: Professor Zheng Song

- Bottom right: Professor Asher Wolinsky

This conference's keynote speakers included Professor Asher Wolinsky from the Department of Economics of Northwestern University, Professor Zheng Song from the Department of Economics of the Chinese University of Hong Kong, and Professor Paul Glasserman from Columbia Business School. Song presented his paper "Unequal Returns to China's Intercity Road Network". The article quantitatively analyzes the problem of resource mismatch in the construction of China's intercity roads by estimating the rate of return on investment of the intercity road network. Wolinsky and Glasserman respectively talked about their papers "Auctions with Frictions" and "Linear Classifiers under Infinite Imbalance with Applications to Credit Risk".

41 high-quality academic papers were selected from many submissions, covering major fields such as microeconomics, mathematical economics, risk management, macroeconomics and finance, portfolio selection, and quantitative finance. Three papers of our faculty and researchers were selected and presented at the conference.

PKU-NUS

Professor Jaehyuk Choi presents his paper

Professor Jaehyuk Choi talked about his paper “On Simulation of Integral Functionals of Brownian Motion with Applications to Financial Engineering”. In this paper, they used the mixture model approach to compute European option prices and Greeks under the stochastic-alpha-beta-rho (SABR) model as the weighted sum of those under the base model, so as to easily perform the Monte Carlo simulation.



Professor Xianhua Peng presents his paper

Professor Xianhua Peng presented his paper “A Machine Learning Algorithm for Stochastic Control Problems in Economics”, co-authored with Professor Steven Kou of Boston University. Based on deep neural networks and deep learning, they propose a machine learning algorithm for solving high dimensional time-inhomogeneous stochastic control problems, and apply the algorithm to solve various finite-time control problems in economics, such as multi-sector stochastic growth problem and social cost of carbon problem related to climate change.



Ph.D. student Linqing You presents his paper

Operating lease makes up two-fifth of U.S. capital expenditures and are an important channel for obtaining capital. In order to study the difference between leasing and purchase, Ph.D. student Linqing You and PHBS Professor Kai Li coauthored the paper “Flexibility, Option Value of Leasing, and Investment”. They explicitly built a buy-and-lease decision into the neoclassical investment theory with costly investment reversibility and expandability. Their empirical research shows that the company’s lease capital ratio is significantly positively correlated with the irreversibility of its investment, and the inflexibility of corporate investment encourages companies to use leases to obtain capital.



In addition, other scholars also presented and discussed their papers. They were from universities and institutions at home and abroad, including Yale University, Cambridge University, City University of New York, San Diego State University, National University of Singapore, University of Waterloo, Chinese University of Hong Kong, Hong Kong Polytechnic University, Hong Kong University of Science and Technology, Tsinghua University, Zhejiang University, Tongji University, Southern University of Science and Technology, Shanghai Scholars from the University of Finance and Economics, the Central University of Finance and Economics, and the Federal Reserve Board of the United States.

In the past several years, the PKU-NUS International Conference on Quantitative Finance and Economics has been successfully held to provide a communication platform for academics and the industry, improve the quantitative financial strategies, and respond to regulatory changes in the financial sector.



Demystify and Empower: The First Year of the Computational Economics and Finance Program

Written by: Mingming Cao

Translated by: Xiangyu Ding, Ting Hu, Kenghua Huang, Jiahui Li, Bo Pang

FRONTIER
FASHION

DEMYSTIFY
EMPOWER

LIVE UP TO HIGH
EXPECTATIONS



Python

In September 2020, when for the first time in her life, Li Lei, a 2019 master of economics student at the Peking University HSBC Business School, typed out the first line of code, “Hello World” in class, she did not realize that another door in the world had opened when she pressed the enter key.

Her original intention for choosing the Computational Economics and Finance program was that “Python is more powerful than Excel for processing data”. However, after the four modules, her gains far exceeded her expectations.

Li Lei is one of more than 40 classmates in the “Computational Economics and Finance” course of the Sargent Institute of Quantitative Economics and Finance, Peking University. The series of courses, initiated in the fall of 2020, have been designed and taught by Professor Thomas Sargent, the winner of the 2011 Nobel Prize in Economics and the director of the Peking University HSBC Business School Sargent Institute of Quantitative Economics and Finance, and Dr. Chase Coleman and Dr. Spencer Lyon, both of whom earned their degrees at the New York University. The courses include four modules: “Mathematics Foundation”, “Data Skills”, “Machine Learning and Algorithms”, “Dynamic Models”, and an online preparatory “training camp” course completed before the class.

The courses, which lasted for one academic year, ended in July. How would the students evaluate this course?

“Frontier” and “Practical”

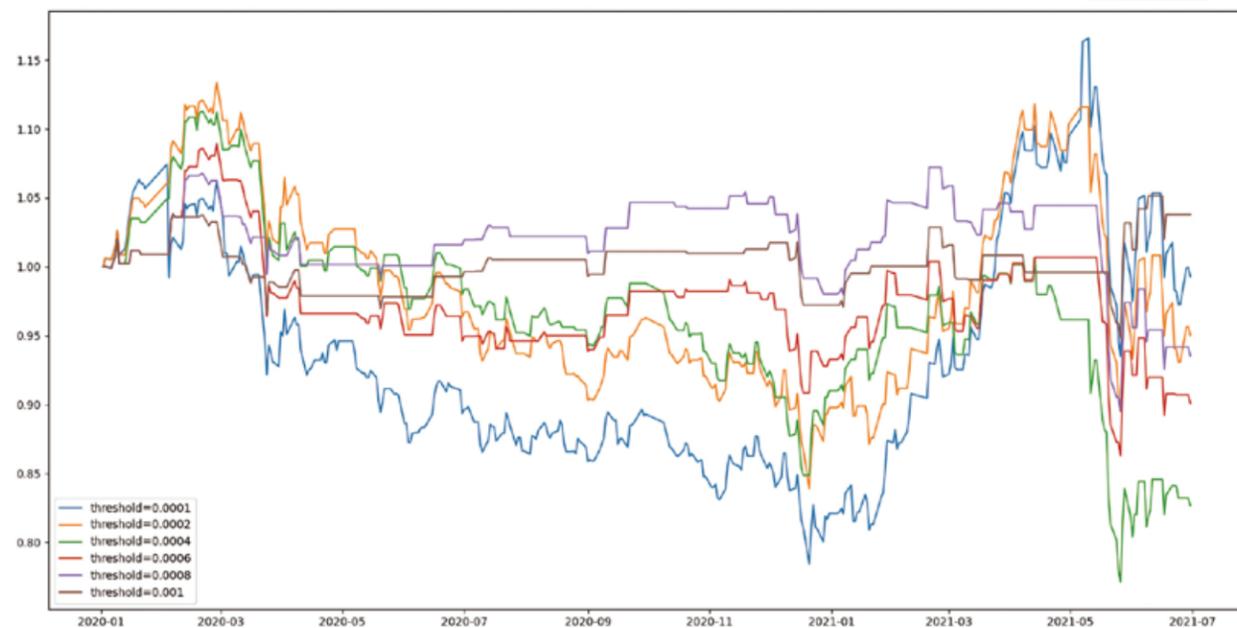
“Frontier”, “fashionable”, “rich”, “practical”, “clear”, and “step by step” are the keywords that students use to describe this course.

Yue Zhang, a 2019 master of management student at PHBS, who has studied four modules, said, “I was not familiar with Python before. Basically, I started from scratch. The hand-in-hand guidance from teachers equipped me with the fundamental operation of Python, like processing data, as well as some principles and methodologies in machine learning”.

According to the course designer Professor Sargent, this course aims to provide students with advanced data operation and management tools, enabling students to apply a variety of classic and cutting-edge machine learning techniques to solve problems in social science.

For students at Peking University HSBC Business School, the first problem they have to solve is the data processing problem in the economics and finance course.

“The application of mathematics in finance is well introduced in this course,” said Li Liu, a 2019 class of economics major. “Through the study of this series of courses, I have



Screenshots of classwork from classmates

benefited a lot in three aspects: first, my programming ability has improved; second, I learned how to apply the theory of financial asset pricing through programming; third, I learned a comprehensive package of math and data science, including probability theory and statistics”.

Students often describe this course as “practical” and “cutting-edge”. These adjectives are rarely heard when someone talks about traditional in-class education, but no words seem more appropriate than these when people describe this course taught at PHBS.

In class, under the guidance of the teacher, students can implement some abstract concepts with codes and images.

In addition, students can also re-calibrate the parameters and pass them to the computer program, which helps them to intuitively understand how the parameters control the outcomes of the mathematical model by directly looking at the changes in the plotted images.

“This interactive format improves efficiency. It enables students to learn by doing,” explained Dr. Lyon.

In addition, all relevant codes of the course are presented through the Jupyter notebook interface, and all course videos are available for review, which greatly facilitates students’ review and homework completion after class. “This course considers every detail for us”, commented student Yue Zhang.

“Demystify” and “Empower”

The great success of this course is attributed to the efforts that all three teachers have put into the gradual and orderly way of teaching.

Professor Sargent places great importance on mathematics, quoting the French mathematician Henri Poincare: “Mathematics is the art of giving the same name to different things”. In this series of courses, he mainly

teaches math and theoretical fundamentals, while the other teachers are responsible for computer programming.

Although each professor has their own contributions, Yue Zhang says that the four modules are “progressive” and “integrated”. To be specific, instead of first teaching one module of mathematics and then learning one module of programming and data processing, they are intertwined, so that students can use the programming to practice the math theory they learnt.

Unlike traditional mathematics and statistics course, “Mathematics is integrated with computer science along the way, from the very beginning of the course, showing students how mathematics can be applied in the frontier of computer science”. Professor Jiao Shi, associate director of the Sargent Institute of Quantitative Economics and Finance, explains that “the entire course, through coherent teaching, provides a variety of core tools”.

Empowering students with a range of cutting-edge tools is Professor Sargent’s education philosophy. He has noted that “learning the use of tools helps to ask good questions”. Tool-based training in basic classes can “show young people the inner consistency that lies behind the outer diversity”.

To prevent students from being intimidated by these cutting-edge tools, the three professors try to motivate students through their teaching. “Despite the fact that Professor Sargent is an economist with great achievement, he often said in class that the teaching material was not so easy for him either”. Li Lei recalls, “This gave us great encouragement to know that success does not only depend on endowment, but that hard work is also the key. He taught us not to give up when we encountered difficulties”.

According to Professor Jiao Shi, a major feature of this course is that “By demystifying, it lets students understand the mathematical principles behind artificial intelligence, teaches a complex thing in a very simple way, and lets students not only feel that the whole process is understandable, but also know how to apply it. For example, cutting-edge methods of neural networks and deep learning are used to forecast economic-related outcomes, or useful information can be extracted from words and images”.

With the rapid development of the computer and artificial intelligence, many colleges and universities, both domestic and overseas, have also set up quantitative finance courses. “However, this course at PHBS is integrated with Professor Sargent’s decades of teaching experience in economics. He knows the obstacles and difficulties of the subject, the essence of the subject in the past few decades, how it will move forward, and how computer science can help its development,” Jiao Shi explained. The classes link the core of the mathematical foundation directly to applications. “It is useful, and provides students with psychological satisfaction”.

“Live up to high expectations”

Dr. Lyon has taught computational economics and finance courses at the Data Bootcamp of New York University for many years, but he thinks he has more time to cover more comprehensive content at PHBS, so that he, as an instructor, “can cover more topics, provide more details, and explore more case studies and examples”.

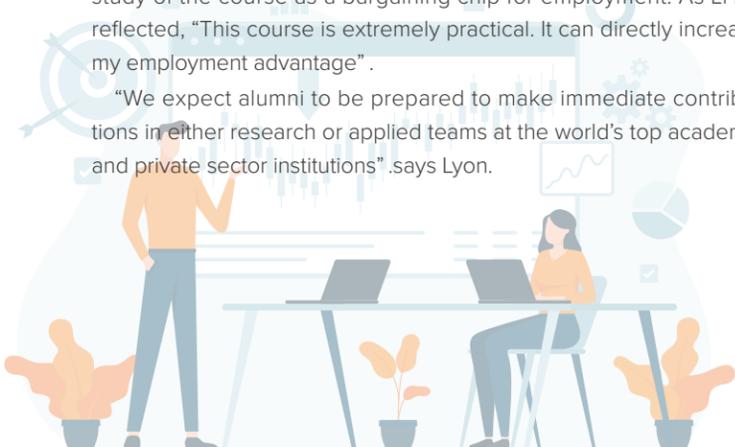
Students at PHBS have lived up to high expectations. Dr. Lyon commented that, with their commitment to a strong work ethic and a willingness to put in the time necessary to learn these advanced subjects, the students already have the knowledge and skills required by computational economy and finance.

This is the first time the course sequence is offered in PHBS. The instructor gave a high evaluation of the overall performance of the students who had enrolled in the courses. In the next academic year, this course will make some necessary adjustments based on the experience in this year. For students who are preparing to take this course next semester, Dr. Lyon said, “This project provides an excellent opportunity to learn cutting-edge methods and skills from experienced researchers and practitioners in this field. Students who commit to working hard and are comfortable with the at-times-uncomfortable process of learning new skills like programming will exit the program with very tangible skills”.

Professor Sargent once described the blueprint for the target students of the Quantitative Finance Master's Program: “Provide aspiring students with the necessary knowledge and tools, and exercise them intellectually... Today, the demand of exciting technology companies like Tencent and Alibaba for artificial intelligence and machine learning has exploded. There are more and more jobs in the industry that are as academic as in universities... These companies even provide better pure research opportunities and facilities than universities. This trend, I think, will continue and provide exciting prospects for graduates with diverse and solid academic backgrounds”. Professor Sargent supplemented, “Of course, the door to further academic research as well as Ph.D. study will keep opening to them”.

In fact, among the more than forty classmates who were enrolled in this course, some students were preparing to apply for a Ph.D. and further engage in research, while other students regarded the study of the course as a bargaining chip for employment. As Li Lei reflected, “This course is extremely practical. It can directly increase my employment advantage”.

“We expect alumni to be prepared to make immediate contributions in either research or applied teams at the world's top academic and private sector institutions”. says Lyon.



“

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Professor Pengfei Wang Receives NSFC Original Exploration Program Project Grant

Written by : Mingming Cao

Translated by : Xiangyu Ding



Pengfei Wang

Professor

Vice Chancellor of Peking University Shenzhen Graduate School

Associate Dean of Peking University HSBC Business School

Research areas:

Macroeconomics, Financial Economics,

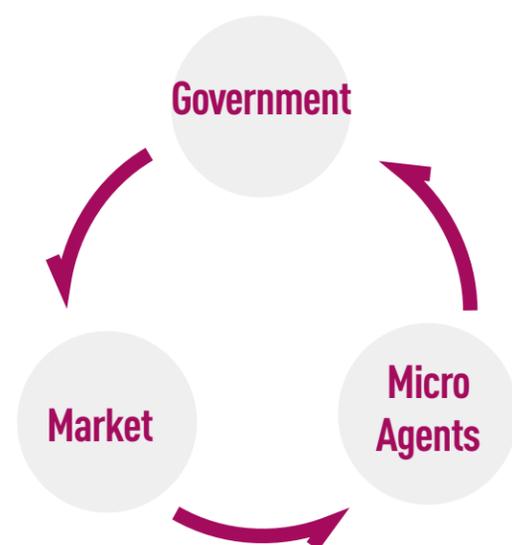
Monetary Economics

On March 19, 2021, the Management Science Department, National Natural Science Foundation of China (NSFC) held the Original Discovery Program review meeting in Beijing. After expert evaluation, four projects were finalized for funding. Project “Complex Macroeconomic Theory and Methods Based on Heterogeneous Microeconomic Agents” led by Professor Pengfei Wang, Vice Chancellor of Peking University Shenzhen Graduate School and Associate Dean of Peking University HSBC Business School, was awarded a grant of 3 million RMB.



Macroeconomic Research ought to guide policy making, and macroeconomists should devote themselves to solving urgent problems: Specific macroeconomics theory adapted to the Chinese economic environment has not been developed. Therefore, based on the unique macroeconomic phenomenon of China, Professor Pengfei Wang's project carries out an innovation on macroeconomic theory. The Chinese economy is characterized by the heterogeneity of microeconomic agents, the incompleteness of the market and endogenous government decisions. These three key features provide evidence and reliable references for the exploration of the creative theoretical analysis at which Prof. Wang's project aim.

The theoretical part of the project aims to construct a complex macroeconomic system that fully reflects the characteristics of China's economy, and at the same time develop a set of methods to reduce the dimension of endogenous heterogeneity. Therefore, the model can characterize the equilibrium and the dynamics of the economic system. This complex macroeconomic system consists of three core components: microeconomic agents, market, and the government, between which the dynamic interactions determine the mechanism of how the economy works. In particular, the endogenous optimal decision of the heterogeneous microeconomic agents including



households, firms and financial institutions, form the basis of the complex system. Based on this, the market of commodity and factor connects different micro agents and determines the price and resource allocations. Finally, the institutions and policies under which micro agents make their decisions are determined endogenously by the government.

The empirical part of this project is to propose a quantitative method applicable to the study of complex macroeconomic systems by the micro distributional data and the macro time-series data to construct structural estimation and numerical simulation. Meanwhile, the project expects to develop a platform for quantitative analysis of economic policy and use it to evaluate and predict the impact of policies on the complex economic system.

In recent years, the dramatic changes in domestic and international economic environments and the vigorous growth of the Chinese economy raised an epic topic for Chinese researcher. Chinese economists are expected to make innovation in economic theories with scientific methodology and a global vision. As the project stresses out 'With the Chinese economic growth entering a new era, we should not only fully absorb the scientific and general nature of global frontier theories, but also focus on real problems in China and try to solve the problems that the current theories have failed to solve'.

The NSFC established the Original Discovery Program in 2020 to promote original and fundamental research. The program provides grants for researchers that propose a new idea, and carry out exploratory and risky research, such as proposing new theories, developing new methods, and revealing new mechanisms. The program aims to cultivate leading achievements from scratch, sole scientific conundrum, lead research directions, open up new research fields, and promote the high-quality development of fundamental academic research in China. **According to NSFC website, the project is the third project from Peking University to have received funding from the NSFC Original Discovery Program since its establishment in 2020.**

Professor Wang is currently the Associate Dean of Peking University Shenzhen Graduate School, Professor of Economics at Peking University HSBC Business School, and Associate Dean of Peking University HSBC Business School. His main research areas are macroeconomics, financial economics, and monetary economics. Professor Wang has published dozens of papers in top international journals such as *Econometrica*, *the American Economic Review*, *the Journal of Finance*, *the Journal of Economic Theory*, *the Journal of Monetary Economics*, *the Journal of Financial Economics*, and *the American Economic Journal: Macroeconomics*. He has made remarkable research achievements in the fields of dynamic

stochastic general equilibrium theory, asset bubbles, financial crisis, and the interaction of multiple equilibria and endogenous economic fluctuations. He is an economist with international influence in the field of macroeconomics.

“
With the Chinese economic growth entering a new era, we should not only fully absorb the scientific and general nature of global frontier theories, but also focus on real problems in China and try to solve the problems that the current theories have failed to solve’.

“
According to NSFC website, the project is the third project from Peking University to have received funding from the NSFC Original Discovery Program since its establishment in 2020.



The National Natural Science Foundation of China (NSFC) was established on February 14, 1986. Upon its establishment, NSFC was an institution directly under the jurisdiction of the State Council, tasked with the administration of the National Natural Science Fund from the Central Government. In 2018, it became managed by the Ministry of Science and Technology (MOST) but kept its due independence in operation.



The Seventh International Young Finance Scholars Conference

Written by: Carryn Young, Yuting Hang

On the 12th and 13th of July, PHBS-UK was pleased to host the 7th International Young Finance Scholars Conference. This year's event was open to all finance related topics and the keynote speech was by Nobel Laureate, Professor Thomas J. Sargent, the Director of the Sargent Institute of Quantitative Economics and Finance at PHBS. The organizing committee received a record number of 226 submissions from the US (13%), EU (24%), UK (33%), and Asia Pacific (13%), making the conference truly international for global connectivity.

Due to the ongoing Covid-19 pandemic this conference was held completely online running from 8.30am to 6.30pm (UK time) attracting

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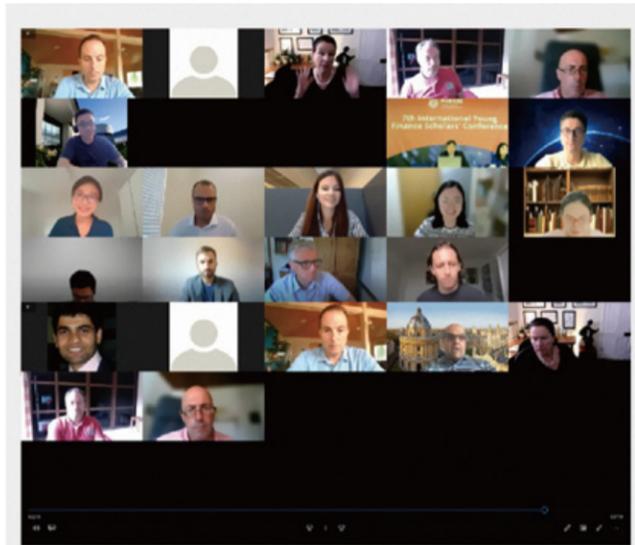
It is particularly exciting to have an intimate insight into how such a great mind conducts research and how this research is relevant to current times and how it might potentially predict the effects of the Covid-19 pandemic.

attendees from all over the world and from different time zones. The conference consisted of 7 sections with 6 parallel streams in each section, providing a total of 42 slots each with 4 presentations over the two conference days. The panel topics discussed include Asset Pricing and Valuation, Banking, Behavioral Finance, Corporate Finance, Financial Markets, Corporate Governance, Credit Risk, Fintech, Forecasting, Fund Management, Green Finance, Macro Finance, and Market Microstructure.

Apart from the individual presentations, the notable sessions of the conference include a welcome address by Professor Pengfei Wang, Deputy Chancellor of Shenzhen Graduate School, Peking University, and Associate Dean of Peking University HSBC Business School, who wished all attendees a fruitful and intellectual discussion with peers and senior academics. Professor Wang remarked that it was indeed a wonderful opportunity for everyone involved to meet one another albeit virtually, to share knowledge and learn from each other. As it was the first time that PHBS-UK hosted a virtual conference and Professor Wang also expressed his thanks to the organizing committee, the session chairs, the presenters for their hard work and for making this event possible.

The highlight of the conference was having renowned Nobel Laureate in Economics, Professor Thomas J. Sargent talk to the attendees about his research on 'the Impact of US Fiscal and Monetary Policy on

Global Financial Markets'. It was an incredible experience having such a distinguished professor walk everyone through his ongoing research on the fiscal and monetary policy of the US since its founding, and its impact on the global financial markets under various presidents and global events. It is particularly exciting to have an intimate insight into how such a great mind conducts research and how this research is relevant to current times and how it might potentially predict the effects of the Covid-19 pandemic. Conference participants thank Professor Sargent for this wonderful learning experience and hope that there would be more opportunities to learn from him in the future.



On the second day, conference hosted the incredibly popular Meet-the-Editors Session with four internationally well-known editors of renowned journals – Professor Carol Alexander, Co-Editor for the KJournal of Banking and Finance; Professor Rama Cont, the Chief Editor of Journal of Mathematical Finance, and Co-Editor of Statistics and Risk Modelling (with Applications in Finance and Insurance), Professor Douglas Cumming, Chief Editor of the Review of Corporate Finance and Co-Editor of the British Journal of Management; and Professor Alexander McNeil, Senior Editor of the Journal of Risk and Insurance. The aim of this session was to provide young scholars with the opportunity to have direct exchanges with journal editors and learn from their editorial experience in publishing research for the leading journals in financial studies. Many attendees asked numerous questions and engaged the senior editors in sharing their insights on the publication process. It was truly a very enlightening session for attendees to be provided with a behind-the-scenes look at research publication and they gained valuable insights on what it takes to submit a publishable research article.



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WILLIAM SILBER:
A SERIES OF BRIEF
PARAGRAPHS ON ECONOMICS
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03

WEN HAI:
BUILDING A NEW PATTERN OF
HIGH-LEVEL OPENING-UP BASED
ON THE RULES AND PRINCIPLE
OF MUTUAL BENEFIT

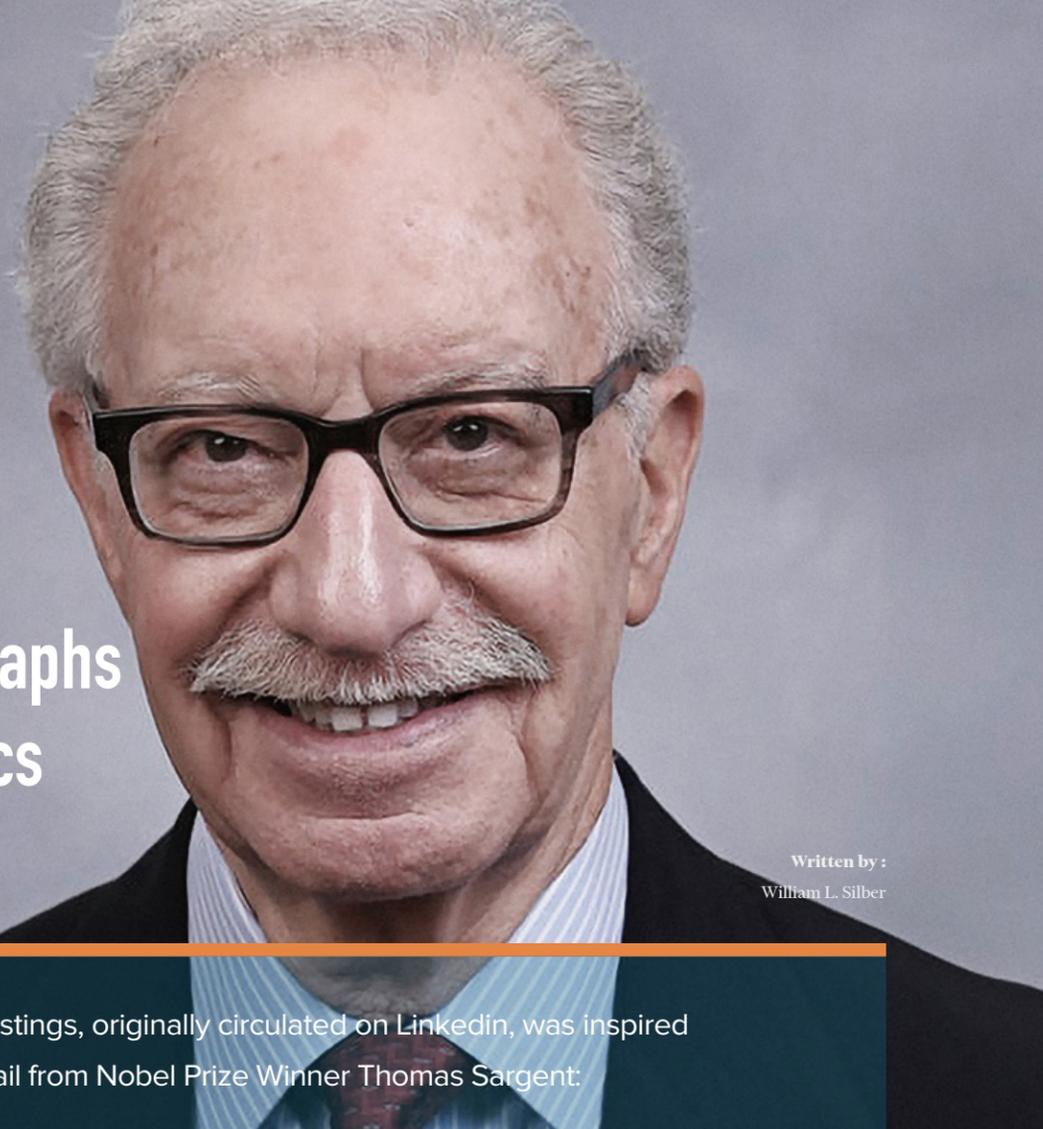
04

LEARN THE HISTORY OF
REFORM AND OPENING-UP
WITH PROFESSOR WEN HAI,
PEKING UNIVERSITY

FEATURED ARTICLES



A Series of Brief Paragraphs on Economics and Finance



Written by :
William L. Silber

This collection of postings, originally circulated on LinkedIn, was inspired by the following email from Nobel Prize Winner Thomas Sargent:

On 4/11/2021 11:25 AM,
Thomas J Sargent wrote:



Dear Bill,

Thanks for sending me this post. I like it a lot. I am going to share it with some friends and family members.

I recommend that eventually you assemble these posts into a book. I believe that Paul Samuelson and/or Milton Friedman might have done something like that with their news week columns decades ago.

You are a gifted writer and teacher.
Tom



Thomas Sargent

So here is a collection of the most popular posts beginning the summer of the pandemic, August 2020. Some were right and some wrong but all are verbatim as they appeared on LinkedIn. I hope you enjoy them.

Bill Silber

01 Gold and Silver in the Great Inflation and the Great Recession

Bill Silber
August 2, 2020, 7pm

Two crises during the past half century threatened the world with financial chaos, the Great Inflation that peaked in 1979-1980 and the Great Recession, including Lehman's bankruptcy in 2008, and the continued turmoil with the European debt crisis in 2011. Precious metals rose during both episodes, protecting investor portfolios. In the 12 months from January 1979 through the record levels of January 1980, gold rose 400% while silver jumped 800%, both responding to double-digit inflation, the Iranian hostage-taking of Americans, and the Soviet invasion of Afghanistan. Between Lehman's bankruptcy in 2008 and the sovereign debt threats in 2011, gold rose by 250% and silver by nearly 400%. The world survived the Great Inflation and the Great Recession, and both precious metals declined as the crises waned, but that is when other assets rose, including stocks, bonds, and real estate, which is how portfolio insurance works. No one knows how or when the current crisis will end, but the past behavior of gold and silver guides us in how to prepare. It is not so clear that crises will always end in a smile.

02 Bitcoin Versus Precious Metals

Bill Silber
August 30, 2020, 6:45pm

Since the beginning of 2020, Bitcoin has increased in value by 61% compared with 56% for silver versus 30% for gold. Does that make the so-called "virtual currency" better than precious metals to protect investors against the unknown? Before answering, let's be clear, bitcoin is not currency, and neither are gold or silver. They are risky assets, just like stocks and bonds. Currency is a medium of exchange for purchasing goods and services, like cars, iPhones, and haircuts. In the United States, paper dollars (currency) and bank deposits, together called money, serve that function, and also serve as a standard of value. Precious metals were the world's medium of exchange for thousands of years, but not since the middle of the twentieth century when paper money took over. Investors who distrust the government's commitment to maintain the value of currency have always turned to precious metals, and also to cryptocurrencies like Bitcoin, more recently. Gold and silver have 5,000 years of history on their side, no small advantage for an asset like money, which is a social contrivance to begin with. Cryptocurrencies need time to earn their credibility.

03 How to Trade in Efficient Markets

Bill Silber
September 13, 2020, 7pm

The public markets for stocks, bonds, and precious metals are efficient, so trading on public information wastes your time and money. Financial professionals exploit the news before it reaches us, earning them a wage (often substantial) commensurate with their skill, which drives prices to fair value. Those are the sad facts, so what's left for us? The answer comes in two parts. First, hold a portfolio of risky assets – including stocks, bonds, and precious metals – to earn a return above the risk-free rate, and put the rest in CDs. How much of your net worth belongs in the risky portfolio? Too much causes insomnia, so no more than what allows you to sleep well at night. Suppose that is 60% of your total assets. Now comes the second part, buy and sell the risky portfolio to keep your fraction at 60%. For example, if stock prices rise and the fraction goes to 65%, sell enough to bring it down. And if prices fall and brings the fraction to 55%, buy enough to bring it up. This so-called "rebalancing" will make you buy low and sell high, just like a pro.

04 Precious Metals Bulls Need a Strong Stomach

Bill Silber
September 23, 2020, 8am

Those who followed my public advice to buy silver as a portfolio hedge at \$15 an ounce in March 2019 have earned 60% since then, and those who bought gold earned 45 percent. Many think precious metals will go higher because of the Federal Reserve's ultra-easy monetary policy. To protect against the very real dangers of Fed over-expansion, investors should continue to hold about 5% of their risky portfolio in precious metals. Speculators buying more than 5% may earn big profits, but only if they survive a bumpy ride. The last great bull market in gold and silver began after the Lehman bankruptcy in September 2008. A week after Lehman's demise, both gold and silver jumped by 20%, but two months later they gave up all their gains and more. Gold fell 7% below its pre-Lehman level and silver fell 14% lower. Many speculators panicked, but those who stuck to their guns profited handsomely. The bull market that began in 2008 lasted through the European debt crisis of 2011. Gold hit a then-record \$1,900, an increase of 250% during those 3 years, and silver rose by 400%. Patience pays dividends.

05 A Speculation on Inflation

No one knows why inflation has remained subdued over the past decade, but most of us use the internet to find low prices, whether shopping for a lawnmower or dog food, and that has helped. The ease of uncovering the lowest price for just about everything, except haircuts and other very personal services, has shifted market power from sellers to buyers, preventing big companies from boosting prices beyond the competitive level. John Kenneth Galbraith, a humanistic Harvard economics professor, suggested in his 1952 book, *American Capitalism*, that the “countervailing power” of big buyers versus big sellers determined prices. Galbraith’s institutional thesis remains unproven, but the free-market Chicago school would confirm that internet search promotes low transactions prices. The pricing revolution began with books at the turn of the millennium and has expanded during the past decade to every corner of the marketplace, restraining price increases. Does that mean the threat of inflation is dead? Quite the reverse. Too much money chasing too few goods would boost demand across all markets as Milton Friedman would have said, and the internet will transmit upward pricing pressure faster than before.



Bill Silber
October 4, 7:45pm

06 Breaking the Rules in Financial Crises

History teaches that great financial crises demand bold solutions. During the Great Depression, President Franklin Roosevelt shut all banks in the U.S. for eight days in March 1933 to stop a run on the nation’s banking system. A generation earlier, William McAdoo, Woodrow Wilson’s Treasury secretary, shut the New York Stock Exchange for more than four months at the outbreak of World War I in 1914, the longest closure ever, to stop Europeans from selling U.S. securities and draining America’s gold. Both leaders averted financial disaster by breaking the rules, but they also had exit plans to restore normalcy. Jerome Powell, chairman of the Federal Reserve System, America’s central bank, stopped a downward spiral in U.S. financial markets by pledging on March 23, 2020, to buy unconventional assets, such as corporate and municipal securities, to insure “the flow of credit to employers, consumers, and businesses”. The Fed stopped the financial panic like in those twentieth century episodes, but has so far failed to explain how to unwind its emergency measures. Without an exit plan, private finance will remain tethered to government lifelines, a landscape more compatible with China than America.

Bill Silber
October 11, 2020, 7:45pm

07 Bring Back America’s Debt Ceiling

U.S. government debt now exceeds \$27 trillion, greater than 100% of Gross Domestic Product, a ratio not seen since World War II, and raising questions about America’s fiscal integrity. In the past, Congress voted on a numerical debt ceiling, setting a limit on government securities outstanding, which served as a speed bump on deficit spending. Congress usually voted to raise the ceiling to finance big deficits, but sometimes it balked, as in the mid-1980s, mid-1990s, and more recently in 2011 and 2013, threatening a government shutdown. Negotiations to prevent a crisis helped produce America’s last budget surpluses towards the end of the 1990s. In August 2019 Congress and President Trump agreed to suspend voting on the ceiling, which stood at \$21.9 trillion, until July 2021, kicking the can down the road to avoid an election year battle. Government debt is now more than \$5 trillion above the last ceiling vote. America is one of two countries in the world with a debt ceiling (Denmark is the other), but the U.S. needs this guardrail to help maintain trust in its currency as international money. Congress must restore its oversight before it is too late.

Bill Silber
October 25, 7pm

08 Reckless Second-Term Presidents

Bill Silber
November 1, 2020, 6pm

Republican Presidents Richard Nixon and Ronald Reagan, and Democrat Bill Clinton, found trouble in their second terms. Nixon covered up the Watergate burglary, Reagan admitted to the Iran-Contra scandal, and Clinton was impeached for perjury and obstruction of justice. Of the four men elected to a second term in the last half of the 20th century only Dwight Eisenhower remained unscathed. The explanation rests, in part, with the 22nd Amendment to the U.S. Constitution that became law in 1951, barring U.S. presidents from serving more than two full terms, so they become lame ducks after being reelected. They have less to lose in their second term without the threat of the ballot box, and the limited downside encourages them to take chances like with a Hail Mary. Not every lame-duck president misbehaves, but the odds are in favor. No one knows what President Trump would do if reelected, but towards the end of the recent campaign, when his prospects looked dim, Alex Conant, a Republican strategist, said that the Trump world is at a dangerous pass: “The knives come out, the donors flee, and the candidate throws embarrassing Hail Marys”. Think and vote.

09 Could Donald Trump Pardon Himself?

Bill Silber
November 15, 2020, 6pm

Lame-duck presidents abuse the pardon power because they have little to lose. Democrat Bill Clinton granted 140 pardons in his last day in office, including one for fugitive financier Marc Rich, called “unpardonable” by the Washington Post. Republican George H.W. Bush pardoned former Defense Secretary Casper Weinberger, accused of lying to Congress in the Iran-contra affair. Special Prosecutor Lawrence Walsh, a life-long Republican, said that act “undermined the principle that no man is above the law”. My forthcoming book “The Power of Nothing to Lose: How It Shapes Politics, War, and Business”, suggests how to minimize the misbehavior. But the worst miscarriage of justice would be a president pardoning himself. As preposterous as it sounds, Donald Trump says he could, tweeting in 2018: “As has been stated by numerous legal scholars, I have the absolute right to PARDON myself, but why would I do that when I have done nothing wrong?” Philip Kurland, the late University of Chicago legal scholar, summed up the presidential self-pardon case: “Obviously there’s no answer”. Uncertainty persists, and no president has tried, but if Donald Trump does, it could easily provoke a constitutional crisis.

10 Investment Advice for Finance Professionals

Bill Silber
November 29, 2020, 6pm

An investor should hold a stock index fund and CDs to match his or her risk preferences. Financial advisors often tout 60% in stocks and 40% in bonds, but that is just an example. The key is: Too much in stocks increases risk and too much in CDs earns too little. But people working in finance, as opposed to health care professionals, for example, should tilt their allocation toward CDs, perhaps a 50-50 split rather than 60-40. And that is because everyone should view their wage income as returns on a very big asset, their human capital, their education and accumulated skills. Finance professionals are overexposed to the stock market in their take-home pay, such as a bonus tied to their company’s profits or getting fired when the stock market declines, while others are not. So, if you work for a big mutual fund, a small private equity company, or even a Wall Street law firm, you should cut the stock allocation in your portfolio. A related recommendation: Sell any stock bonus as soon as it vests. Those sales are not a sign of disloyalty, but of smart portfolio diversification.

11 Here Comes Inflation

Bill Silber
December 13, 2020, 6:30pm

Everyone knows that inflation cannot be measured with the precision of an atomic clock. The Government’s reported inflation rate records prices from a survey of “sales outlets... where people shop”. Former Federal Reserve Chairman Paul Volcker, who defeated inflation in the 1980s, said, “No price index can capture, down to... a quarter of a percent, the real change in consumer prices. ... The shifts in demand... and quality are too complex to calculate precisely from month to month or year to year”. So why does America’s central bank worry today that inflation during the past decade, which averaged about 1.7% a year, was dangerously below its 2% target? Those numbers are barely distinguishable. The Federal Reserve announced in August 2020 that going forward it would aim for “inflation moderately above 2 percent for some time” to make up for past shortfalls. That policy is a serious mistake and will enable inflation far exceeding expectations going forward. Cash balances of companies and individuals have grown to record levels during the past year and will be dry tinder for a burst of inflationary spending if the economy recovers. And it will, especially if the Democrats control Congress.

12 Inflation Destroys Trust

Bill Silber
December 20, 2020, 6pm

Many politicians think low unemployment is more important than low inflation, arguing that rising prices are benign if wages move in tandem. For example, paying \$20,000 for a car on an income of \$100,000 is equivalent to buying a \$10,000 car on a \$50,000 salary. The adjustments are never so neat, but even if they were, rising prices pose a bigger problem. Inflation undermines the social contract between citizens and elected officials. We give the government the right to print money, trusting that it will not abuse that privilege by debasing the currency. The mistrust occurs, for example, when the government allows prices to double, so that a \$100 bill can buy only half as much as before. According to former Secretary of State George Shultz, "Trust is the coin of the realm," and its absence undermines democracy. John Maynard Keynes, one of the greatest economists of the 20th century, quoted Vladimir Lenin as saying that the best way to destroy capitalism is to debase the currency. Lenin may not have said exactly that, but Keynes used poetic license to trumpet the evils of inflation. It destroys trust in government.

13 Why President Trump Loved Tariffs

Bill Silber
January 3, 2021, 6pm

Donald Trump imposed tariffs, a series of taxes, on imports from China, including tractors, washing machines, and industrial furnaces, capturing the hearts of U.S. workers in those industries, and making them a chorus praising the president. China retaliated, of course, but the small cohesive group of workers protected by the tariffs shouted the unorganized majority of citizens injured by higher prices for imports. Most of us barely notice the increased cost of shirts, shoes, golf clubs, and baseball bats, because the prices of those items fluctuate for many reasons, such as coupon giveaways, loyalty points, and Black Friday specials. But the evidence shows the damage of tariffs adds up. The nonpartisan Congressional Budget Office estimated that the Trump tariffs reduced average real household income by \$1,277 in 2020, a staggering toll. The subtle but substantial benefits from free trade fail to register with most consumers, which is why mainstream politicians, Democrat and Republican, must support free trade for the common good. Demagogues, on the other hand, promote gains to the few constituents in industries benefiting from protection, who reward them with vocal support.

14 A Crisis of Trust

Bill Silber
January 6, 2021, 6:30pm

Two weeks ago I described how inflation undermines trust in government, but that subversion takes time, months if not years. Today's events in Washington shattered confidence in our democracy like an earthquake, an instantaneous disruption in the rule of law. It began, of course, with President Trump's failure to acknowledge defeat in the election and accelerated with his efforts at subversion during his telephone call to government officials in Georgia. This is an existential crisis requiring bold and immediate action before it destroys faith in America as a safe haven. Congress does not have time to consider impeachment as a remedy, but must resort to Section 4 of the 25th amendment to restore trust: Whenever the Vice President and a majority of either the principal officers of the executive departments or of such other body as Congress may by law provide, transmit to the President pro tempore of the Senate and the Speaker of the House of Representatives their written declaration that the President is unable to discharge the powers and duties of his office, the Vice President shall immediately assume the powers and duties of the office as Acting President.

15 Buying into Bitcoin ?

Bill Silber
January 17, 2021, 5pm

Investors buy precious metals, and more recently cryptocurrencies like bitcoin, when they distrust government-issued paper money. During 2020, the value of bitcoin left its two main rivals in the dust, gaining almost 400% compared with about 50% for silver and 25% for gold. Moreover, companies like Home Depot and AT&T now say that individuals can settle their obligations with bitcoin. But make no mistake, bitcoin is not currency, and neither are gold or silver. They are risky assets, just like Tesla stock. Currency is a medium of exchange, and in the U.S., paper dollars and bank deposits serve that function. The fine print in making payments with cryptocurrencies shows they must be ultimately converted into money, incurring transactions costs. For example, the State of Ohio permits taxpayers to use bitcoin to settle obligations but requires that "Payments go through a third-party processor that converts the bitcoin payment to U.S. dollars and deposits it into a state account". Bitcoin's price increase last year makes cryptocurrency speculators seem like geniuses, except compared with investors in Tesla shares, which rose more than 800% during 2020. Risky assets sometimes pay off big.

16 Did GameStop Short-Sellers Get What They Deserved ?

Bill Silber
January 31, 2021, 6pm

Short-sellers have a bad reputation. They are market professionals who bet against a stock by selling shares they do not own, hoping to buy them back later at a lower price. How do they sell what they do not own? They borrow the shares from brokerage firms holding the stock of current owners, and deliver them to the new buyers. This is not illegal and not unpatriotic, but since most investors own shares, the short-sellers are going against the hopes and dreams of most investors. However, they serve a valuable economic service, betting against companies whose prices have risen too far, too fast, who would be able to raise capital at an inappropriately negligible cost. In some cases, they push down prices of companies guilty of fraud, like Enron, lowering the losses of those who bought the deception. But short-sellers need cash reserves. If they are wrong, and the stock price continues to rise, they will lose a lot when they have to buy the shares to return them to the brokerage firms. Financial markets pit optimists against pessimists, and absent collusion, whoever wins at the end gets what they deserved.

17 When Will the Bull Market End ?

Bill Silber
February 7, 2021, 5pm

You did not have to be smart to make money last year; all assets rose – stocks, houses, cryptocurrencies, and precious metals, to name a few. The "Bull Market in Everything" stems from the famous Wall Street adage: "Don't Fight the Fed". This means buy when the central bank expands credit, and sell when the Fed starts to tighten. The rally in everything began on March 23, 2020, when the Federal Reserve promised to support asset prices, and continues today with the near zero target for short-term interest rates. Since then, the S&P500 has increased by about 65%, gold is up 25%, silver –100%, and Bitcoin – 400%. For some perspective, consider that stocks have increased by about 10% per year over the last century, so the current jump is six times the annual average. Will it ever end? Any number of negative surprises might hurt, such as a new coronavirus or a big bankruptcy, but more importantly, even a hint that the Federal Reserve is thinking about tightening would send stocks crashing down. The bull market will continue, however, as long as the Fed can afford to keep interest rates near zero.

18 Cheap Credit Leads to Socialism

Low interest rates promote leverage (borrowing money to buy assets), and leverage increases risk. For example, suppose you are worth \$100,000, and you buy an apartment for that amount – without borrowed money, so no leverage. If apartment prices go up by 20% you will make \$20,000 and if prices go down by 20% you lose \$20,000. Now suppose that with interest rates so low you decide to borrow \$900,000, and use the "leverage" to buy an apartment for \$1 million. Then a 20% price increase brings its value to \$1.2 million, and you make \$200,000, but a 20% decrease causes a drop to \$800,000, and you lose \$200,000, which is more than you started with. Leverage makes you rich when prices rise, but can cause bankruptcy when prices decline. Companies have become more leveraged during the last decade and that is an important reason the Federal Reserve had to support aggressively the private debt markets beginning March 23, 2020 – to prevent bankruptcies of big companies. But with interest rates now lower than before, those same companies have become even more leveraged, forcing the Federal Reserve to extend the safety net indefinitely. And that is socialism.

Bill Silber
February 14, 2021, 6pm



19 Golf's Inflation Lessons

Bill Silber
February 21, 2021, 6pm

The Biden administration does not care about inflation, according to Treasury Secretary Janet Yellen: "I have spent many years studying inflation and worrying about inflation, but we face... tremendous suffering in the country... That's the biggest risk". And Federal Reserve chair Jerome Powell added, "Inflation dynamics will evolve, but it's hard to make the case why they would evolve very suddenly, in this current situation". Every golfer knows that thinking you have conquered the game is the road to ruin. The reason is not evil spirits (although golf has them); but rather you become sloppy, forgetting the fundamentals that brought success. And that is why inflationary pressure is so worrisome today. The Fed has abandoned the key lesson of the past, preemptive restraint, the practice that has anchored low inflationary expectations until now, and markets have taken notice. Government interest rates have risen sharply since March 2020. The benchmark 10-year US Treasury bond now stands at 1.34%, more than double last year's record low yields, reflecting big government borrowing, economic recovery, and a jump in inflationary expectations fueled by policymaker indifference. It is just the beginning.

20 Should You Lend to the U.S. Treasury for 10 Years at 1.5% ?

Bill Silber
February 28, 2021, 6pm

Last Sunday I wrote that interest rates on the 10-year Treasury bond, which had already doubled from March 2020, would go much higher. During this past week yields increased from 1.34% to over 1.50%. That may not seem like much, but it helped depress stock prices by 2 1/2%. How does that happen? Higher yields attract investors into Treasuries and away from other assets, including stocks, and the sellers of equities drive down prices. Should you invest in Treasuries at the new rate? That depends on many things, of course, but a key consideration is the future path of the 10-year yield. If interest rates go higher, as I expect they will, then lending to the Treasury at 1.5% is foolish. No one knows exactly what will happen but the past offers guidance. During 2020 the 10-year Treasury yield averaged .89%, but between 2000 and 2019 the average was 3.3%. Will the future resemble 2020 or the twenty years before? With inflationary expectations now exceeding 2%, my bet is the ten-year yield will reach 3%, which looks high but we were there less than 2 1/2 years ago.

21 Jerome Powell's Transitory Inflation Spells Trouble

Bill Silber
March 7, 2021, 6pm

Last week Federal Reserve Chair Jerome Powell responded to inflation concerns by saying "If we do see what we believe is a transitory increase in inflation", then "I expect we will be patient" in tightening credit. He added, "There's a difference between a one-time surge in prices and ongoing inflation". I certainly agree with Powell about the difference, but aside from focusing on core inflation, how will the Fed identify "transitory inflation"? I have studied monetary economics for many years and conclude that we know only after the fact if a burst of inflation disappears. But if the inflation continues then what appeared transitory becomes persistent. And that is how we get in trouble and why the Fed and other central banks adopted the successful policy of preemptive restraint introduced by Paul Volcker in the 1980s. The difficulty of separating transitory from sustained inflation is similar to separating asset price bubbles from an upward valuation in risky assets. Bubbles are obvious only in retrospect, after they have popped. The Federal Reserve should avoid trying to identify inflation as transitory just as it has avoided labelling stock price increases as a bubble.



22 Who Cares about Bitcoin's Intrinsic Value ?

Bill Silber
March 14, 2021, 6pm

Bitcoin detractors anchor their skepticism in the absence of any intrinsic value to the cryptocurrency. Bitcoin shares that dubious honor with dollar bills, but that has not prevented millions of people from considering greenbacks valuable. Dollars are worth more than the paper they are printed on because they are America's medium of exchange and are acceptable at face value by the U.S. Treasury for settling taxes, making the dollar the standard for defining such obligations. Although some States say they accept bitcoin for tax payments, they always require a third party to change bitcoin into dollars, which is potentially costly and depends on the cryptocurrency's volatile price. Bitcoin, therefore, is not a medium of exchange, nor is it a standard of value. But some sectors of the world economy, such as the drug trade, may use it to settle payments. These transactions could confer value on bitcoin as a vehicle currency for illegal activities, similar to the U.S. dollar's vehicle role in international transactions. Bitcoin could be worth \$5,000, \$50,000, \$500,000, or zero, depending on supply and demand, just like everything else, despite its lack of intrinsic value.

23 Two Percent Inflation "Ain't What it Used to be"

Bill Silber
March 21, 2021, 6pm

Last week the Federal Reserve confirmed its target of "inflation moderately above 2 percent" to make up for past shortfalls, which it considers consistent with price stability. But make no mistake, 2% is not stability. At that rate prices will increase by 50% in a generation, and a \$100 bill tucked inside the family Bible will buy that much less. Moreover, according to former Federal Reserve chairs Paul Volcker and Alan Greenspan, who created and sustained the trust we enjoy today, price stability really means "expected changes in the general price level do not effectively alter business or household decisions". Neither man endorsed 2% but would have settled for that number after the double-digit annual price increases of 1979 and 1980. Now that inflation has been running under 2% a year for more than a decade, however, a jump above that level is likely to alarm consumers and investors worried about the central bank's backbone. The Federal Reserve must act before businesses and households "alter their spending decisions" as a result, which are difficult to restrain once started.

24 Practitioners Invented Market Efficiency

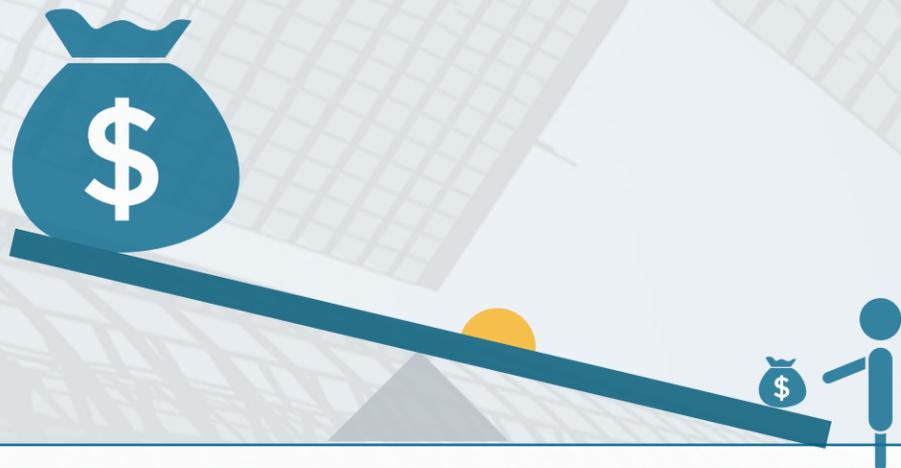
Bill Silber
March 29, 2021, 8pm

Long before University of Chicago's Eugene Fama described market efficiency, earning him practitioner scorn and the 2013 Nobel Prize in economics, Wall Street understood the idea. Traders knew to avoid information that had been discounted by the market. The word 'discounted' used here means that market prices reflect the information. For example, practitioners know that if everyone expects a company's earnings to jump by 50% next year, investors will not earn abnormal returns if that occurs. The price already incorporates the expectation. William Hamilton, editor of the Wall Street Journal between 1903 and 1929, said that prices on the New York Stock Exchange "are sufficient in themselves" to reveal everything worth knowing, which is a working definition of market efficiency. Fama added two ideas: First, stock prices reflect all publicly available information; and second, it is therefore impossible to earn abnormal profits by trading on such information. Despite what you may have heard, trying to beat the market by buying likely winners and selling the dogs is usually a mistake, unless it is your full-time job, and even then, it's not easy.

25 A Spineless Fed Enriches Gold Bugs

Bill Silber
April 4, 8pm

Everyone should have a 3-5% allocation to precious metals as portfolio insurance, but gold speculators benefit from much more when inflation threatens paper currency's value. The most recent spectacular example occurred in 1979, when U.S. inflation jumped above 10% a year and the yellow metal rose fourfold, from about \$200 per ounce in January 1979 to over \$800 in January 1980. But that memorable episode did not end there. Three months later, in March 1980, gold dropped to under \$500 despite continued double-digit inflation. Many factors contributed to gold's collapse, but the biggest reason was the appointment of Paul Volcker as Federal Reserve Chairman in mid-1979, and a new central bank policy of allowing interest rates to move with market forces. The rise of the 10-year Treasury rate from 9% at the beginning of 1979 to over 13% in March 1980 was the beginning of a protracted battle against inflation, putting a lid on gold. A spineless central bank back then would have restrained interest rates and fed a continued precious metal boom. Today's gold bugs should inspect the latest x-rays of current Fed Chair Jerome Powell's vertebrae.



26 How Leverage Killed Archegos and its Bankers

Bill Silber
April 11, 2021, 6pm

Leverage, borrowing money to buy assets, works wonders when prices rise but can cause disaster when they decline. Suppose you are worth \$200,000 and want to speculate on a stock called “cryptocurrency.com”. You borrow \$800,000 from your favorite bank, invest the entire \$1 million in the stock, which the bank holds as collateral against the loan. A 50% price increase makes “crypto” worth \$1.5 million, so you earn \$500,000, but a 50% price decline drops its value to \$500,000, and you lose \$500,000, which is more than you started with. That surely spells trouble for you but also for the bank. It must sell the collateral to protect its loan, already under water, but those sales push the stock down further. That is what happened to big banks like Credit Suisse which lent money to Archegos, Bill Hwang’s investment fund, a heavily leveraged company whose derivative contracts masked speculation in a few stocks. Not only did Hwang bankrupt the family firm but his bankers lost their proverbial shirts when they sold the concentrated collateral trying to recoup their loans. Leverage kills with a double-edged sword, and neither a borrower nor a lender escape.

27 Options in Baseball and the Stock Market

Bill Silber
April 18, 6pm

Baseball is in the air so let’s take a strategy lesson. When a manager gives the green light to a batter facing a count of three balls and no strikes, the hitter has the option – the right but not the obligation – to swing at the next pitch. Mike Trout, a three-time winner of the Most Valuable Player Award, said that when the count is 3-0, he tries “to hit the ball far”, often ending in a swing-and-miss. Normally a disciplined hitter, Trout embraces danger when the downside is an innocuous “strike one” because the chance to hit a double or home run makes it worth the risk. In a similar way, most investors are cautious, but become risk-takers when buying a call option. Calls give the owner the right, but not the obligation, to buy stock at a fixed price. Rights, without obligations, give these options a skewed payoff: profits increase with rising stock prices but losses are limited to a fixed fee, called the option premium. This immunity against big losses makes call options on volatile stocks especially valuable. Downside protection, the unique feature of an option, encourages risk taking.

28 Even Unused Options are Valuable

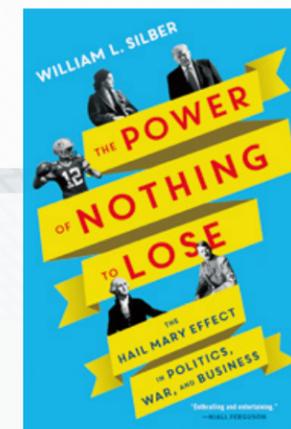
Bill Silber
April 25, 6pm

Everyone likes options because they confer rights without an obligation to do something. Option owners pay a fee for those rights, the option premium, which causes losses as the option expires. Nevertheless, options are valuable even if unused, because they ease otherwise risky decisions. For instance, people usually take out a mortgage to buy a home, a huge financial outlay, so they value the right (without obligation) to refinance the mortgage. The right to replace a 5% loan with one costing 3%, for example, the embedded refinancing option in a mortgage, helps potential homeowners make the big decision. The cost of this option, which increases when rates are volatile, is hidden in a higher mortgage rate, but almost no one takes out a mortgage without it. Even during and after the 1970s inflation, as mortgage rates rose to more than 18%, making refinancing unprofitable, home buyers never abandoned the option to refinance. Since then interest rates have declined and refinancing has become quite attractive, especially during 2020 as rates fell below 3%, the lowest levels on record. The lesson: Keep your options open; they may become more valuable than you think.

29 Hail Marys in Politics, War, and Business

Bill Silber
May 2, 6pm

Quarterback Aaron Rodgers gambles with the Hail Mary pass when he has nothing to lose – the throw might bring victory or end in a meaningless interception. My forthcoming book, “The Power of Nothing to Lose: The Hail Mary Effect in Politics, War, and Business”, available for pre-order at <http://bit.ly/TPONTLB>, shows that Rodgers has much in common with George Washington, Rosa Parks, Woodrow Wilson, and Adolf Hitler, who changed the world with their risky decisions. Washington crossing the Delaware may not look like a Hail Mary, but it was. He said before his decision to attack, “If this fails I think the game will be pretty well up”. Rosa Parks risked her life by staying seated in the white section of an Alabama bus, sparking the modern civil rights movement. She recalled, “I was not frightened. I just made up my mind that as long as we accepted that kind of treatment it would continue, so I had nothing to lose”. Washington and Parks made the world a better place, but next week I will describe how demagogues have inflicted great damage with Hail Marys.



30 Hail Mary Collateral Damage in Politics, War, and Business

Last week I described how George Washington and Rosa Parks improved the world with exploits resembling football’s Hail Mary. Demagogues, however, have imposed great collateral damage with their desperate heaves. For example, Adolf Hitler faced certain defeat in World War II in December 1944, so he launched the Battle of the Bulge, a futile counterattack that inflicted a grave wartime atrocity on U.S. troops. American presidents also turn reckless when they have little to lose. President Woodrow Wilson kept the U.S. out of World War I during his first term, but a month after his second inauguration, no longer needing voter approval, he declared war on Germany. No one knows what Donald Trump would have done had he been reelected, but during the 2020 campaign, Republican strategist Alex Conant said of Trump’s diminishing prospects: “The knives come out, the donors flee, and the candidate throws embarrassing Hail Marys”. Pre-order my “The Power of Nothing to Lose: The Hail Mary Effect in Politics, War, and Business”, at <http://bit.ly/TPONTLB>, and see how downside protection promotes risky gambles that changed the world for better or worse.

Bill Silber May 9, 6pm

31 Follow Janet Yellen’s Deeds, Not Her Words

Bill Silber
May 16, 5pm

In a recent interview Treasury Secretary Janet Yellen said, “It may be that interest rates will have to rise somewhat to make sure that our economy doesn’t overheat, even though the additional spending is relatively small relative to the size of the economy”. Shortly after she donned her political stripes, muting her message: “I don’t think there’s going to be an inflationary problem, but if there is the Fed can be counted on to address it”. Janet Yellen, a distinguished economist, knows that the central bank must push up short-term interest rates, currently hovering around zero, before inflation becomes a problem, just like every Fed has done since Paul Volcker was chairman. An expanding economy raises borrower demand for credit, and if the Federal Reserve sits still, inflation will accelerate. Janet Yellen led America’s central bank when it increased interest rates in December 2015, a preemptive tightening that successfully restrained inflation and inflationary expectations during the recovery from the Great Recession. Current Fed chair Jerome Powell should follow what Yellen did at the Fed rather than what she now says from her perch at 1500 Pennsylvania Avenue.

32 Why Elon Musk Flipflop over Bitcoin

Bill Silber
May 23, 1pm

Bitcoin rose to more than \$63,000 soon after Elon Musk’s February 8 announcement that Tesla owned bitcoin and would accept it in payment for cars. And then on May 12, Musk sowed confusion by tweeting a suspension of Tesla’s bitcoin program because he worried about fossil fuel consumption of bitcoin miners, and then he denied any policy change. Musk, a physics major in college, surely knew about the environmental problem of cryptocurrencies, and so did everyone, but his very public concern contributed to bitcoin’s 50% selloff from the peak. A more plausible explanation of Musk’s behavior is the Colonial Pipeline saga that began May 7 and the bitcoin payment the company made to a criminal gang. This payoff confirms my suggestion here two months ago that cryptos could be a vehicle currency for illegal transactions, and Colonial’s ransom surely must have alarmed Elon Musk. He would not want his company linked even indirectly with illegal activities. More importantly, he must have worried about hackers targeting Tesla’s hoard. Musk’s flipflop and bitcoin’s gyrations affirm that cryptocurrencies belong in Las Vegas rather than on company balance sheets.



ETF

33 Choose Your Poison: Mutual Funds Versus ETFs

Bill Silber
May 30, 6pm

Index mutual funds offer an inexpensive way to invest in a diversified portfolio. They follow an index, such as the S&P500, which discards active advisors so their management fees are tiny or zero. Investors have fueled the growth in index mutual funds over the years, but indexed Exchange Traded Funds (ETFs) offer an alternative structure with an apparent advantage: Investors can buy and sell ETF shares throughout the day, just like Apple or Coca Cola stock, rather than having to wait until the end of the day with a mutual fund. And that idea, along with the ability to manage capital gains, has attracted investors recently. But it carries a nontrivial hidden cost. Buyers of ETF shares usually have to pay the asked price and sellers usually receive the lower bid price, and the difference between the two, called the bid-ask spread, is the cost of transacting, which can be substantial. Buyers and sellers of mutual funds, however, transact at Net Asset Value (NAV) at the end of the day, and NAV blends bids and offers on stocks in the fund, so transactions cost average close to zero. Choose your poison.

34 The Dark Side of Unconditional Surrender

Bill Silber
June 6, 11am

Today's 77th anniversary of D-Day, the June 6, 1944, Allied invasion of Normandy, makes it timely to recall the collateral damage of President Roosevelt's WWII demand for "unconditional surrender" and how to avoid similar fallout. My forthcoming book, "The Power of Nothing to Lose: The Hail Mary Effect in Politics, War, and Business", (see <http://bit.ly/TPONTLB>) shows that FDR's decree, borrowed from General Ulysses S. Grant in the Civil War, backfired. It sounded like the moral high ground, but Nazi propaganda minister Joseph Goebbels made those words a call to arms: "The Germans have nothing to lose and everything to gain" by continuing to fight. General Dwight Eisenhower, the Allied commander in Europe and future U.S. president, agreed. He warned the Combined Chiefs of Staff in Washington, "the enemy's continued stolid resistance" comes, in part, from "Nazi propaganda which is convincing every German that unconditional surrender means the complete devastation of Germany and her elimination as a nation". Read the book to see how FDR's demand led to a massacre of American troops and to absorb the lesson: Never give your adversary nothing-to-lose.

35 Meme Stocks Suffer from Selection Bias

Bill Silber
June 13, 5pm

No one touts meme stocks (securities popularized on social media) that have collapsed in value. And that is because investors brag about their winnings and hide their losses in the closet. In addition, the numbers sound more spectacular going up, than down, so profitable trades make better headlines. A stock jumps by 100% when going from \$10 to \$20, but declines by 50% when it's back to \$10. Ignoring "meme losers" gives social media too much financial credibility and makes its profit record look better than it is. This is called selection bias, a problem that often victimizes the truth. For example, omitting data on hedge funds that have gone bankrupt during the last 10 years because they no longer exist, exaggerates the return to investment in that industry, similar to the error of ignoring meme losers. Good researchers try to guard against selection bias, but it often sneaks in when they aren't looking. Shy Trump voters refused to respond to pre-election surveys in 2016, leading to Hillary Clinton's predicted victory, and embarrassing the best political pollsters. Don't let selection bias fool you in the stock market the way it did at the ballot box.



36 Urgent Lesson from the "Transitory" Inflation of 1974

Bill Silber
June 20, 4:30pm

Many know that 1979's 13% inflation broke peacetime records in America, but few recall that 1974 was not far behind. The 12% inflation of 1974 gets lost because of 1979 and because leading contemporary economists called it transitory. Nobel Prize winner James Tobin, Janet Yellen's thesis adviser at Yale, and a very thoughtful man, said that shortages of food and energy driving up 1974 prices are "once-for-all adjustments to new supply-demand situations; those prices won't necessarily fall, but all that is needed to improve the rate of inflation is for them to stop rising". And he was right, briefly. Inflation declined after 1974, temporarily, and the respite encouraged a misguided Federal Reserve to delay fighting inflation, rather than practicing what is now called preemptive restraint. This past week the Fed reiterated its belief that the current jump in inflation is transitory and decided to maintain zero short term rates through 2022, so it is about to repeat that same mistake, an imprudent delay in dampening accelerating inflation. Janet Yellen knows the danger quite well and should warn Fed Chair Powell to begin preemptive restraint before it is too late.

Debt and Taxes in Eight U.S. Wars and Two Insurrections



Authors of the paper: George J. Hall and Thomas J. Sargent

Author of the summary: Zhuo Wang



Wartime surges in government expenditures have always provoked debates about how to pay for them. Those debates inspired classic theoretical contributions about the optimal mix of debt and taxes and whether the mix matters at all. The origin of theories of optimal tax-borrowing policies in those debates is an element of the main defense against a Butterfieldian charge of inappropriate presenteeism (interpreting the past from a perspective and with information not available to those who acted in history).

In Hall and Sargent (2020), the authors use two benchmark theories of optimal taxation and borrowing to frame a narrative of how government decision makers reasoned and learned about how to manage a common set of forces that bedeviled them during all of the wars; forces that included interest rate risks and unknown duration of expenditure surges. Moreover, the government creditors' debt dilution fears, and the temptations to use changes in units of account and inflation to restructure debts are also in the research scope of this paper.

Two Theories of War Finance

Hall and Sargent (2020) describe two classical models of wartime finance to study how a government optimally finances wartime surges of government expenditure, one is attributed to Gallatin (1837) and Barro (1979), and the other to Lucas and Stokey (1983). The similarity between the two models is that both are about how a government ought to adjust tax collections and government borrowing in response to random government expenditure shocks. The models differ in how much fiscal shock absorbing is done by adjusting tax collections, and how much is done by adjusting ex-post returns to government creditors and quantities of government debt.

Concretely, in the Barro model, fiscal shocks permanently affect both tax collections and government debt but leave ex-post returns on government debt unaffected. So, a war that is expected to be short should be financed more by borrowing, while a war expected to be long should be financed more by raising taxes. Instead, in Lucas-Stokey model, regardless of how persistent they are, fiscal shocks leave government tax collections completely unaffected but affect ex-post returns to government creditors. Another difference lies in the model assumption. The Barro (1979) model assumes that a government can only trade risk-free one-period bonds in each period, while the Lucas and Stokey (1983) model allows a government to trade a complete set of one-period Arrow securities. Interest rates are exogenous in both models. In Hall and Sargent (2020), the authors make the models as close as possible to each other by setting state-contingent prices in the Lucas-Stokey model so that the return on risk-free one-period debt is the same as it is in the Barro model.

As for optimal tax-borrowing plan, in Barro's model, a decision rule for collecting taxes that minimizes a loss criterion subject to the sequence of government budget constraint satisfies the conditions that: 1) tax collections follow a random walk; 2) government assets are a unit root process that is cointegrated with government assets. In the Lucas-Stokey model, a decision rule for tax collections that minimizes the loss subject to the sequence of budget constraints completely smooths tax collections across time and states, where a state-contingent asset-purchasing strategy supports the tax collection policy.



Researches Comparison

Compared with Clark (1931), Goldin (1980), Edelstein (2000), Rockoff (2012) and Zielinski (2016), Hall and Sargent (2020) account the alternative decomposition of U.S. war finance differently in two ways. First, these previous authors attributed increases in specific items in the federal government's budget to the war, while Hall and Sargent (2020) instead attribute to the war all deviations from a prior trend of components of the government budget constraint. During wars, expenditures on non-military items also increased. Second, Hall and Sargent (2020) take into account GDP growth and inflation. For some wars, the results in Hall and Sargent (2020) align with the calculations in those previous studies.

For four other wars, the differences highlight the distinction between the two methodologies:

- 1 For the War of 1812, Goldin (1980) finds that 21% of the war was financed by taxes while Hall and Sargent (2020) find that tax revenue fell relative to the peacetime baseline, making their estimate of the contribution from taxes negative.
- 2 For World War II, Hall and Sargent (2020) find that 11.5% of the war was "paid for" through real GDP growth and devaluation of the debt through inflation.
- 3 For the Korean War, Goldin (1980), Ohanian (1997), Edelstein (2000), and Rockoff (2012) estimate that, consistent with President Truman's stated policy, the war was 100% tax financed. Indeed, the quantity of debt outstanding did remain virtually unchanged during that war. Further, President Truman ran a balanced budget during the Korean War, with taxes rising sufficiently to cover the increase in spending. However, prior to the war, the government ran a primary surplus and was paying down the debt incurred during World War II. The budget constraint decomposition reported in table 1 and the spending and revenue prewar averages in table 2 record that Truman's financing of the Korean War eliminated the primary surplus and deferred the post-World War II pay-down of the debt. Hall and Sargent (2020) compute that debt and money growth financed 45.5% of the costs because the Korean War halted this debt pay-down. That is, although the debt/GDP ratio fell during the war, this ratio was higher in 1954 than it would have been had the war not occurred.
- 4 Edelstein (2000) argues that the Vietnam War was paid in part by a decrease in non-defense spending.

What Can We Learn from Different Wars in This Paper

In the government budget constraint, Hall and Sargent (2020) consider three explicit sources of revenue: taxes, debt, and money creation. However, governments can also raise resources implicitly through the nationalization of private assets, the confiscation of goods from its enemy, as well as their own people and the drafting of its citizens into the military. The U.S. government has used all of these measures at various times, but perhaps the most important of these indirect revenue measures is the draft. In order to raise large fighting forces without paying market wages, during the Civil War, World War I, World War II, the Korean War, and the Vietnam War, the federal government drafted men into the military. By requiring young men to join the military at below market wages, a reluctant soldier or sailor paid in kind a tax equal to the difference between what he could have earned elsewhere and his actual military pay.

In both the Barro (1979) and Lucas and Stokey (1983) models, wars are well-understood, purely exogenous shocks to government spending, and taxpayers and bondholders are the same people. In both models, the government wishes to minimize dead-weight losses from distorting taxes. These models provide sharp statements about optimal time paths of taxes, borrowing, and returns on debt for financing a large temporary government expenditure. In their elegance and simplicity, these models necessarily ignore three concerns that frequently arise in political discussions of war finance. Fortunately, Hall and Sargent (2020) provide a perfect addition in this respect and prove its reasonability using the data from eight U.S. wars and two insurrections.

War Start - End (U.S. entry -)	(1) government spending	(2) return on debt	(3) (1) + (2)	(4) tax revenue	(5) debt growth	(6) money growth	(7) GDP growth	(8) inflation	(9) cross term	(10) residual
War of 1812 1812:6 - 1815:2	7.34	-0.20	7.14	-2.35 -32.9	10.60 148.5	0.00 0.0	-0.16 -2.2	0.06 0.8	-0.39 -5.5	-0.62 -8.7
Mexican War 1846:5 - 1848:2	2.26	0.20	2.47	-0.6 -2.4	2.72 110.4	0.00 0.0	-0.06 -2.5	-0.01 -0.5	-0.00 -0.1	-0.12 -4.8
Civil War (Union) 1861:4 - 1865:4	31.04	2.10	33.14	2.26 6.8	19.74 59.6	6.49 19.6	1.08 3.2	3.95 11.9	0.40 1.2	-0.77 -2.3
Spanish-American War 1898:4 - 1898:8	0.78	0.11	0.90	0.45 50.0	-0.26 -28.9	0.07 7.3	0.67 74.3	0.13 14.6	0.03 3.2	-0.18 -20.4
World War I 1914:7 - 1918:11	36.11	0.43	36.54	6.83 18.7	26.76 73.2	3.41 9.3	0.52 1.4	1.22 3.4	0.03 0.1	-2.24 -6.1
(1917:4 -)	36.93	0.30	37.23	7.76 20.8	27.79 74.6	2.59 7.0	0.05 0.1	0.76 2.1	0.00 0.0	-1.73 -4.6
World War II 1939:9 - 1945:8	129.50	0.10	129.60	49.91 38.5	54.78 42.3	11.32 8.7	15.42 11.9	9.62 7.4	0.26 0.2	-11.71 -9.0
(1941:12 -)	116.48	2.00	118.48	35.80 30.2	54.53 46.0	11.96 10.1	8.99 7.6	6.05 5.1	0.43 0.4	0.71 0.6
Korean War 1950:6 - 1953:6	15.43	-0.71	14.73	5.42 36.8	4.17 28.3	2.53 17.2	10.99 74.6	-10.12 -68.7	0.05 0.3	1.70 11.5
Vietnam War 1964:8 - 1973:6	5.53	-2.13	3.41	1.39 40.8	0.44 12.9	-0.60 -17.8	-5.55 -163.0	3.91 114.9	0.19 5.7	3.63 106.5

Table 1: Decomposition of Wartime Revenue

War Start - End (U.S. entry -)	Government Spending/Year			Tax Revenue/Year			
	Fiscal Year	prewar	war	postwar	prewar	war	postwar
War of 1812 1812:6 - 1815:2	1812 - 1815	0.88	2.72	1.82	1.95	1.37	3.14
Mexican War 1846:5 - 1848:2	1847 - 1849	1.18	1.94	1.51	1.31	1.29	1.66
Civil War (Union) 1861:4 - 1865:4	1861 - 1865	1.58	7.79	2.50	1.42	1.87	4.72
Spanish-American War 1898:4 - 1898:8	1898 - 1899	2.15	2.55	1.98	2.20	2.42	2.14
World War I 1914:7 - 1918:11	1915 - 1919	1.88	9.10	3.17	1.94	3.30	5.03
(1917:4 -)	1917 - 1919	1.76	14.07	3.17	1.80	4.39	5.03
World War II 1939:9 - 1945:8	1940 - 1946	8.21	25.43	14.00	5.52	12.89	15.86
(1941:12 -)	1942 - 1946	8.31	31.97	14.00	6.15	15.43	15.86
Korean War 1950:6 - 1953:6	1951 - 1953	13.79	15.70	15.84	15.07	16.91	16.52
Vietnam War 1964:8 - 1973:6	1965 - 1973	16.13	16.45	18.29	16.67	16.65	17.35

Table 2: Average government spending net of interest payments and tax receipts as a percent of GDP for the five years prior to each war, for the war period, and for the ten years following the war

Reference: George J. Hall and Thomas J. Sargent, 2020, Debt and Taxes in Eight U.S. Wars and Two Insurrections, Working Paper.

Wen Hai: Building a New Pattern of High-level Opening-up Based on the Rules and Principle of Mutual Benefit

Written by: Wen Hai
Translated by: Ting Hu, Kenghua Huang
Source from: China Economic Review

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In short, in the new stage of China's economic development, facing major changes unseen in a century, the central government's proposal to build a new pattern of high-level opening-up is a courageous, intelligent, and far-sighted strategic decision of great significance and far-reaching influence. However, to truly implement this measure and achieve a “larger, broader, and deeper” high-level opening-up, it also requires courage and wisdom, and the unremitting efforts of the government, enterprises, and people across the country.



The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China (CCCPC) proposed to implement a high-level opening up to the outside world and develop a new situation of win-win cooperation. On March 3, 2021, "high-level opening up" was listed among the hot words in the People's Daily article "eight hot words looking forward to the 2021 national 'two sessions'". So, what is "high level"? What is the difference between China's high-level opening-up in the future and previously? What opportunities and challenges will China's high-level opening-up bring to consumers and enterprises? How should the government speed up and deepen reforms to achieve a high level of opening-up?

The different stages of China's opening up

01

Different historical stages and objectives have seen a varying degree and level of China's opening up. In the period before the 14th Five-Year Plan, China's opening-up can be roughly divided into three stages.

In the first stage, from 1979 to 1992, the main focus of opening-up were to relax foreign trade control and open up foreign investment. The state's foreign trade monopoly, which aimed at "interchange of needs and adjusting surplus and deficiencies" in the planned economy era, gradually transformed into mobilizing foreign trade aimed at mobilizing the business enthusiasm of foreign trade departments, encouraging enterprises to "earn foreign exchange through export" and promoting China's economic construction. At the same time, the Second Session of the Fifth National People's Congress held in 1979 formally passed the "Law of the People's Republic of China on Sino-Foreign Joint Ventures", declaring China's opening up to foreign direct investment. After that, the State Council repeatedly issued documents to expand the autonomy of local governments in examining and approving foreign investment on their own, and offered many preferential policies and tax reductions. Foreign direct investment (FDI) gradually changed from "permission" to "encouragement". It could be said that this stage of opening

to the outside world had just begun, and it was also limited. The main measures were to encourage export to earn foreign exchange, purchase advanced equipment, and introduce capital and technology, to promote China's industrialization process.

In the second stage, from 1993 to 2001, the opening-up was mainly carried out around China's "return of customs" and the goal of joining the World Trade Organization (WTO). The features of this stage were reducing import barriers and encouraging foreign investment. Therefore, on July 1, 1994, the "Foreign Trade Law of the People's Republic of China" was formally implemented, the RMB exchange rate was merged, and the RMB became subject to conditional convertibility under the current account. The import and export mandatory plans were canceled, the trade barriers reduced, and the tariff dropped from nearly 40% to about 15%. International trade not only encouraged exports but also began to expand imports. After 1994, China's foreign investment policy was further adjusted, and market forces replaced regional preferential policy as the main determinant of FDI. Infrastructure, basic industries, high-tech industries, technological transformation projects of state-owned enterprises, and middle and low-end residential projects were open to FDI. There were three main goals of opening-up at this stage: one was to speed up accession

to the WTO, and the other was to improve people's living standards and the industrial structure.

The third stage, from 2002 to 2019, was characterized by gradual integration into the world economy and becoming an important part of the global industrial chain under the framework of the WTO. On December 11, 2001, China officially became a member of the WTO. Her foreign trade system also entered a new stage of comprehensive reform based on WTO rules. Not only did China further reduce its tariffs to 12% (the current weighted average tariff is only 3.5%), the general trend in foreign investment policies became more open, more transparent, and more stable.



According to its WTO commitments, China has not only expanded the scope of foreign investment in production but also opened many service areas (such as finance, communications, and retail) that, in the past, foreigners were not allowed to invest in. For foreign enterprises investing in China, the government began to implement national treatment and cancel policies formulated for foreign investors that were not in compliance with the WTO (such as localization requirements, export ratio requirements, and technology transfer requirements). At the same time, Chinese companies began to go abroad, and FDI continued to increase. The field and scope of the opening-up at this stage was relatively broad, and the intensity was relatively large. On the one hand, it was the requirement of China's accession to the WTO. On the other hand, Chinese enterprises also gained a broader international market from China's accession to the WTO, and Chinese consumers also gained more benefits from expanding imports.

The new pattern of China's opening-up

02

Starting from 2020, the launch of the 14th Five-Year Plan and the proposal of the 2035 long-term goal meant that China's opening-up has entered a new historical stage. The 14th five-year plan adopted by the 'two sessions' and the long-term goal proposal for 2035 put forward that we should adhere to the implementation of opening to the outside world in terms of a wider scope, a wider field, and at a deeper level, relying on China's large market advantages, promoting international cooperation, and achieving mutual benefit and win-win results. Fundamentally, this can be said to explain

the meaning of "high-level opening to the outside world".

Specifically, the high level of opening-up means opening up across a larger range, wider area, and at a deeper level. To ensure this opening-up, it is not only open in the "free trade zone", but also throughout the whole country; not only should manufacturing industry be open, but also financial, legal, and medical services; it is not only open in terms of concrete practice, but also through reform at the system and institutional level. In summary, in the future reform and development of China, opening up should reach a higher and more

comprehensive level. Different from the previous goals of serving domestic economic construction, high-level opening-up has two most important characteristics: first, to identify and abide by the international rules and adhere to the globalization of multilateralism; and, second, through opening up the Chinese market, all parties to international cooperation can benefit.

Why is China doing this? There are two main reasons. One reason is that China's goals have changed. Before the 18th National Congress of the Communist Party of China (NCCPC), China's main goal was to pursue its own development and strive to build a well-off society. After the 18th NCCPC, the central government began to put forward the idea of "building a community of shared destiny for mankind". In September 2015, General Secretary Jinping Xi delivered an important speech at the United Nations Headquarters in New York, pointing out that: "In today's world, all countries depend on each other and share weal and woe. We should inherit and carry forward the purposes and principles of the UN Charter, build a new type of international relations with win-win cooperation at its core, and build a community of shared future for mankind". On March 11, 2018, the first session of the 13th National People's

Congress wrote into the constitution: “promoting the construction of a community with a shared future for mankind”. It can be seen that China’s opening-up is no longer just for China itself, but for the common development and progress of the world.

Another reason is that the world environment has changed. In the past two decades, with the rapid rise of China and the relative decline of western countries, great changes have taken place in the attitudes of various countries towards China. In the early days of China’s reform and opening up, especially in the 1980s, from the perspective of restraining the Soviet Union, the western countries led by the United States were relatively friendly to China, and they also believed that China was a developing country, and they were willing to open their markets and invest in China. Although the Soviet

Union disintegrated in the 1990s, China was still actively reforming and its economic strength was weak. The western world did not regard China as an important competitor. At the beginning of this century, especially in the following ten years since 9/11, the United States devoted its main energy to the ‘War on Terror’, while western countries were also busy dealing with the financial crisis and debt problems. However, China has been growing at a high speed, and its comprehensive strength has become the second in the world. Under such circumstances, the western countries headed by the United States no longer regarded China as a developing country and did not recognize China as a market economy. Their expectations and requirements for China have changed. They are uneasy about China’s rise and pay more attention to their own

interests in economic and trade relations with China.

In the face of changes in the international political and economic situation, China has two choices: one is to go its own way and do not hesitate to decouple from the economies of other countries; the second is to expand opening-up, adhere to reform, and cooperate with all countries in the world for win-win results. There is no doubt that China is now choosing the latter. China’s development cannot do without the world, and the prosperity of the world needs China. As President Jinping Xi has reiterated repeatedly on international and domestic occasions, openness brings progress, while isolation leads to backwardness”. Furthermore, “the pace of reform will not stagnate, and the open door will only grow bigger and bigger”.

How to Achieve “Larger, Broader and Deeper” High-Level Opening-Up

03

First, there is still a need for changes of the mindset. Although China’s reform and opening-up has been in place for more than 40 years, and the flag of opening-up has been held high, people still have many doubts about why there should be opening-up. Part of this doubt comes from a belief for thousands of years in the small-scale peasant economy, where people were always thinking that self-reliance could provide enough food and clothing, and where people were always trying to do what they could by themselves, thinking there was no need to import from abroad. Another part of this doubt comes from mercantilism, which believes that only exporting products or investing in foreign countries to earn

other people’s money can create value. Opening the market to import products or introducing foreign capital is an opportunity for foreigners to make money and create value. A third part of the doubt comes from the international situation in recent years. Since Trump became president, the United States has been continuously suppressing China. Many industries in China have been “strangled” by developed countries. Western countries have also abandoned Chinese technology in the name of national security. Under these circumstances, some people are naturally skeptical about the need for “larger, broader, and deeper” opening up to the outside world.

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To win credibility and maintain sustainability in international economic and trade cooperation, equal exchanges, reciprocity, and mutual benefit will be an important principle.

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If we want to achieve a higher level of opening-up, we must pay attention to the existence of these doubts and guide people. We must vigorously publicize the history of reform and opening-up and publicize the benefits of the international division of labor and trade to economic growth and people’s lives from the perspective of both theory and practice. International trade not only enhances the value of exported products and creates a large number of employment opportunities, but it also improves the level of welfare through opening up imports, and allows people to enjoy goods and services that they cannot produce or that had prohibitively high production costs. Facing the unfriendly attitudes of Western politicians, we need to conduct effective communication and greater opening up on the premise of safeguarding national security and dignity to prevent any attempt to “decouple” the Chinese economy from the world. In short, to achieve a “larger, broader, and deeper” high-level opening-up, we must have unwavering faith in the value

of opening-up, and put unwavering emphasis on the mindset of opening-up.

Secondly, we need to recognize and abide by international rules. As the country develops and grows, the behavior and level of opening up to the outside world should also continue to improve. Just like the development process of any country, China also experienced “barbaric growth” in the early stages of opening up, and behaviors such as disrespect for intellectual property rights, local protectionism, and unfair competition all existed. However, after China’s accession to the WTO, and its economic and corporate strength becomes stronger and stronger, any non-compliance with internationally accepted rules will not be accepted, which will affect the country’s reputation, and thus undermine the opening-up to the outside world.

Which international rules must be observed and maintained in opening-up? It is WTO rules that we must abide by when conducting international trade and investment, namely goods trade agreements, service trade

agreements, and intellectual property agreements. These reflect the fundamental principles of “free trade” and “fair competition” of the WTO, which have also been endorsed and signed by the Chinese government. The principle of “free trade” includes the reduction and gradual elimination of tariff and non-tariff barriers, and the principle of “fair competition” includes most-favored-nation status, national treatment, anti-dumping, countervailing, and protection of intellectual property rights. These principles are not only reflected in trade policies, but also in domestic industrial policies that affect the fairness of competition.

It should be the basis for high-level opening-up in the latest stage to respect international rules rather than seek special treatment. Especially when Chinese companies are competitive, the international community will use rules to monitor the behavior of Chinese companies all the time. Just like participating in the Olympic Games, athletes from all countries participate in the competition under the same rules,

and any achievements obtained by violating the rules will not be recognized by other competitors. When athletes are far behind in performance, no one cares about whether they strictly obey the rules, but for athletes who have achieved championship and runner-up results, any violation of the rules will be scrutinized and not accepted.

There are also cases in international trade of companies in developed countries not following the rules, but this should not be the reason for Chinese companies to not conform. As a major country that advocates building a community with a shared future for humankind, observing the rules is the basis for earning respect. A high level of opening-up means that we need to do better than others under the rules that everyone agrees.

At the same time, equal cooperation and mutual benefit must be emphasized. Although we all know that international trade and cooperation are definitely mutually beneficial and win-win, why are there still so many disputes in trade? Therefore, it can be inferred that the two counter parties in trade or cooperation should not only benefit mutually, but also be basically equal. The Sino-US trade war in recent years has appeared to be a trade imbalance on the surface, but what the United States emphasizes is reciprocity, i.e., reciprocity in tariffs and in market access. Like the rules, when a country's economy is weak and small, a powerful country generally does not care about the equivalence of interests, but for a rising competitor, a powerful country will generally no longer maintain

a high profile but require reciprocity and mutual benefit.

During the first three stages of opening up to the outside world, we were in an early stage of economic development and paid more attention to the benefits we gained from opening up. As a rising and responsible major country in the process of high-level opening-up, we must consider not only our own gains but also the interests of other countries as well as our contribution to world peace and human development. This is also a major country's international social responsibility. Therefore, to win credibility and maintain sustainability in international economic and trade cooperation, equal exchanges, reciprocity, and mutual benefit will be important principles.

Significance and Challenge of High-Level Opening-Up

04

In the new stage of historical development, our opening up to the outside world should also change from the early extensive and limited mode to a “larger, broader, and deeper”, as well as more standardized high level. However, opening up to the outside world at a higher level also raises higher and stricter requirements of ourselves. So, why should we do this? What is the significance of high-level opening-up?

First of all, it is conducive for improving people's living standards. The report of the 19th NCCPC pointed out that the main contradiction in current society is that between the people's growing demand for a wonderful life and unbalanced, inadequate development. After more than 40 years of reform and development, Chinese people have entered the stage of pursuing quality of life. Relative to people's desires, the resources of any



country are scarce, and no country can produce all the goods and services that its people require. Through foreign investment and import, diversity of goods and services can be greatly increased and the country's shortcomings offset. Generally speaking, a country with a higher per capita income needs to expand its opening-up to meet the people's demand for a high-quality of life. All developed countries are typically highly open countries. As it gradually becomes a high-income country, China also needs to open up at a high level.

Second, it is conducive for technological progress. In today's world, the rapid development of science and technology is largely due to the hard work, exchanges, and cooperation of companies and scientists from various countries. China's rapid development over the past 40 years has largely benefited from foreign investment and international exchanges in the field of education and scientific research. A high-level opening-up to the outside world, emphasizing compliance with rules and protection of intellectual property rights, will have a positive role

in promoting broader international scientific and technological cooperation and innovation. We cannot deny the positive effect of opening up on scientific technological progress despite the “stranglehold” behavior of certain governments. We cannot regard forced self-reliance under such circumstances as the best strategy for technological progress.

Third, it is also conducive for improving international relations and promoting world peace and development. In recent years, anti-globalization and populism have been prevailing, and some Western politicians, led by those in the United States, are setting off an anti-China wave, which is likely to promote a new round of the Cold War. In addition to the fact that the United States wants to maintain its world hegemony, most Western countries also hope that China will recognize and follow international common rules, open the Chinese market on a larger scale, and share the dividends of China's economic growth. China is running counter to the trend of anti-globalization by promoting a high-level opening-up based on rules and mutual benefit. This will surely attract more investment and exports to China, which will benefit the economic growth of other countries. This is conducive for alleviating and improving China's international relations, conducive to break down the United States' new Cold War attempts, and conducive to world peace and development.

Of course, it is not an easy job to implement such a high-level opening-up. Especially in the current international situation where anti-globalization and populism prevail, it is bound for us to face many challenges. One of these challenges is how to deepen China's economic system reform. As a socialist market economy, China has a large number of state-owned enterprises, and the government has a strong ability to plan and regulate the economy. For this reason, Western countries believe that the Chinese government has various types of support for state-owned enterprises, and there is

unfair competition between Chinese and foreign enterprises. China is not a freely competitive market economy. Therefore, how to achieve the “competitive neutrality” of state-owned enterprises may be a key issue for whether we can truly achieve a “larger, broader, and deeper” high-level opening-up to the outside world.

The second challenge is how to improve the global competitiveness of Chinese companies. If China implements a “larger, broader, and deeper” opening-up, it means that various special protection policies for Chinese companies will be reduced or even eliminated. Facing the competition of global multinational companies under the same rules, are Chinese companies ready with their R&D, innovation, product quality, legal awareness, and so on?

The third challenge is how to handle the relationship between politics and economy. In the current situation of serious political confrontation, how can we continue to adhere to the “larger, broader, and deeper” opening-up policy? How can we assure that multinational corporations achieve “political neutrality” and adhere to international cooperation without being affected by politics? These issues are not only challenges for the government but also issues that the people are required to handle well during opening-up.

In short, in the new stage of China's economic development, facing major changes unseen in a century, the proposal of the central government to build a new pattern of high-level opening-up is a courageous, intelligent, and far-sighted strategic decision of great significance and far-reaching influence. However, to truly implement this measure and achieve a “larger, broader, and deeper” high-level opening-up, it also requires courage and wisdom, and the unremitting efforts of the government, enterprises, and people across the country.

Learn the History of Reform And Opening-up with Professor Wen Hai at Peking University

Written by : Fang He

Translated by : Jiahui Li, Bo Pang

Source from : WeChat office account of Peking University

He was the first batch of rural educated youth who were admitted to Peking University after the resumption of the national college entrance examination. He said that he was very fortunate to have witnessed reform and opening-up. This reform, which attracted the attention of the world, has changed China and the destiny of thousands of young people.

His name is well-known at Peking University, where he is an economics professor whose classes are always full, and his life of struggle is a vivid case for studying the history of reform and opening-up.

He is Wen Hai, the Dean of Peking University HSBC Business School. He has devoted himself to the wave of reform and always takes the initiatives to engage in the innovation of education.

Outside the classroom, let us study the history of reform and opening-up with Professor Wen Hai. Let us strengthen the “Four Self-confidences” together, and discover his forty years of life with reform and opening-up.



Wen Hai said:

“

The greatest luck in my life is to experience the reform and opening-up.” Wen Hai said.

44 years ago, as one of the first tranche of examinees after the resumption of the national college entrance examination, he walked out of the great northern wilderness and forged a lifelong bond with Peking University.

“The destiny of our generation has changed because of reform and opening-up. The history of this period is recent and is still being written, which requires young people to study it, not only knowing the facts but also having a rational understanding and thinking.” Wen Hai recalled his 40 years of life with the reform and opening-up and put forward suggestions for young students to study its history.

Fortune: Going Together with the Reform and Opening-up

In a speech at the conference celebrating the 40th anniversary of reform and opening-up, Present Jinping Xi pointed out profoundly that reform and opening-up is a great awakening of our party, and it was this great awakening that gave birth to our party’s great creation from theory into practice. Reform and opening-up is a great revolution in the history of the development of the Chinese people and the Chinese nation. It is this great revolution that promoted the great leap of the cause of socialism with Chinese characteristics!

When cultivating and guarding border areas in Hulin County, Heilongjiang Province, in 1977, Wen Hai received the news of the resumption of the national college entrance examination. The scholar, whose hands were full of calluses from nine years living in the Great Northern Wilderness, entered the room for the college entrance examination that had been suspended for ten years. More than 40 years later, Wen Hai believed that the resumption of the college entrance examination was a prelude to reform and opening-up. He especially praised the TV series “Deng Xiaoping at a historical turning point”. In particular, he saved fragments in this movie related to the college entrance examination and took a look at them from time to time. “It still feels like a dream. At that time, I was planting corn, cutting beans, and drinking ‘Great Northern Wilderness Wine’ in the commune. I worked from sunrise and rested at sunset. I never thought I would enter Peking University one day”.

Since the convening of the Third Plenary Session of the 11th CPC National Congress and the discussion on “practice is the only criterion for testing truth”, the term “reform and opening-up” has gradually become familiar to the public. “Our Department of Economics is a place where discussions on the topic of reform and opening-up are particularly enthusiastic. Everyone is paying attention to various economic phenomena from the rural household contract responsibility system to the urban ‘self-employed’ business”, said Wen Hai.



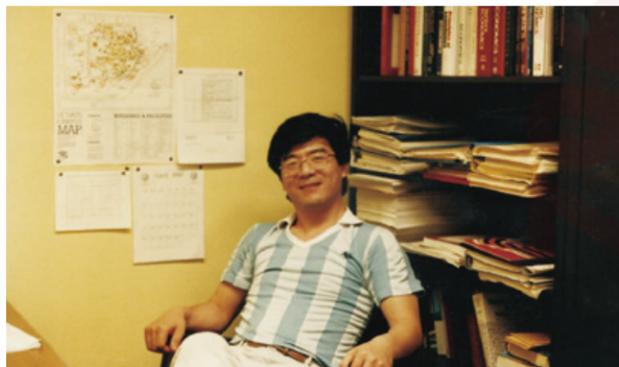
Wen Hai cultivated and guarded border areas in the northeast of China for nine years, devoting his youth to the great northern wilderness

In the early days of reform and opening-up, there were all kinds of endless controversies. As Wen Hai said: “The people’s commune had been in operation for more than ten years. Suddenly, the country wanted to contract out production to households and give the land to farmers for personal cultivation. Was this still socialism? Was it exploitation of the old society or capitalism to hire people in business”? The breakthrough of ideology shocked Wen Hai, and he realized that a change different from any previous political movement was rising in China.



Group 6, Class 2, Department of Economics at Peking University. The third from the right in the front row is Wen Hai

Wen Hai recalled that there were already many European and American students studying in the Department of Economics at Peking University, as well as teachers from Western countries, and everyone would discuss the road to China's economic development. "At that time, I thought that just arguing was not enough. I had to go outside and learn the "scriptures" of economics, and to see how the economic system of western developed countries worked". Graduating with a bachelor's degree in early 1982, Wen Hai went to the United States at his own expense. After obtaining a master's and then a doctorate, he stayed in academia and earned a tenured faculty position at the Business School of Ford Lewis College in the United States.



Wen Hai studied in the U.S.

"At that time, the Party Central Committee made it clear to develop a socialist market economy. It was the exploratory stage of crossing the river by feeling the stones. Those of us as 'returned scholars' especially hoped to participate in such a great cause by combining what we had learned and seen with everything that was happening in China". Wen Hai and his colleagues compiled several economic and management book series reflecting the market economy. He also edited the *International Economics Translation Series* to explore the nascent socialist market economy from the perspective of the integration of East and West.



Wen Hai (first from right) and other founders of the Chinese Economic Association in the United States



Wen Hai (third from right) returned to China and founded CCER with other scholars

"In 1992, Comrade Xiaoping made a speech during his southern tour and wrote a poem on the South Sea where he once drew a circle. At that time, the central government's confidence and courage in reform and opening-up increased. Shenzhen's continuous development and rise have become a microcosm of the success of reform and opening-up from the 1990s to the present". In 2001, Peking University and the Shenzhen Municipal People's Government signed the agreement on co-founding Peking University Shenzhen Campus and co-founded Peking University Shenzhen Graduate School. In 2005, Wen Hai, the vice president of Peking University at the time, was entrusted by the school to come to Shenzhen for "a second entrepreneurship". He was responsible for the work of Peking University Shenzhen Graduate School and founded the Peking University HSBC Business School and the School of International Law.

Recalling the situation when he first came to Shenzhen more than ten years ago, Wen Hai said with deep emotion, "At that time, Shenzhen could be considered a 'desert' of higher education. Although the level of economic development was already very high, the 'superstructure' of education, scientific research, and culture had not kept up. Peking University should provide its own wisdom to the exploration of reform and opening-up and to the young city of Shenzhen".

Since entrepreneurship, Wen Hai has led many batches of "Nanyan people" to work hard in the small town of Xili. Starting from the 5 colleges jointly established with the headquarters, it has developed into a well-known higher education institution with 8 frontier fields and interdisciplinary colleges, more than 3,000

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In a speech at the 40th-anniversary celebration of the establishment of the Shenzhen Special Economic Zone, Present Jinping Xi pointed out that Shenzhen is a brand-new city created by the party and the people after the reform and opening-up. It is a brilliant interpretation of socialism with Chinese characteristics on a blank sheet of paper. The vast number of cadres and the masses in Shenzhen have overcome difficulties, worked hard, and accomplished in 40 years what it took some international metropolises abroad hundreds of years to accomplish. This is a miracle in the history of world development created by the Chinese people.



The China Economics Annual Conference was founded in 2001

full-time postgraduates, more than 700 faculty members, and multiple achievements in production, education, and research. In 2017, Peking University HSBC Business School explored further opening by establishing the "UK Campus" in Oxford shire, England.

"I am the lucky one who has experienced the reform and opening-up. Everything I accomplished was enabled by this great historical era. Against this backdrop, I have the opportunity to make progress for the country in education development. I never regret anything I have paid for this exploration". Wen Hai said sincerely.

View the History of Reform And Opening-up in Light of the Characteristics of the Times

As a participant of reform and opening-up, Wen Hai believes that the most important historical experience of reform and opening-up is to emancipate the thoughts and to give full play to the initiative and creativity of the people. "Without continuous emancipation of thoughts or continuous theoretical innovation, there will be no achievements and advancements in reform and opening-up and the construction of socialism with Chinese characteristics".

The history of reform and opening-up is an important part of the history of the party and the country, and Wen Hai hopes that when studying it, young students can look at events as unfolding processes in the light of the background of the time.

He divided the 40-year history of reform and opening-up into four important development stages. The first stage was the 14th National Congress of the Communist Party of China from 1978 to 1992. During this period, the country focused on restoring the economy, breaking the rigidly planned economy in the past, encouraging the people to give full play to the enthusiasm and initiative of production and life, and "pulling" the national economy from "recession". During the second stage, which was from the "Decision of the Central Committee of the Communist Party of China on Some Issues Concerning the Establishment of a Socialist Market Economic System" adopted by the Third Plenary Session of the 14th Central Committee in 1993 to the time when China joined the World Trade Organization (WTO), the country has formed a consensus on the development of a socialist market economy from top to bottom, determining to set the exploration of reform and opening-up as a national policy. In this period, the economy and society continued to be energized, China entered the "take-off stage", and industrialization and urbanization brought about the country's industrial and social structure change. The third stage was from China's accession to the WTO in 2001 to the 18th National Congress of the Communist Party of China. This stage was the period when China began to adapt to the rules and mechanisms of the international society and economic operation and continued to integrate into the world economy. The fourth stage was after the 18th National Congress of the Communist Party of China. China has made brilliant achievements in the construction of economy, politics, culture, society, ecological civilization, and law-based governance, gradually shifting from "integrating into the world" to "influencing the world".



Graduation photo of PHBS students



Wen Hai taught the course "Principles of Economics" to undergraduates

"The characteristics of each stage of historical development are different, and the historical missions that need to be undertaken are also different". Wen Hai believes that the different historical periods before and after the reform and opening-up cannot be separated; the achievements of China after the reform and opening-up cannot be used to deny the hard work

that new China has made for the exploration of the socialist road from its founding to the reform and opening-up.

"The difficulties we faced when new China has just been founded were beyond our imagination. The whole country was waiting to be rejuvenated, and the international environment was very dangerous. Therefore, the main task at that time was not to build a 'Moderately Prosperous Society'. It was not enough to shout slogans of 'emancipation of the mind'. You had to protect your home and the country, to feed the people, and to build industrial and agricultural infrastructure".

Wen Hai compared China with India. As two large developing countries that won national liberation after World War II, China and India have chosen different development paths. "Although China has made many detours in the first three decades, it has laid a solid foundation in many fields. We have popularized elementary education, eliminated illiteracy, all backed by stable politics and infrastructure, so that we could concentrate on carrying out reform and opening-up and developing the economy later. China first solved the problem of people's lack of food. However, there are still many people suffering from malnutrition because of hunger in India. This has resulted in several differences in the quality and speed of the subsequent economic development of the two major countries".



HSBC Business School Students' Military Training

Wen Hai said, "The greatness and ingenuity of the Chinese Communists lie in advancing with the times and being able to continuously improve the strategies they adopt. For example, at the beginning of reform and opening-up, we needed to develop the economy as soon as possible to meet the people's basic material needs. Therefore, we set GDP growth as the main goal. At that time, there was too much backwardness, so the need for development speed was necessary. However, as a series of environmental problems, unbalanced development problems, and rule of law problems appeared later, the Party Central Committee began to attach importance to the improvement of the quality, as well as the speed of development, so that the national economy could attain a higher quality and more sustainable development".

Peking University Members Must Always Stand at the Forefront of Reform and Opening-up

“For more than 40 years of reform and opening-up, generations of Peking University members have led the times with ideas, served the country with academic advances, and benefited the people with hard work. They have integrated their lives and careers into the practice of fighting for the prosperity of the country and national rejuvenation. They have bravely led the trend of reform and made outstanding contributions to the development of the economy and society.”

On August 31, 2020, Wen Hai, as PHBS Dean, gave a lecture entitled “Caring for Home and Country, Pursuing Excellence – Peking University History and Peking University Spirit” to more than 500 freshmen of the class of 2020 at the opening ceremony. In nearly three hours, he imparted valuable historical knowledge of Peking University. He believed that every piece of history of Peking University, accompanied by the national crisis and the establishment of the nation, is a precious spiritual treasure that the new members of Peking University should not forget. “All students who are admitted to Peking University are intelligent and motivated. I hope they can ‘worry about the country and the people, shoulder social responsibility; pursue excellence, and reform and innovate continuously’”.

In Wen Hai’s eyes, Peking University members always have a sense of “worries”. They are not satisfied with the status quo and can always find problems. “The discovery of problems is due to a strong sense of social responsibility and mission. During the May Fourth New Culture Movement, members of Peking University awakened the ‘sleepers in the iron house’. During the reform and opening-up, Peking University members are always ‘aware of the problems’. They are not satisfied with just pointing out problems, but are more willing to practice personally and continuously reform and innovate in practice”.



In 1981, Peking University students strongly voiced of the era of “Unite And Revitalize China”

When recalling the most impressive scene at the beginning of reform and opening-up, Wen Hai talked about the moment when the slogan “Unite and Revitalize China” was shouted in Yanyuan— “No matter how many years have passed, I will not forget that night”. At that time, Wen Hai, who was in his senior year, sat around the only black and white television in the corridor with his classmates, and watched the final of the men’s Volleyball World Cup Asian qualifying match between China and South Korea. “At that time, the TV station needed to rent the satellite signal broadcasting rights, but the game was not finished after 2 hours and the broadcasting rights expired. Everyone was disappointed and had to listen to the radio. In the end, the Chinese team won. Everyone was very excited. It seems that the passion accumulated for a long time must be released! The students ran out of the dormitories and gathered in the open spaces between the buildings. More and more people gathered. People sang the national anthem and shouted slogans. I did not know who shouted the slogan of ‘Unite and revital-

“
Our country is stronger now,
but the younger generation
must not be complacent.”



ize China!’ Everyone’s emotions reached a fever pitch, and they all chanted this slogan together”.

These witnesses did not expect that the slogan that night and the emotions behind it would spread quickly like shock waves. It suddenly became the strong voice of the era that connected Chinese people around the world. “Because everyone had been suppressed for too long, there needed to be a force to unite the Chinese at home and abroad to work hard for our motherland, and to march forward bravely for the hard-won new era!”



Class of 1977- We want to be world champions

In 2018, the 120th anniversary of Peking University, the 77th and 78th grades also held the 40th-anniversary commemorative activities. Wen Hai stopped for a long time before the school anniversary photo exhibition. These photos showed young students with a long-lost relaxed smile, the grand bonfire party held by Peking University students in 1981 to celebrate the Chinese women’s volleyball team’s first World Cup championship, and students diligently reading and discussing. Those photos took Wen Hai back to his youth when he worked hard with sweat and tears. “That was a booming age. I especially hope that the young people of Peking University still maintain the surging passion”, Wen Hai said touchingly.

Looking back at more than 40 years of reform and opening-up, Wen Hai believes that this is a miracle created by the Chinese people in the modern economic history of the world under the strong leadership of the Communist Party of China. “It allows the world to understand that the Western path is not the only way of economic development, and the path of socialism with Chinese characteristics, that respects the laws of market development and the will of the people, can also make brilliant achievements”. Therefore, young people should be full of confidence.

Self-confidence is not complacency. “Our country is stronger now, but the younger generation must not be complacent”. Wen Hai believes that it is important to study the history of reform and opening-up, extract experience, and sum up lessons, to contribute to the future economic and social development. He hopes that the members of Peking University would learn history with a progressive mindset, and compare globally with an open mindset, learn from other’s strengths, and keep moving forward. “You are a generation that enjoys the dividends of reform and a generation that will contribute to the realization of the great revival of the ‘Chinese Dream’. You must not only insist on freedom of thoughts and be courageous in thoughts and action, but also know how to respect rules and be self-disciplined. You should be brave and selfless to shoulder social responsibility, pursue excellence persistently, and make achievements in all kinds of industries”. This is Wen Hai’s sincere hope for the young students at Peking University.



Wen Hai, Professor of Economics at Peking University, from Hangzhou, Zhejiang Province, graduated from the Department of Economics of Peking University in early 1982 (Class of 1977). He graduated from California State University, Long Beach, USA in 1983 with a master’s degree in economics. He graduated from the University of California (Davis) in 1991 with a master’s degree and a PhD degree in economics. He has taught in American universities for many years. He participated in the founding of the China Center for Economic Research of Peking University (now the National School of Development) and served as the executive deputy director. He used to be the Vice President of Peking University and Dean of Peking University Shenzhen Graduate School. He is currently the Vice Chairman of Peking University Council and Dean of Peking University HSBC Business School. His main teaching and research fields are international, development, and transition economics.

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Notes on “Liquidity”: Multiple Meanings of a Word



Written by: Thomas J. Sargent

Introduction

This is a very incomplete survey as well as a personal glossary and commentary about a set of “liquidity” concepts that play roles in some models in macroeconomics and finance. “Liquidity” has meant different things to different authors. So has “illiquidity”. I find it helpful to recognize these differences as they appear inside alternative settings in which analysts have imagined exchanges of good, services, and assets to be accomplished. This essay is organized as a sequence of comments about alternative models and relationships among them. The literature is vast and my knowledge is limited, so my essay is necessarily incomplete and biased by my limited knowledge. I hope that the essay can provide a guide to some readers who want to learn about how some thoughtful and creative economists have thought about liquidity. The topic remains unfinished and wide open for more discoveries.

Concepts of “liquidity” are to economists what “frictions” are to physicists and engineers. To isolate and analyze effects of some important forces, it is convenient completely to ignore all frictions. This is how some widely used models in economics and physics are constructed. We’ll begin this essay with some leading benchmark “frictionless” models that are at the cores of many applied models. To understand gaps between observations and predictions from these benchmark models, applied economists add various frictions that give rise to illiquidities that impede trades. We’ll inspect a variety of frictions and authors’ reasons for putting them into their models.

Before we dive in, I make a confession. Because we’ll encounter so many notions of “illiquidity”, it can be challenging to keep track of them, even for me. So please just view this essay as a “helicopter tour” of a forest of frictions that can provoke liquidity and illiquidity.

An appendix includes some disorganized scattered thoughts that amount just to my “thinking out loud”.

Benchmark models

A workhorse of finance and macroeconomics continues to be the general equilibrium models of (Kenneth J. Arrow and Gerard Debreu 1954). There are two variants, features of which set the stage for all subsequent discussions of liquidity. In both variants, there are no bilateral trades. All trades are multilateral. Exchanges of all valuable objects between each person and all other people are “netted out” or “cleared” by a Walrasian auctioneer, an artificial actor that is outside the model. The auctioneer sets a high dimensional price vector that verifies all budget constraints.



Kenneth Arrow

American Economist
The Sveriges Riksbank Prize in
Economic Sciences in Memory of
Alfred Nobel 1972



Gerard Debreu

Contemporary French American
Economist
The Sveriges Riksbank Prize in
Economic Sciences in Memory of
Alfred Nobel 1983

1. The Arrow-Debreu model with time zero trading. At time zero, a comprehensive list of time-and history-contingent commodities is traded. By indexing commodities by time and histories of random events, then proceeding with general equilibrium ‘business as usual,’ the framework makes ‘dynamics and randomness a special cases of statics and certainty.’ All trades occur once at time 0. At future dates, deliveries occur, but no new trades. A tell-tale sign

of an Arrow-Debreu model is that every agent has a single budget constraint¹. To repeat, at time 0, there is a vast centralized clearing arrangement that we can imagine being effected by a Walrasian auctioneer who allows any trades that satisfy all budget constraints. There is a vast number of trades at time 0, none later.

2. Arrow’s model of sequential trading with Arrow securities. K. J. Arrow (1964) described a trading arrangement that supports the same equilibrium allocations as the Arrow-Debreu model, but in which people trade fewer things (one-period-forward Arrow history contingent securities) more often, meaning every period in a discrete time model². Arrow’s discovery is a wonderful illustration of the dictum that ‘finding the state is an art.’ Two keys to sustaining Arrow’s trading arrangement (still multilateral) are: (a) attaching to each consumer a time t , history h_t state variable that summarizes his past consumption-savings behavior and that also describes his future obligations; this magic state variable is the household’s *continuation wealth* evaluated at continuation Arrow-Debreu prices; and (b) a description of some state-by-state borrowing limits for each household that assure that it is feasible for the household to meet its state-contingent obligations next period. There is a vast number of these borrowing limits – one for each household for each date and each history and for each value of a next period state on which payoffs are contingent. Notice that a hypothetical auctioneer in an Arrow-securities economy has to name not only a price vector each period, but many *quantities* in the form of a list of vectors of one-period borrowing constraints for each household. (The auctioneer is very busy.) Trading is multilateral and the auctioneer now runs a vast clearing system *each period*, but it is much smaller than that for the Arrow-Debreu economy.

3. Digression. In an Arrow-Debreu or Arrow economy, do assets trade for their ‘fundamental’ values? The answer depends what you mean by “fundamental”. These complete markets frameworks allow heterogeneous beliefs, so people can disagree about prospective payouts and values. They trade on the basis of their own beliefs about values. Equilibrium prices are a complicated function of people’s beliefs about fundamentals. Do more accurate beliefs ultimately prevail? Blume and Easley (2006) describe technical conditions under which the answer is yes, but they also showed that even when those conditions are satisfied it can take a long time for more accurate beliefs to prevail and be encoded in equilibrium prices.

4. Complete liquidity. In the complete markets models of Arrow and Debreu and Arrow, all assets are ‘perfectly liquid’ – there are no bid-ask spreads or delays in executing trade. The ‘Walrasian auctioneer’ (who as we have noted lives outside the model) costlessly ‘supplies liquidity’ because it is costless to supply. The multilateral clearing systems works like a charm – there are no limits to ‘pledging future income’.

¹ This is what Robert E. Lucas, Jr. was referring to when, paraphrasing Tolstoy’s first words in *Anna Karenina*, he said that ‘All complete markets models are alike, while all incomplete markets are incomplete in their own ways.’ See Lucas Robert E (2013).

² Continuously in a continuous time model.

Minimal modifications of the benchmark framework

A comparison of the time 0 trading Arrow-Debreu setting and the Arrow sequential trading setup sets the stage for an important class of models whose authors use them to formulate notions of illiquidity. These all use some device to tighten borrowing constraints and thereby impede trades of Arrow securities. Trades continue to be multilateral but now they are impeded by some enforcement or information frictions.

1. I call these modifications 'minimal' because they assume that agents are 'as present' and 'as connected' as they are in the Arrow-Debreu model. What impedes trades is not locational separation (as in the Townsend (1980) turnpike model and in Duffie, Garleanu, and Pedersen (2005) and Weill (2007) style high frequency search models).

2. The Kehoe-Levine model. In the Arrow-Debreu model, contracts are assumed to be costlessly enforced. Not so in the model of (Kehoe and Levine 1993). Here the same set of Arrow-securities are traded as in Arrow's model, but contracts must be self-enforcing. To Kehoe-Levine, this means that equilibrium allocations must be arranged so that each household *wants* to honor its contract at each moment even though it is always free to walk away and thereafter live in 'autarky' (or maybe, as in the work of Genicot and Ray (2003), into some other 'society' of trading arrangements). Technically, what Kehoe and Levine do is to tighten the history-contingent state-by-state borrowing constraints in Arrow's model, tighten them in a way that embeds 'participation constraints' that are cleverly designed to make it in everybody's interest always to honor his contracts. Kehoe and Levine show how these these tightened borrowing constraints lead to additional *history dependence* in allocations and how they affect equilibrium prices of Arrow securities. Zhang (1997) and Alvarez and Jermann (2000) use related setups to explain asset pricing 'puzzles' (puzzles in the sense that data are not consistent with at least some empirical implementations of the Arrow version of the sequential trading model).

In models in the Kehoe-Levine tradition, an auctioneer still clears markets with multilateral trades. (There is no need for 'money' or a medium of exchange.) But there is a sense in which some consumers' assets are 'illiquid.' Here "illiquidity" could be quantified state-by-state by comparing the borrowing constraints that Arrow would assign and the *tighter* constraints that Kehoe and Levine assign. You can regard Kehoe and Levine's as having thus contributed an elegant model of 'non-pledgable' income. Similarly, some assets, namely, the non-pledgable income streams, are not priced in a Kehoe-Levine equilibrium.

In models in the Kehoe-Levine tradition, there is an *enforcement* friction but no *information* friction.

3. Models with repeated moral hazard. Models of Thomas and Worrall (1990), Phelan and Townsend (1991), Atkeson and Lucas (1992) and others turn off Kehoe-Levine's enforcement friction and replace it with an information friction that gives individuals incentives to misreport their incomes and preference shocks. In various versions of these models, incomes or endowments or efforts are observable



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only to the individual agent receiving them, not to others. It is possible to design history-dependent contracts that use an individual agent's desire to insure himself against what for him are bad states as a motive to get him truthfully to reveal his information about himself in what for him are good states. Such contracts trade off supplying *intratemporal* insurance against agents' desire for intertemporal consumption smoothing, with the outcome that neither insurance across states nor smoothing across time is as perfect as it is in the Arrow-Debreu benchmark without the information friction.

In such optimal contracting models, trades are bilateral – not multilateral. They occur according to an *exclusive* contract between individual households and a 'social planner' or a 'financial intermediary.' The contracts have continuation values as state variables. In response to the agent's report of his income or preference shock, the planner awards a transfer in the current period and also adjusts the continuation value that the agent will bring into the next period. The contract takes the form of a pair of functions, one that maps the agent's report of his current income or preference shock into a current transfer from the 'planner,' another that maps the agent's report of his current income or preference shock into a next period continuation value. By iterating these functions through time, the contract makes today's transfer a function of the *history* of the agent's reports to the planner. The contract is designed to induce the agent to report truthfully.

In the Atkeson-Lucas model, the 'shock' is a privately observed preference shock to be imperfectly insured by a social arrangement. The Atkeson-Lucas model can be viewed as or modified to be a multi-period general equilibrium of a Diamond and Dybvig (1983) model of bank runs.

4. Models with both repeated moral hazard and enforcement. The gold

standard here is Atkeson (1991). Again, contracts are bilateral. Atkeson's model explains 'sudden stops' of credit in international credit markets in the sense of withdrawals of capital triggered by bad output realizations as part and parcel of an incentive compatible contract. There is a sense in which 'liquidity' crises occur in Atkeson's model. These would not occur if the private information problem weren't there.

5. Justification of bilateral contracts: The repeated private information settings of Thomas and Worrall (1990), Atkeson and Lucas (1992), Phelan and Townsend (1991) are models of an enduring bilateral *relationship*. That the relationship is long-lasting with well understood consequences of the agent's reports to the "insurer" or "planner" lets the arrangement improve the allocation of risk by trading off intratemporal risk-sharing against intertemporal consumption smoothing. We can regard these setups as elementary models of 'banks,' 'insurance companies', and other 'financial intermediaries.' These institutions 'do something important' by presiding over exclusive (meaning bilateral) enduring arrangements that facilitate risk sharing and consumption smoothing.



Andrew Atkeson

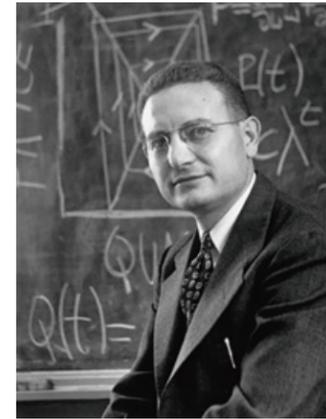
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Minimal modifications of the benchmark framework

6. Competition? Sustaining the bilateral risk-sharing and borrowing-lending relationships just described requires prohibiting or substantially limiting competition among financial intermediaries. For example, an agent might be prevented from buying insurance from more than one company. Nevertheless, some types of competition among intermediaries have been included and have played important roles in models of bilateral relationships, for example, Atkeson and Lucas (1992). Here competition among intermediaries at time 0, each intermediary offering an exclusive long-term relationship between itself and a prospective agent, can be used to restrict the present value of the financial intermediary's profit from the long-term contract.

7. Bewley models. General equilibrium models in the incomplete markets tradition of Bewley (1977, 1983), Huggett (1993), and Aiyagari (1994) shut down many Arrow securities markets. Some of them tighten borrowing constraints. Tightening borrowing constraints enough makes room for fiat currencies. Trade remains multilateral in these models.

8. Or is it? The Townsend (1980) turnpike model can be regarded as a twist on a Bewley model that through an ingenious pattern of locations and exogenous agent itineraries makes some physically feasible and welfare improving trades incentive infeasible. Townsend's physical environment contains a notion of a 'liquidity shortage' that no private party can provide. A social institution like fiat money or government debt can provide it.



Paul Samuelson
American Economist
The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1970

9. Overlapping generations models.

From a particular and perhaps peculiar (but nevertheless valid) perspective, the overlapping generations model of Samuelson (1958) is a special case of the Arrow-Debreu model that arranges life-spans and endowments in a way designed simultaneously to

- a. *Torpedo the two fundamental theorems of welfare economics.*
- b. *Open the way to welfare-improving equilibria with valued fiat money.*
- c. *Give rise to a valued fiat money that can't exist in environments in which the two welfare theorems prevail. Valued fiat money is an excellent and basic example of a welfare improving 'bubble'. Fiat money is a claim to a stream of zero payments so it seems that its "fundamental" value would be zero in an Arrow-Debreu complete markets economy fulfilling 'ordinary' regularity conditions. But when some of those conditions are violated, as they are in the setting analyzed by Samuelson (1958), there can exist rational expectations equilibria in which unbacked fiat money is worth more than its fundamental value.*



Robert Lucas
American Economist
The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1995

10. Cash-in-advance models. There is no room for valued fiat money in the special versions of the Arrow-Debreu structure that underlies "real business cycle" and other models that remain workhorses for asset pricing theory. That means that those models don't provide theories of the price level and its movements over time. That they are entirely "non-monetary models" means that they leave open the challenge of modeling how aggregate price levels are determined. J. Lucas Robert E (1980; R. Jr. Lucas 1982) took a direct approach to 'integrating monetary and value (general equilibrium) theory' that he purposefully designed to

- *retain all or most of an Arrow-Debreu theory for pricing assets,*
- *but then to add a cash-in-advance friction for some types of purchases that would give rise to a 'liquidity preference' for a government (or bank) issued asset that is dominated in rate of return in equilibrium.*
- *create a framework for analyzing interactions of monetary and fiscal policies in determining nominal prices and interest rates.*

The monetary equilibria in such models leave open arbitrage opportunities for a central bank or a private bank that can offer a risk-free nominal claim to dollars that is 100% backed by a safe portfolio of interest-earning Arrow

securities. The model builder has to shut down exploitation of these potential arbitrages by private intermediaries, by regulations that effectively prohibit the emergence of "free banking". When in place, such regulations in effect give the central bank and the regulators a monopoly on the right to exploit those arbitrage profits.

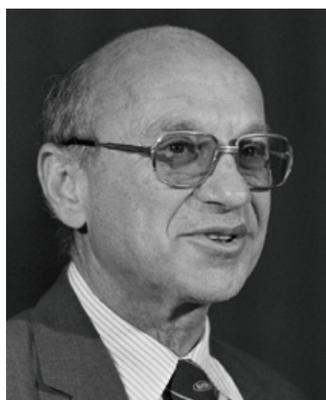
Lucas arrested the history-dependence that would ordinarily be produced by wealth effects originating from open market operations and other monetary disturbances. Arresting that history dependence was a key to preserving those convenient asset pricing formulas and preventing the distribution of private wealths as being a state variable.³ The device introduced by Lucas here is also used in the popular Lagos and Wright (2005) model that creates a role for an unbacked currency by separating day and night transactions.

11. Friedman rule as a response to the shortage of liquidity in those models.

The rule that delivers the optimal quantity of money of Milton Friedman (1969) restricts both monetary and fiscal policies. This mixture is evident in policies to pay interest on reserves in order to implement what has come to be known as a "Friedman rule".⁴ Friedman (1960) stresses the importance of how paying interest on reserves is financed (e.g., taxes, interest on the central bank portfolio, printing money) and how those necessary supplementary financing arrangements will influence equilibrium allocations.⁵ A footnote of Friedman (1960) indicates that within the class of models in which he was reasoning, two superficially very different regulatory arrangements could lead to virtually equivalent equilibrium allocations of resources:

- *A quantity theory regime in which the government monopolizes the issue of bank notes and pays interest on reserves at the risk-free nominal interest rate; and*
- *Free banking*

A quarter of a century later, Friedman and Schwartz (1986) revisited this issue with perhaps more of a tilt toward free banking.



Milton Friedman

American Economist

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1976

12. How many fiat currencies? When the developed world left the Bretton-Woods pseudo gold standard in 1971, the following abstract theoretical question suddenly became of substantial policy importance: in a multi-country overlapping generations or cash-in-advanced model, how many fiat currencies is there room for? J. Kareken and Wallace (1981) presented a striking answer in settings with flexible prices, namely, one and only one. The analytical basis of their answer was contained in an exchange rate indeterminacy proposition. A minor extension of their analysis indicates that in their flexible price environment, any martingale is an equilibrium exchange rate. That result was the nemesis of a “monetary theory of exchange rates” formalized elegantly in R. Jr. Lucas (1982). He rendered exchange rates determinate by imposing a particular set of cash-in-advance constraints that shut down the extensive “nickels and dimes” currency substitution that drives the J. Kareken and Wallace (1981) analysis. The Lagrange multi-

pliers in the country-resident specific cash in advance constraints in R. Jr. Lucas (1982) are a theory of “liquidity”.

In a sticky price version of the J. Kareken and Wallace (1981) and R. Jr. Lucas (1982) environments, is there room for multiple fiat currencies? Perhaps. It would depend on where and how the model maker would put the stickiness.

13. Financial accelerator models.

Models of liquidity like Chien and Lustig (2010) can be regarded as living within the multilateral trades tradition of Kehoe and Levine (1993) and Alvarez and Jermann (2000). They tack on collateral constraints to create ‘liquidity premia’ for assets that qualify as collateral. Deteriorations of value of collateral impede borrowing and lending and denigrate allocations.

Collateral constraints generate motives for precautionary savings. With high discount factors β , precautionary savings offers such a useful way of circumventing the collateral constraint that it can attenuate effects of collateral constraints on equilibrium allocations. This creates a troublesome problem that authors in this tradition have fought in various ingenious ways such as by shortening agents’ lives and lowering their subjective discount factors. The force that these “repairs” are designed to arrest is that occasionally binding collateral constraints reshape indirect utility functions in ways that, relative to an Arrow-Debreu benchmark allocation, lead to precautionary savings, socially excessive savings, and distorted interest rates and intertemporal prices. These models provide an easy case for government interventions that relax collateral constraints.

Collateral constraints as justification for quantitative easing Araújo, Schommer, and Woodford (2013).

14. Collateral constraints and ‘good

bubbles.’ Collateral constraints affect equilibrium asset prices, causing them to deviate from what they would be in corresponding economies without those constraints. In some models, ‘bubbles’ in asset prices can improve outcomes by relaxing collateral constraints, thereby redirecting lending to socially worthwhile projects.

15. Directly altering utility functions:

J. Lucas Robert E (1980; R. Jr. Lucas 1982) used cash-in-advance constraints to produce indirect utility functions that allowed him to “integrate monetary and real theory” in a way that preserved many of the asset pricing implications of Arrow-Debreu modeling. A “shallower” but insightful approach to achieve a similar analytical purpose was simply to put money or monies into private agent’s utility functions (e.g., Brock (1974) and Croushore (1993)). Nowadays some authors even put bonds of different maturities in the utility function models to rationalize liquidity premia on them (e.g., Krishnamurthy and Vissing-Jorgensen (2012)). These models impose on utility functions things that theorists seeking “higher” (or “deeper”) foundations prefer to derive as properties of indirect utility functions identifying sources of liquidity preferences. But they yield readily workable theories of rate of return discrepancies and liquidity premiums. These setups provide boilerplate models of exchange rate determinacy and exchange rate risks.

Larger modifications of the Arrow-Debreu model come from breaking the locational and temporal links that allow multilateral trade and clearing arrangements in that model. These models arrange meetings of people in time and space that are designed to make all trade be bilateral, thereby making room for middlemen who are recognizable as “liquidity providers”.

1. Models of Duffie, Garleanu, and Pedersen (2005), Weill (2007) and others create search set ups in which buyers and sellers of an asset arrive randomly via distinct Poisson processes. Prospective buyers and sellers who randomly meet then might or might not trade bilaterally, depending on the countervailing offers they make to one another.

2. These models are open to having several classes of traders:

- a. *Sellers for ‘nonfundamental reasons,’ i.e., reasons not connected to their opinion about the fundamental value of the asset (e.g., rebalancing, death, divorce, marriage).*
- b. *Sellers whose opinions about the fundamental value of the asset has deteriorated.*
- c. *Buyers for ‘nonfundamental reasons,’ i.e., reasons not connected to their opinion about the fundamental value of the asset (e.g., rebalancing, death, divorce, marriage).*
- d. *Buyers whose opinions about the fundamental value of the asset has improved.*
- e. *Liquidity providers. These ‘buy into’ temporary decreases in prices caused by surges in arrivals of nonfundamental sellers. They ‘sell into’ temporary increases in prices caused by surges in arrivals of nonfundamental buyers.*
- f. *Liquidity providers want to ‘avoid’ or ‘front run’ traders who buy or sell for fundamental reasons, meaning their opinions about the fundamental valuations of the asset. They have incentives to figure out whether someone is a fundamental or nonfundamental trader.*
- g. *Size of trades can help dealers infer whether a trader is fundamental or non-fundamental. (When they step in as dealers in response to what they see as contagion, governments sometimes mistakenly infer the opposite from a surge in trades.)*
- h. *This literature provides a definition of liquidity: rates of arrival of buyers and sellers.*
- i. *There seems to be a ‘frequency domain’ specialization among dealers with dealers carrying on basically the same activities, but specializing in markets with different arrival rates (e.g., minutes, days, weeks).*

3. Liquidity providers earn excess returns for taking risk involved in inferring fundamental from non fundamental customers.

4. Are liquidity providers private (e.g., hedge funds) or public (central banks and treasuries)?

5. Weill (2007) describes a beautiful model in which an intermediary or central bank improves outcomes by ‘leaning against the wind’. In the model, the intermediary needs not be a government institution.

6. What we want: ‘limit theorems’ in which trading arrangements

approach Arrow-Debreu allocation outcomes as contact rates go to infinity.

7. Models in the Kiyotaki and Wright (1989) tradition. Here an asset is liquid if it is used as the medium of exchange. Kiyotaki and Wright (1989) is a beautiful modern version of the Wicksell triangle.

Models of contagion

1. Benchmark models here are Bryant (1980) and Diamond and Dybvig (1983). These papers describe Nash equilibria that have earmarks of bank runs and that are Pareto inferior to equilibria without runs.

2. These papers set off a productive literature about alternative ways to improve allocations by arresting threatened runs.

3. Atkeson and Lucas (1992) and Phelan and Townsend (1991) can be viewed as providing a dynamic versions of the physical environment of a Diamond and Dybvig (1983) model. Such models are needed to predict outcomes and design institutions and contracts to implement optimal allocations that eradicate runs. This context provides fertile ground for applying implementation theory.

4. Jacklin (1987, 1993) provides a fruitful application of implementation theory in this type of environment. These papers analyze the role of sequential-service constraint coupled with deposit contract in setting the stage for bank runs.

5. Please remember the caveat about moral hazard brought up in the concluding section of Diamond and Dybvig (1983) where they drew attention to the fact that they ignored moral hazard and recommended that the reader keep in mind the warnings issued by J. H. Kareken and Wallace (1978). That paper focused on the adverse effects of deposit insurance unless accompanied by appropriate regulation of bank portfolios.

Scattered thoughts

We have just touched the surface of how economists think about liquidity nowadays. In this appendix, I list just some of the many questions and topics that recent work has studied.

³ Milton Friedman used to emphasize those forces shut down by Lucas as part of the ‘transmission mechanism!’

⁴ Such policies were just “mental experiments” in the mind of Friedman when he wrote about them. Since the 2008 financial crisis, they have been a mainstay of US Federal Reserve policy.

⁵ Does anyone in the US now understand how interest payments on bank reserves in the US will be financed in the medium term future?

Sources of illiquidity

1. Search frictions – low contact rates.
2. Asymmetric information – lemons problems.
3. Asymmetric beliefs.
4. An agent is said to be liquidity constrained when he can't borrow against the discounted present value (whose discount factor?) of his future income (of what types? labor income? financial income?).

Collateral?

What determines what assets can be used as collateral?

1. Potentially anything with a small enough haircut. (Pawn shops).
2. Coordination of people who favor 'on the run' securities.
3. Why use Treasury bills and not commercial paper? 'Informationally insensitive' versus 'informationally sensitive' assets.
4. Public information about an individual's payments history?

Alternative definitions of 'liquidity'

1. An asset is said to be 'liquid' or the state of a market for that asset is said to be 'liquid' if you can rapidly find someone to write a repo against it with a small haircut. "Contact rates are high".
2. An asset is liquid if its default rate is low.
3. An asset is liquid if bid-ask spreads are low.
4. An asset is liquid if people agree about its value.
5. An asset is liquid if it is a medium of exchange.

6. An asset is said to be illiquid when its value is less than the discounted present value of its dividends. But whose stochastic discount factor? (The property stressed in this definition is the opposite of the property of an asset with a bubble).

7. An asset is said to be liquid when big trades don't affect its price much. (Liquidity providers work to produce that outcome when they infer that demands and supplies are driven by noise and other liquidity-driven traders trading not because they forecast changes in fundamental values; liquidity providers work against that outcome when they infer that traders have information about changes in fundamental values).

8. An asset is liquid if big trades have at most temporary effects on prices.

Global liquidity

1. Provision of insurance against exchange rate risk.
2. Who or what generates exchange rate risk?
3. Is insurance against exchange rate risk to be supplied by private liquidity providers or by (some) government institutions? Are the government institutions that would provide the insurance distinct from the government institutions contributing to exchange rate risk?
4. Who decides what currency or currencies trades are to be conducted in? (Evolution of the gold standard; collapse of the gold standard. Case study provided by court cases after the US civil war and after 1933. The government abrogated contracts, thereby redistributing resources between creditors and debtors. Was that redistribution intentional)?

Governments as liquidity providers?

1. Government guarantees of interest and principal payments – US New Deal effort to jump start private lending.
2. WWI payment of insurance premiums for ships before US entry into WWI.
3. Deposit insurance – should the government provide it? To what financial institutions? Can private insurers provide it? How should it be priced?
4. Unintended consequence of incorrectly priced deposit insurance? Shifting of risks to tax payers? Or a heterogeneous beliefs explanation where the government has more accurate probability assessments.

Heterogeneous beliefs

1. Heterogenous beliefs create wedges that can look like bid-ask spreads and impede or shut down trade. Contributions by Dow and Werlang (1992) and Araujo, Novinski, and Páscoa (2011) provide examples of fruitful ways of framing the topic. Such models provide approaches to how model ambiguity provides endogenous heterogeneous beliefs. Baliga, Hanany, and Klibanoff (2013) provide an intriguing example endogenous 'polarization' of beliefs fostered by model ambiguity.
2. The classic Harrison and Kreps (1978) paper on bubbles with heterogeneous beliefs makes one think hard about alternative concepts of 'fundamental values'.

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Constrained-Efficient Capital Reallocation

Authors of the paper: Andrea Lanteri, Adriano A. Rampini

Author of the summary: Kaihong Song

Roughly speaking, there are two types of capital: new capital and old (used) capital. In general, more financially constrained firms, which have a higher marginal value of net worth, acquire more old capital than the unconstrained firms, which always install new capital and resell the capital on a secondary market as it ages.

It is popular to subsidize new investments around the world, but the literature doesn't offer a very convincing theoretical foundation for this policy. In this paper, through a stylized model and a full-fledged dynamic model, the authors theoretically show the efficiency gain from subsidies on investment and policy interventions, i.e. tax on old capital in the secondary market.

Comparing to existing literature, this paper contributes to the field of capital reallocation, the role of the secondary market, pecuniary externalities and capital misallocation.

Pecuniary Externalities of Old Capital

Comparing to the traditional perfect economy, financial frictions bring externalities into the secondary market and depart the economy from the first-best investment and output levels.

Specifically, there are two types of pecuniary externalities resulting from a decrease in the price of the old capital: distributive externality, which means a lower price of the old capital in equilibrium can help constrained firms raise more capital for producing, and collateral externality, which will tighten the borrowing constraint when the price of old capital declines.

With these externalities, even the competitive equilibrium can't achieve the constrained efficient allocation, because, in general, the distributive externality exceeds the collateral externality in stationary equilibrium, which means a relative "excess" demand for old capital and thus a high equilibrium price of old capital with respect to the constrained-efficient economy.

Capital Reallocation and Pecuniary Externalities

In this paper, a continuum of overlapping firms with measure one is born at the start of each period with heterogeneous initial net worth but applies the identical production function. The firms only live for two periods: investing when young and producing when old. To produce, they have two perfectly substitutive instruments: old capital with zero resale value, and new capital with a collateral resale value, but which will age next period.

There exists a credit constraint: firms can only borrow up to a fraction of the market value of the total new capital they own, or finance by issuing equity (negative dividend) with a convex adjustment cost function of the dividend. These firms are owned by the representative household, so they will decide how to allocate between new and old capital to maximize household utility.

Figure 1 gives the policy function of firms with different initial wealth. In the stationary competitive equilibrium, there are three thresholds, denoted by $0 < \underline{w}_N < \bar{w}_0 < \bar{w} < w_{max}$. Firms with initial wealth less than \underline{w}_N , which are those most financially constrained, only purchase old capital, and it's indifferent to buy either type of capital for firms with $w \in (\underline{w}_N, \bar{w}_0)$. Then firms will stop purchasing old capital until their initial wealth reaches \bar{w}_0 and makes them unconstrained. When net worth is high enough, firms can invest optimally, thus achieve a constant level of investment. With initial wealth increasing, total capital invested is weakly increasing, with investment on new capital continuing to (weakly) increase, while the acquisition of old capital increases and then declines. Besides, the marginal cost of equity issuance, which reflects the marginal value of net worth, keeps decreasing.

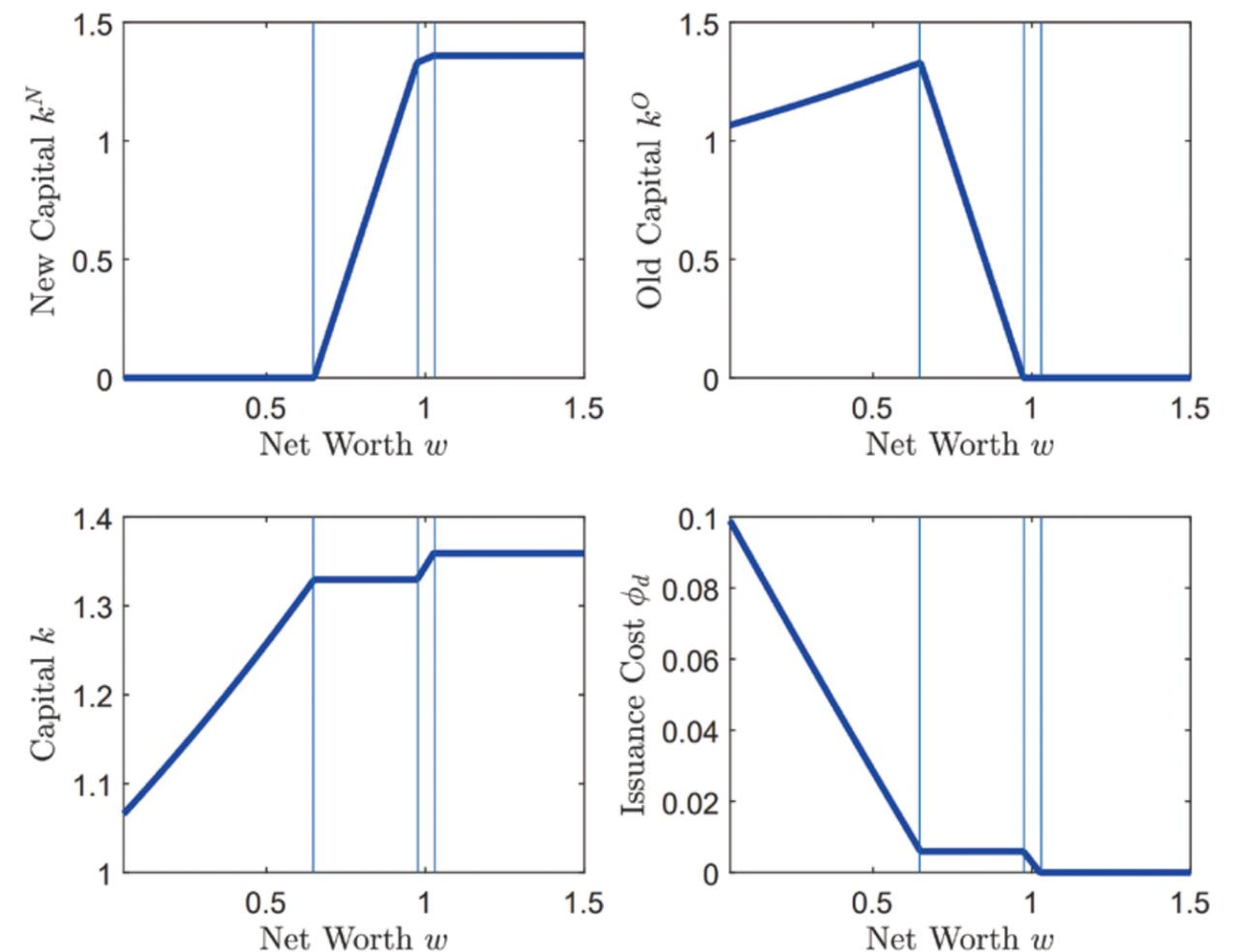


Figure 1: Stationary competitive equilibrium – example. Top left: new capital k^N ; top right: old capital k^O ; bottom left: total capital k ; bottom right: marginal cost of equity issuance ϕ_d . The x-axes report net worth w . The parameter values are: discount rate $\beta = 0.96$; support of net worth distribution $w_{min} = 0.05$ and $w_{max} = 1.5$; curvature of production function $\alpha = 0.6$; collateralizability $\theta = 0.5$; and cost of raising equity parameters $\phi_0 = 0.1$ and $\phi_1 = 2$.

In this model, the authors analytically and quantitatively show that the relative price of old capital is inefficiently high in the decentralized competitive equilibrium, comparing to the social planner economy under the same constraints. This results from the fact that distributive externality is higher than the collateral externality in equilibrium.

Therefore, if we can reduce the future price of the old capital, we can improve reallocation and induce net welfare gain in the constrained stationary competitive equilibrium. Furthermore, this equilibrium can be realized by subsidies on new capital and taxes on old capital, which are offset by lump-sum taxes or transfer.

For comparison, in Figure 2, the solid lines are previous function values and the dashed lines are constrained-efficient allocation with optimal taxes and subsidies. The total investment after intervention keeps efficient, independent of initial wealth, and the secondary market reallocates old capital towards more constrained firms, which reduces the dispersion in marginal production of capital without any equity financing cost.

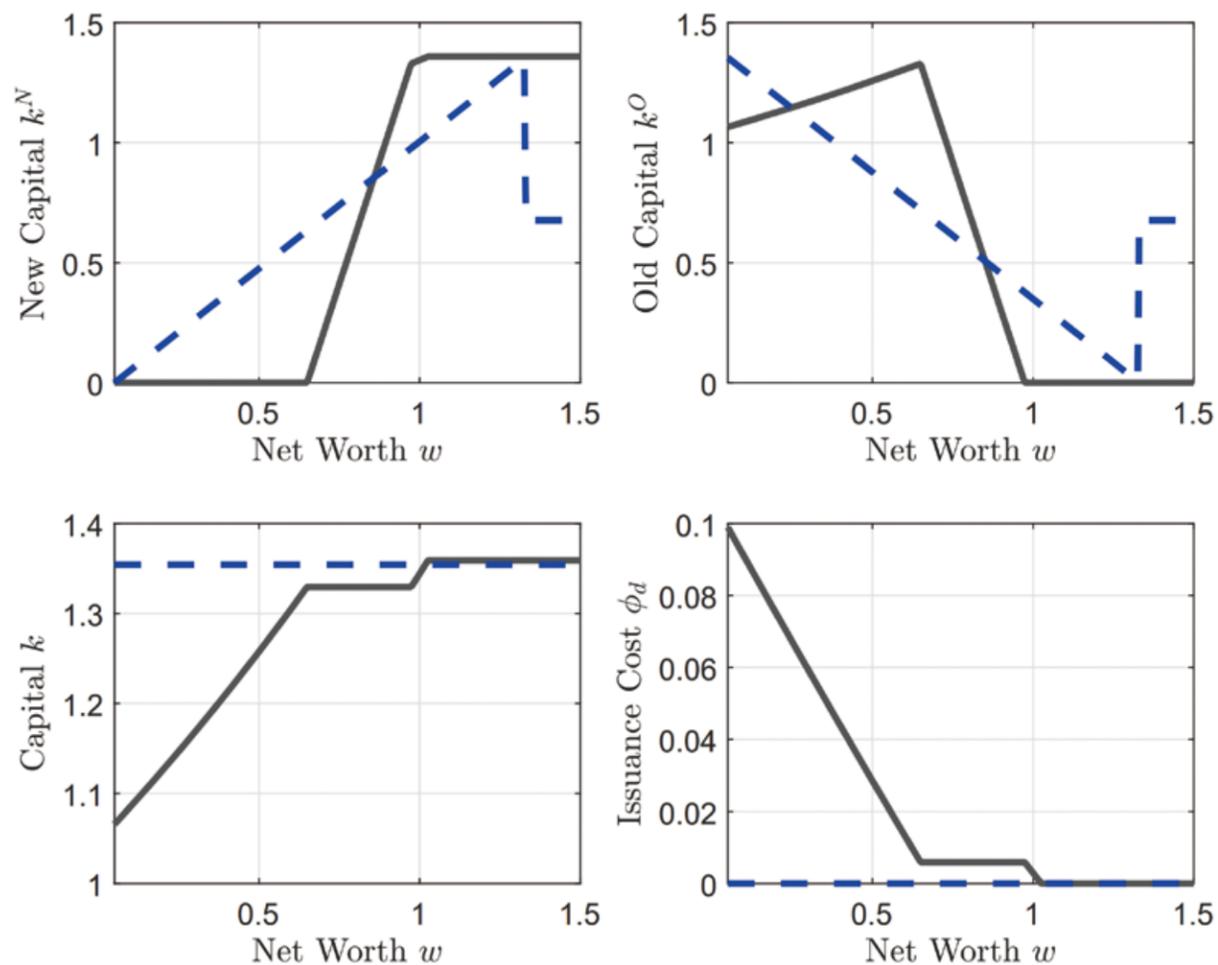


Figure 2: Stationary competitive equilibrium and constrained-efficient allocation – example. Top left: new capital k^N ; top right: old capital k^O ; bottom left: total capital k ; bottom right: marginal cost of equity issuance ϕ_d . The x-axes report net worth w . Solid lines denote the competitive equilibrium allocation, dashed lines the constrained-efficient allocation. See the caption of Figure 1 for the parameter values.

Generalization and Quantitative Analysis

The authors also extend the model in several ways, by including risk-averse entrepreneurs, heterogeneity in productivity, and introducing firm life cycle and long-lived capital to capture reality facts. The main results, that distributive externality dominates collateral externality in stationary competitive equilibrium and that the price of old capital is inefficiently high, still hold.

In a full-fledged quantitative dynamic model with a stochastic firm life cycle, long-lived capital, and persistent idiosyncratic

productivity shocks, capital reallocation is driven by financial frictions and stochastic productivity. Given calibration, the price of the old capital in the stationary competitive equilibrium is 0.553, while the first-best price is 0.547.

Figure 3 gives the corresponding policy functions and the marginal value of equity issuance with respect to initial wealth. Overall, they show similar patterns to the stylized model. Besides, for a fixed initial wealth, high productive firms (thick lines) are more financially constrained with a higher marginal equity issuance cost, which induces them to acquire a higher fraction of old capital than low productive firms (thin lines). The old capital reallocation is from high productive and low net worth to low productive and high net worth firms, which are not so constrained.

Quantitatively, in this calibrated model, the distributive externality is around 2.3 times as large as the collateral externality in aggregate, consistent with previous analytical results. After subsidies and taxes, the economy gains an 8% increase in output and 5% in consumption, relative to the stationary competitive equilibrium.

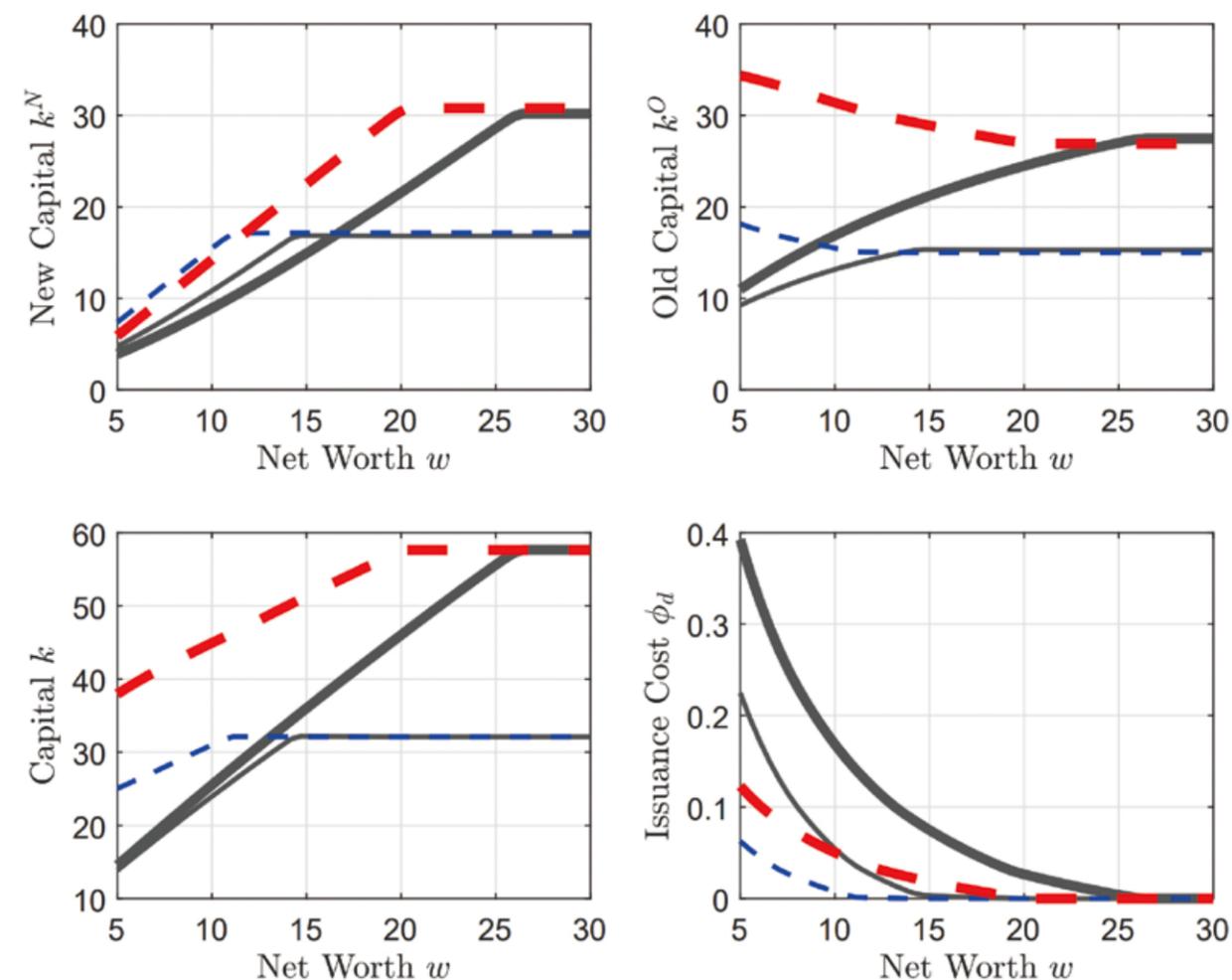


Figure 3: Stationary equilibrium and constrained efficient allocation. Top left: new capital k^N ; top right: old capital k^O ; bottom left: capital bundle k ; bottom right: marginal value of net worth ξ . The x-axes report net worth w . Solid lines denote the competitive-equilibrium allocation, dashed lines the constrained-efficient allocation. Thick lines denote the high productivity realization, thin lines the low realization.

Summary:

This paper provides a novel perspective and guidance on the optimal design of investment incentives with a theoretical foundation. In an economy with financial frictions, there exists pecuniary externality in the secondary market for old capital. Since financially constrained firms tend to buy old capital from relatively unconstrained firms, due to the higher distributive externality, the high demand drives the price of the old capital inefficiently high. Thus, subsidies on investment or taxes on old capital can induce welfare gains in aggregate.

Thomas Philippon : Let the Worst One Fail

Authors of the paper: Thomas Philippon, Olivier Wang

Author of the summary: Yukui Yang

In general, governments often bail out large financial firms during a financial crisis because, if not, the crisis would be contagious and then the sufferings could be very large and the economic costs of letting these firms fail will exceed the fiscal costs of the bailouts themselves. However, this recurrent issue came to a head during the global financial crisis of 2008-2009 because of the magnitude and scope of the bailouts. Therefore in the aftermath of the Great Recession, governments pledged to end the “too-big-to-fail” problem and endorsed a financial system reform which includes three pillars: capital requirement, enhanced supervision and resolution regimes. The first two pillars are almost stable, while there is currently no consensus about the ability of governments to resolve large banks during times of economic stress yet. The root of the skepticism is that one cannot expect policy makers to let a majority, or even a significant number, of large banks fail simultaneously.

Philippon and his coauthor tell us that this skepticism is misplaced and they present two flaws of the argument. Firstly, the argument assumes that if regulators do not let a majority of banks bankrupt then there will no bank fail in the end. Secondly, the argument assumes only the average level of the bailout can affect private incentives.

This paper mainly uses the logic of tournaments to resolve the “too-big-to-fail” issue in the context of imperfect resolution regimes. The authors acknowledge that government will not give up intervening to support the financial sectors during a crisis, but they don’t think the government should help every bank in the same way. The authors argue that though time consistency can pin down bailout size, it does not pin down bailout distribution, which matters for incentive.

In detail, the arguments of this paper are made in three steps. Firstly, the authors use a simple model that bailout can be ex-post efficient because of a negative externality on the real economy when the financial system is undercapitalized. Given the assumption that bailout funds can be distributed symmetrically across banks, the authors achieve a conclusion that bailouts can increase the banks’ risk taking, and the deeper the pockets of the government are, the worse the situation is. This conclusion suggests that we should limit the funds for bailouts and restrain our regulators.

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Particularly, in the first step they use a systemic risk model where the negative externality on the real economy depends on the aggregate capital shortfall in the banking system. The authors show that they can reach the first-best equilibrium by conditioning government support on a relative performance mechanism such as a rank-order tournament. In the tournament, banks perform above the median receive a higher bailout than those banks performing below the median. Punishing badly behaved banks and rewarding good ones can help each individual bank strive to make sure it does not end up in the lower half. The authors also find that if they extend their model and add limited liability constraints, the outcome regarding deep pockets would be overturned. Beyond this interesting result, they also show that a set of implementable policies improve monotonically with fiscal slack. When the government slacks the liability constraint and provides more incentive for banks, there will be less moral hazard, and if the government is able to provide enough fiscal slack, the existence of a first-best allocation will be assured despite the limited liability.

One thing to be remarked is that they assume banks are highly substitutable in the baseline framework, and the capital surpluses in one bank can be used to compensate for capital shortfall in another bank. Consequently, a resolution authority can merge banks at a low cost when necessary. But, if the social cost of merging banks is too high, then banks are more interested in bailout and this can spur moral hazard.

Secondly, the authors study a model where banks are imperfect substitutes which is quite common because of soft information, specialization across activities and locations, or market power. With lack of substitution, banks know they would be partly insured and it is costly to get the slack.

The authors find that, in the case of differentiated banks, the notion of renegotiation-proof contracts in Fudenberg and Tirole becomes quite appealing. If government ensures banks a set of transfers, banks can avoid a deviation. Though government can’t punish weak banks directly, it can commit to support well-behaved banks. Numerically, the authors find that the cost decreases rapidly towards the first-best cost as banks become more substitutable.

Finally, they consider a different form of heterogeneity, which arises from financial linkages between banks that generate co-movement in returns. These linkages capture a variety of “contagion” forces, such as cross-exposures, fire sales, or domino effects, as studied in the financial networks literature. We know that contagion leads to systemic risk, and more systemic banks should act more prudently. Only by giving them stronger incentives, can a resolution mechanism work. The authors find that the constraints that

financial linkages impose on bank resolution depend crucially on how bailout funds attributed to one bank spill over to other banks.

The authors also show us that when using a form called “ring-fencing”, bailout money will not be able to flow throughout the system to benefit other banks indirectly, but their tournament mechanism can still remain credible and efficient under minor amendments. In this model, a bank’s rank in the tournament is determined by its ex-post performance, as in the baseline model, but will now be weighted by its systemic risk. If there is no “ring-fencing”, a subtle constraint will appear and bailout can spillover to other banks under this condition. These spillover effect can help to reduce the ex-post cost and be used to rescue some banks indirectly through the linkages. But one problem is that spillover can actually worsen the credibility. Furthermore, the authors suggest that if we want to save the whole system, the cheapest way is to target the most systemic bank. However, then the moral hazard problem will resurge because the most systemic bank, now knowing that it can be completely insured, will maximize its risk-taking, and this behavior can be dangerous to the whole banking system.



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A Theory of Falling Growth and Rising Rents

Authors of the paper: Philippe Aghion, Antonin Bergeaud, Timo Boppart, Peter J. Klenow, Huiyu Li

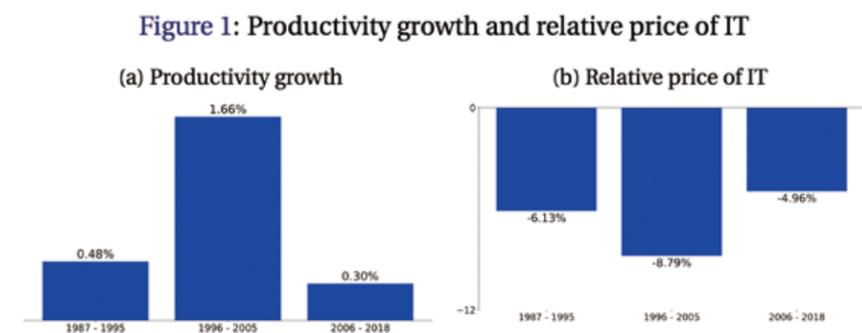
Author of the summary: Chunzi Huang

Abstract

Over the past several decades, growth has fallen in the U.S. while firm concentration has risen. In this paper, the authors construct a general equilibrium model of endogenous growth and firm dynamics linking these trends with the Information Technology wave between 1996 and 2005. The IT revolution drove down overhead costs of spanning multiple markets. In response, the most efficient firms with higher markups spread into new markets, thereby generating a temporary burst of growth and a fall in aggregate labor share. Based on the assumption of leapfrogging innovation and Bertrand competition, such an expansion exacerbates the competition, resulting in within-firm markups and innovation incentives to fall. Due to results from calibration, the rise in market share of more efficient firms outweighs the drop in long-run growth, leaving welfare modestly enhanced by the fall in overhead costs.

Recent studies have documented several stylized facts in the U.S. economy over the past several decades.

1. Slow growth interrupted by a burst of growth



Notes: The figures plot the average productivity growth and relative price of IT within each subperiod. The unit is percentage points. **Left panel:** Source: BLS KLEMS multifactor productivity series. We calculate yearly productivity growth in two digit NAICS trade and service industries by adding R&D and IP contribution to BLS MFP and then expressing the sum to labor augmenting form. We calculate trade and service growth by aggregating industry growth rates using industry share of labor costs. **Right panel:** Source: BEA. We calculate change per year in the price of IT relative to the GDP deflator.

Figure 1a presents the U.S. annual TFP growth in Trade and Service industries from the Bureau of Labor Statistics (BLS) KLEMS data. The growth rate accelerated from an average of 0.48% per year during 1987-1995 to 1.66% per year during 1996-2005, and then fell to just 0.30% per year from 2006-2018. Figure 1b shows that IT prices fell sharply at the same time that TFP growth accelerated.

2. Rising concentration

Table 1: Cumulative change in concentration 1982–2012 (ppt)

	RET	WHO	SRV	ALL 3
Top 20 firms sales share 1982	29	45	21	27
Top 20 firms sales share 2012	46	57	27	35
Change	17	12	6	8

Source: Figure 4 of Autor et al. (2020) and BLS KLEMS. Concentration in each industry are averages across 4-digit industries, with the industries weighted by industry sales shares. Concentration in ALL 3 (=RET+WHO+SRV) is the sales-weighted average share across all three sectors.

Table 1 presents the average change from 1982 to 2012 in top 20 firm concentration within 4-digit NAICS inside Retail Trade, Wholesale Trade, and Service industries, respectively. These sectors make up around one-half of value added and two-thirds of employment in the nonfarm business sector. Aggregating across the three sectors, the top 20 concentration rose from 27% to 35%.

3. Reallocation of market share toward low labor share firms

Table 3: Cumulative change in labor share 1982–2012 (ppt)

	RET	WHO	SRV
$\Delta \frac{\text{Payroll}}{\text{Sales}}$	-0.85	-0.08	0.23
Within firm	4.39	4.66	1.73
Between	-5.44	-4.59	-0.76

Source: Table 5 in Autor et al. (2020). This is a Melitz-Polanec (Melitz and Polanec, 2015) decomposition of the change in the labor share. The entry and exit margin is not reported. The unit is percentage points. RET, WHO, and SRV stand for retail, wholesale, and service.

Table 3 shows the cumulative change in labor share between 1982 and 2012. During this period, within-firm labor share increased across all the three sectors while between-firm labor share decreased, implying reallocation of market share toward low labor share firms.

Model setup

To propose a theory linking these trends in which the driving force is falling overhead costs of spanning multiple markets, the authors construct a general equilibrium model with heterogeneous firms.

For the household sector and final good sector, the model setup is quite standard. A representative household with inelastic labor supply chooses its consumption and wealth paths to maximize its discounted utility subject to its budget constraint and a standard no-Ponzi game condition. The final output good producer produces competitively using a unit continuum of intermediate inputs according to a Cobb-Douglas technology.

For the intermediate input sector, there are two sources of heterogeneity across firms. The first is product quality, which differs across the product lines of a firm and improves endogenously through creative destruction. The second is firm-specific process efficiency, which is time-invariant. With the assumption of leapfrogging innovation and Bertrand assumption, the firm chooses how many new lines to innovate upon, with a linear innovation expenditure, to obtain a perpetual patent to produce at the highest quality level from the next period onward. To prevent high productivity firms from taking over all product lines, the model assumes that firms face a convex overhead cost. Intermediate good producers make innovation decisions to maximize the net present value of their flow of profits.

In the equilibrium, the final output will be used for consumption, total overhead costs, and total R&D expenditures.

Mechanism

The model hypothesizes that the IT revolution may have contributed to lower costs of managing multiple product lines within a firm. Since high productivity firms earn more from an additional product with the fall in overhead costs, they always have a stronger incentive, compared to low productivity firms, to increase innovation investment and expand to obtain a larger market share. Concentration rises as a result.

On the one hand, the expansion of high productivity firms has a positive direct impact on productivity growth. The expansion of the firms with low labor share decreases aggregate labor share. Meanwhile, since more products are produced by these high efficiency firms, short-run growth bursts.

On the other hand, the expansion of high productivity firms induces greater competition. Under the assumption of Bertrand competition, greater competition reduces the expected markup in an additional product line, as the probability of facing high productivity competitors rises. As a result, the fall in overhead costs has a negative effect on innovation and productivity growth in a general equilibrium channel.

The following tables and figures present the results of calibration. Table 7 tells that the fall in overhead costs accounts for roughly 50% (-0.088%/-0.180%) of change in the growth rate. Figure 4 shows the simulation results of concentration level, the aggregate rate of creative destruction, productivity growth rate, and R&D intensity, which is consistent with the theoretical analysis. On average, the fall in overhead costs increases consumption by 0.36% per period, as reported in Table 11.

Table 4: Baseline Calibration Targets

Targeted	Years	Data	Model
1. percentile of top 20 firms	1987	0.137	0.137
2. sales share of top 20 firms	1987	26.7	26.7
3. productivity growth	1987–1995	0.48	0.48
4. price/cost markup	1988-2015	1.25	1.25
5. real interest rate	1980–1995	6.10	6.10
6. semi-elasticity of labor share wrt sales	1987	-2.18	-2.18

Source: 1, 2 and 6: Autor et al. (2020). 3: BLS KLEMS series. 4: Hall (2018). 5: Farhi and Gourio (2018).

Table 5: Baseline Parameter Values

Calibrated	Parameter	Value
1. overhead costs	ψ_o^0	$5.0 \cdot 10^{-4}$
2. R&D costs	ψ_r^0	2.201
3. productivity gap	Δ	1.134
4. quality step	γ	1.249
5. discount factor	β	0.947
6. percent of H-type firms	ϕ	0.137

Table 6: Calibrated change in parameters to fit the ending steady state

	Change	Targeted change	Data	Model
1. overhead costs ψ_o	-23.1%	concentration	8.3	8.3
2. R&D costs ψ_r	5.78%	productivity growth	-0.18	-0.18
3. efficiency gap Δ	0%	relative markup	0	0

Source: 1: Autor et al. (2020), change in the sales share of the top 0.137% firms between 1987 and 2012. 2: BLS KLEMS. 3: Autor et al. (2020), change in revenue per worker of the top 0.137% firms relative to the rest of the firms. Columns 'Data' and 'Model' are in percentage points.

Table 7: Contribution of overhead costs to the decline in steady state growth

	1. ψ_o, ψ_r	2. only ψ_r	1. minus 2.	3. only ψ_o	ψ_o contribution
change in g	-0.180	-0.094	-0.086	-0.089	-0.088

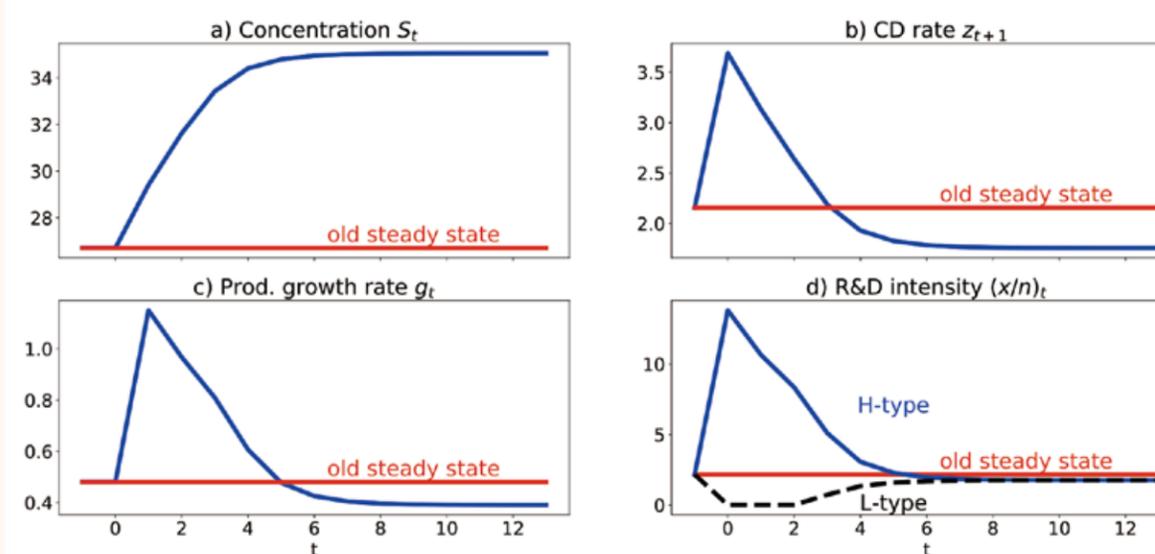
Note: Each column displays the percentage points change in steady state growth rate when the parameters in the column header changes as in Table 6. Column 1. matches the change in the data. Column ' ψ_o contribution' equals the average of columns 3. and 4.

Table 11: Contribution of the decline in overhead costs to welfare

	1. ψ_o and ψ_r	2. only ψ_r	3. 1. minus 2.	4. only ψ_o	5. ψ_o contribution
$\xi\%$	-0.57	-1.01	0.43	0.28	0.36%

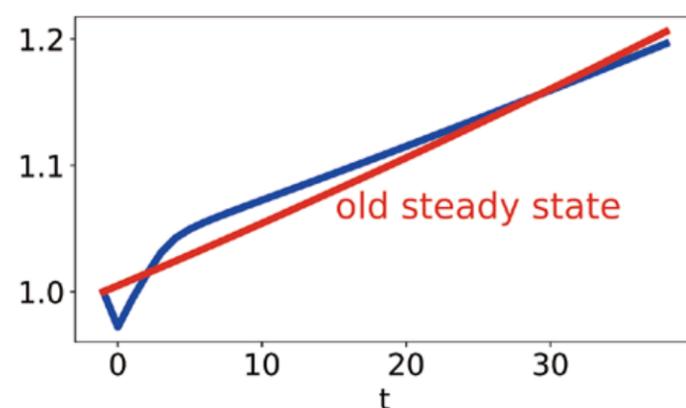
Note: Each column displays the welfare change in consumption-equivalent percentage terms when the parameters in the column header change to the value in Table 6. Column 5, the ψ_o contribution, equals the average of columns 3 and 4.

Figure 4: Transition dynamics



Note: The blue line plots the transition dynamics when overhead cost ψ_o declines by 23.1% (as in Table 6) in period 0 while other parameters stay the same. The unit is percent.

Figure 5: Transition dynamics for consumption



Note: The blue line plots consumption relative to period -1 when overhead cost ψ_o declines by 23.1% (as in Table 6) in period 0 while other parameters stay the same.

Conclusion:

This paper develops a model of innovation-led growth with intrinsic firm heterogeneity. The model analyzes the extent to which the model can potentially account for a significant portion of the U.S. growth experience over the past 30 years: (i) a productivity slowdown (after a burst in productivity growth); (ii) rising concentration at the national level; and (iii) opposing between and within firm changes in labor share.

The authors argue that a significant part of these phenomena can be explained by IT improvements in the mid-1990s to the mid-2000s, which allowed the most efficient firms to expand their boundaries. These firms enjoyed higher markups, so when they expanded their reach into more markets, which pushed down the aggregate labor share. High productivity firms expanded by innovating on more product lines, bringing a temporary surge of productivity growth. Within-firm markups eventually fell for both high and low productivity firms, as they were more likely to face high productivity competitors. This force ultimately reduced within-firm markups and dragged down innovation and growth. Welfare increased despite the lower long run growth.

The model lends itself to richer policy analyses. One could also explore optimal tax and subsidy policies, as well as competition policy and its relation with the productivity slowdown, within the quantitative framework in this paper.

Reference:

Aghion, P., Bergeaud, A., Boppart, T., Klenow, P. J., & Li, H. (2019). A theory of falling growth and rising rents (No. w26448). National Bureau of Economic Research.

Unequal Returns to China's Intercity Road Network

Authors of the paper: Simon Alder, Zheng (Michael) Song, and Zhitao Zhu

Author of the summary: Zhaorui Li

China has a big road infrastructure investment: it counts for 2.5% of GDP, compared with 1.8% of the GDP in other developing countries. However, there is also a heated debate on its potential inefficiency. One source of inefficiency, argued by some researchers, is a misallocation of road infrastructure. But can this argument be empirically tested?

In a recent paper, Simon Alder, Zheng (Michael) Song, and Zhitao Zhu address this issue by estimating the unequal returns to road investment. If a government has limited resources, the most efficient way is to invest in roads which potentially can generate higher returns. By this logic, if the investment is efficient, there should not be significant gaps in investment returns across different roads. Therefore, unequal returns can imply misallocation of resources among road networks, which serves as evidence of inefficiency. To estimate returns to road, the paper conducts a cost-benefit analysis. In terms of benefit, it identifies con-

gested and uncongested intercity links using real-time GPS records of a million trucks and then uses a trade model with optimal route choices to infer the welfare gain from road investment. The cost of investment is estimated from construction costs based on physical topography and market value of acquired land. Through this approach, it is found that 80% of China's intercity links are uncongested. Returns are highly unequal across links, contingent on the congestion status: average return on a congested link is 5.2%; whereas that on an uncongested link is -5.0%. Evidence on misallocation-induced inefficiency in road infrastructure is detected.

Road Congestion

"Road" in the paper refers to intercity links, constructed by county-pair shortest path: the shortest path connecting a county in a city to another county in a different but neighboring city. The congestion status of these intercity links is estimated by big data of heavy trucks. Specifically, the paper utilizes GPS records of trucks from G7, a logistical service provider. It tracks real-time GPS information on heavy trucks and provides over one million data records from 2018. Congestion is measured by examining the correlation between traffic speed and traffic density (number of trucks per unit of a road). Significant negative correlation implies road congestion – if a road is congested, lowering traffic density can significantly help increase traffic speed. As is shown in Figure 1, it is found that 80% of China's intercity links are uncongested: no significant correlation between speed and density in these links.



Figure 1: Spatial Distribution of Congestion

Optimal Route Choice

Based on Allen and Arkolakis (2019), the paper builds a trade model with optimal route decisions. In this model, there is trade among different cities and traders transport their goods from city to city. For two cities that are not directly connected, there can be many possible routes that a trader can choose. Naturally, transportation cost is route-specific: different choices of routes incur different levels of costs. At the same time, another source for cost is a path-specific idiosyncratic shock: you simply don't know what accident will happen during your transportation. In that sense, there is uncertainty on these cost shocks – traders can only know their distribution. Then, the trader has to optimally choose a path to minimize the transportation cost.

But that is not the whole story, since the paper adopts a general equilibrium framework. Traders' choices for paths also collectively influence the transportation cost. For a route, if more traders choose it, it becomes more crowded. The increased traffic density on this specific path lowers the traffic speed – transporting goods along this path takes more time and thereby is costlier. To sum up, given the cost, traders optimally choose paths; on the other hand, traders' choices of paths affect congestion status and influence transportation costs. Trade flows, traffic velocities and traffic densities can be determined in this general equilibrium framework. The parameters of the model are calculated by using the empirical facts in the previous section. The estimated model is found to match the empirical pattern well.

“
Traders' choices for paths also collectively influence the transportation cost. For a route, if more traders choose it, it becomes more crowded.”

Returns on Road Infrastructure

Returns on road infrastructure are estimated by cost-benefit analysis. For a specific intercity link, road infrastructure investment increases its traffic capacity. The benefit is obtained by calculating the welfare improvement implied by the general equilibrium model proposed in the previous section. Specifically, it computes how much additional happiness consumers can obtain from enjoying goods from different cities. On the other hand, the cost of road infrastructure investment mainly comes from two sources: construction cost and land acquisition cost. Construction cost is calculated based on slopes: a higher

slope of land induces a higher construction cost of the road. Land acquisition cost is estimated by its market value, which implies the opportunity cost of acquiring land. Estimation results (Figure 2) show that investment returns vary significantly across different intercity links: for those uncongested links, returns are zero or even negative; in contrast, returns on congested links are much higher. It suggests that there is misallocation in the intercity road investment. In this sense, China's infrastructure investment is inefficient.



Figure 2: Spatial Distribution of Road Returns

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It suggests that there is misallocation in the intercity road investment. In this sense, China's infrastructure investment is inefficient.

Reference:

Alder, S., Song, Z., & Zhu, Z. (2021). Unequal returns to China's intercity road network. Working Paper.

Allen, T., & Arkolakis, C. (2019). The welfare effects of transportation infrastructure improvements (No. w25487). National Bureau of Economic Research.

Unequal returns to China's intercity road network

Conclusion:

This paper tests the inefficiency of China's road infrastructure investment, by estimating the returns on intercity links. Based on big data of over one million truck records, the paper empirically identifies the congestion status of intercity links and finds that only 20% of China's intercity road network is actually congested. Then, the paper builds a model in which traders choose optimal paths to minimize their transportation costs. Based on this model, the welfare gain from the increasing capacity of each intercity link is computed. By weighing welfare gain against construction cost and land acquisition cost, the paper estimates the returns on intercity road network investment. Significant gaps between returns on congested roads and returns on uncongested roads are detected. Therefore, this paper provides evidence for a misallocation induced inefficient infrastructure investment in China.

Projects from the
CEF class



01

IS THE FUTURES MARKET
WEAKLY EFFICIENT?

02

QUANTITATIVE TRADING
BASED ON NEURAL NETWORKS

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U.S. EMPLOYMENT
DYNAMICS DURING THE
COVID-19 PANDEMIC

04

SHANGHAI SECOND-HAND
HOUSING PRICE ANALYSIS AND
CONDITIONAL RECOMMENDATION

Is the Futures Market Weakly Efficient?

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Abstract

In this project, we use the multi-factor method and the Hidden Markov Model (HMM) to construct quantitative investment strategies on rebar futures. We use data from January 1, 2010 to December 31, 2019 to train our model, and data from January 1, 2020 to June 30, 2021 to test our model. We find that the strategy based on the multi-factor model cannot generate stable profit, while HMM can generate stable profit. The performance of HMM is much better than the multi-factor model. When developing the strategy, all the data used is historical data, which gives us a chance to test whether China's rebar future market is weakly efficient or not. Based on our project, China's rebar future market is not very efficient because we can make money through HMM strategy which is only based on historical information.

Models and Outcomes

1. Multi-factor model

We use the five factors as independent variables, which are the same as those that we use in the HMM model. All the independent variables are in lagged form. The dependent variable is log return. The regression function is:

$$\begin{aligned} \text{Log_return_1day}_t &= \beta_0 + \beta_1 * \text{log_return_1day}_{t-1} + \beta_2 * \text{Log_return_5day}_t + \beta_3 \\ &* \text{Log_diff_volume1day}_t + \beta_4 * \text{Log_diff_volume5day}_t + \beta_5 \\ &* \text{Log_diff_price}_{t-1} \end{aligned}$$

log_return_1day is 1-day log return, log_return_5day is 5-day log return, $\text{log_diff_volume1day}$ is 1-day difference of log trade volume, $\text{log_diff_volume5day}$ is 5-day difference of log trade volume, and log_diff_price is the difference of log highest price and log lowest price during one day.

We use the data from January 1, 2010 to December 31, 2019 as training data and data from January 1, 2020 to June 30, 2021 as test data. This is the same as the setting in the HMM model. After training, we use these 5 lagged factors to predict everyday log return from January 1, 2020 to June 30, 2021. Then, we long one unit of future contract when the predicted log return is higher than a certain threshold. We close the position on the next day. We short one unit of future contract when the predicted log return is lower than a certain threshold. Similarly, we close the position on the next day.

The net value of our position is shown in figure 1. Here, we use different thresholds including 0.0001, 0.0002, 0.0004, 0.0006, 0.0008 and 0.001. For example, if the threshold is 0.0001, we long one unit of future contract when the predicted log return is higher than 0.0001 and short one unit when the predicted log return is lower than -0.0001. Using a linear regression model, we can see that we will lose money in most cases. Additionally, the performance of the model is not stable when using different thresholds.

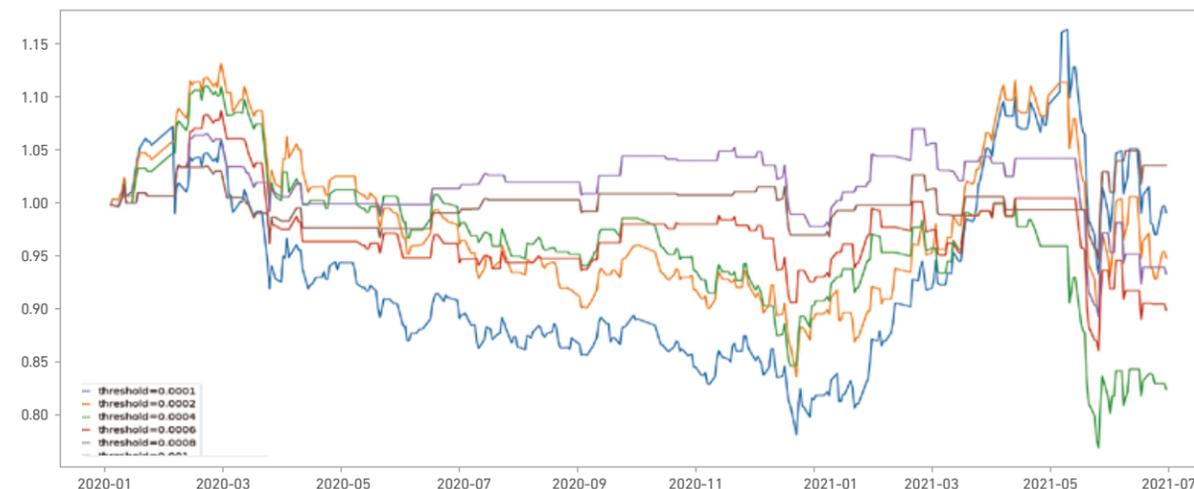


Figure 1: Net Value Based on Multi-Factor Model

2. Hidden Markov Model

In our project, the constructed five price and quantitative factors (same as used in the multi-factor model) are used as the input parameters of HMM, and the everyday rebar market state is deduced by HMM. We set the HMM state parameters as 8 and take the obtained market state as a signal to build a strategy. Specifically, we build 8 long strategies, corresponding to 8 market states respectively. If the signal of the day shows the corresponding state, we will long one unit of rebar contract and close the position the next day. According to the yields of the eight long strategies, we define the two best performing states as "good state" and the two worst performing states as "bad state". Then, if there is a "good state", we will long on the next day and close the position after one day. Similarly, if there is a "poor state", we will short on the next day and close the position after one day.

HMM uses an iterative convergent approximation algorithm for predicting the hidden state. The results obtained have some volatility, so we loop 100 times. In one of the loops, the net value is shown as follows:



Figure 2: Net Value Based on HMM, One of the Loops

After 100 loops, we can see that the strategy based on HMM generates positive profits. The outcomes are shown in the table below:

	Average return per day	Accumulate return rate	Volatility	Max drawback
min	0.00044	0.17306	0.00883	0.07253
max	0.00066	0.26885	0.00919	0.07509
avg	0.00057	0.22912	0.00907	0.07421

Table 1: Result of HMM Model, 100 loops



Quantitative Trading Based on Neural Networks

Authors of the paper: Bo Sun, Jian Zhou, Yongqiao Chen, Man Chen

Quantitative traders have trouble finding the dominating factors in making investment decisions. In this project we use and improve Two-dimensional Convolutional Neural Network (2d-CNN) to carry out and evaluate strategy using Chinese A-share stocks (we use The Shanghai Securities Composite Index (000001.SH) as our benchmark).

The bottom line of the model is to leverage past prices and volume information to predict stock relative performance in the near future. Model inputs are past prices (open/high/low/close) and volume indicators (turnover rate, etc.). Model output is the predicted return rate. We build up two candidate models: StockSelector-Alpha and StockSelector-Beta.

StockSelector-Alpha

The model structure of Stock-Selector-Alpha is shown below. After feature engineering layers, StockSelector-Alpha will flatten all features, disregarding the temporal information. The flattened features are then fed into a dense layer with 64 units. The activation function for the dense layer is the linear rectified unit (ReLU). The optimizer is a SGD algorithm called Adam. We use three regularization methods to mitigate overfitting - batch normalization, early stopping, and dropout.

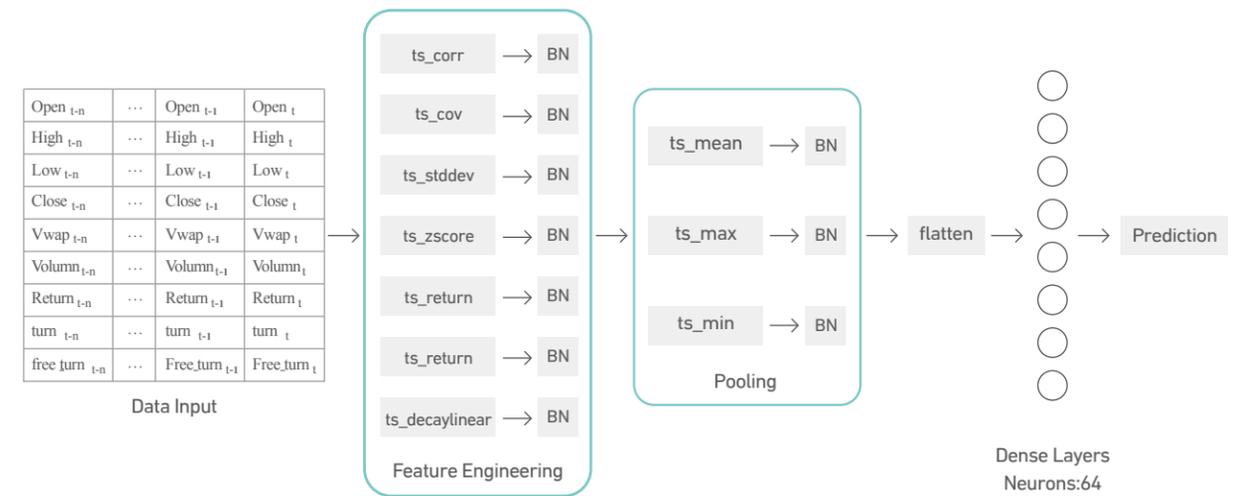


Figure 1: StockSelector-Alpha Model

StockSelector-Beta

The alpha version forgoes the temporal information embedded in the feature map. We gauge that there might be great potential in exploiting the information carried in the sequence. Therefore, the beta version uses a recurrent neural network—LSTM, to leverage temporal sequences. We do not conduct any feature engineering. Instead, we directly input the data picture, whose dimension is time-features, to the LSTM layers.

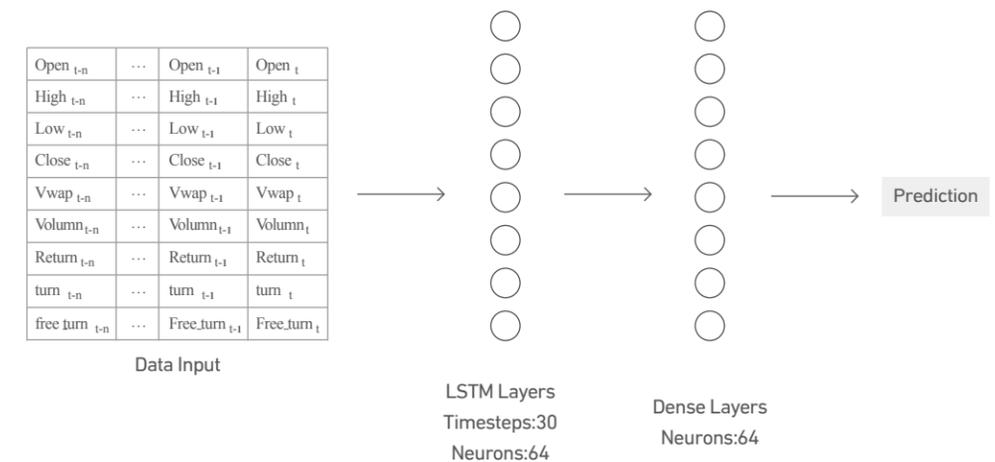


Figure 2: StockSelector-Beta

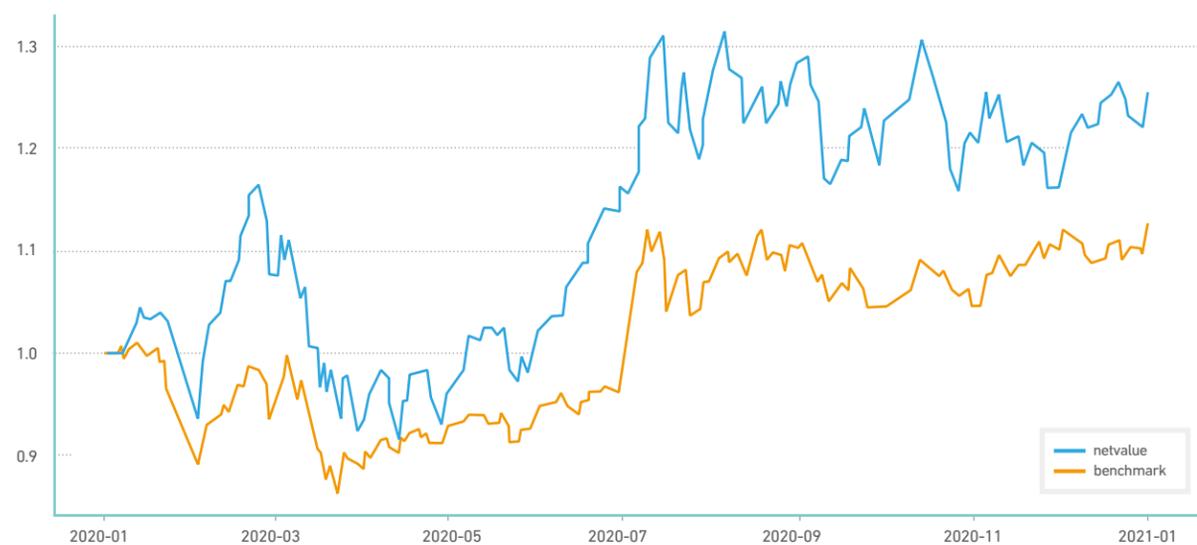


Figure 3: Backtesting Result of StockSelector-Alpha



Figure 4: Backtesting Result of StockSelector-Beta

Backtesting Results

The backtesting results show that both StockSelector-Alpha and StockSelector-Beta defeat benchmark index tremendously. Our StockSelector-Alpha beats the benchmark by almost 13 percent. Our StockSelector-Beta did even better, outperforming market index by 33 percent. StockSelector-Beta considers the features' temporal information and outperforms StockSelector-Alpha.



U.S. Employment Dynamics during the COVID-19 Pandemic

Authors of the paper: Yongqiao Chen

As the COVID-19 pandemic swept across the U.S. in April 2020, the employment rate plunged sharply but rebounded sluggishly afterwards. A structural change in the labor market is widely presumed but how to model it remains an unsolved question. In this project, I use the Lake Model to describe the U.S. employment dynamics with parameters estimated by Bayesian regression. My project is comprised of the following three parts.

Part One: Evidence for Structural Change

The Lake Model simplifies the labor market into two activities: job finding and job separation. The employment dynamics are described as follows:

$$Emp_t = Emp_{t-1} * (1-\beta) + (100 - Emp_{t-1}) * \alpha + \sigma * \epsilon_t$$

where Emp_t is the employment rate at period t , α is the job finding rate, β is the job separation rate, σ is the standard deviation of Emp_t , and ϵ_t is a white noise.

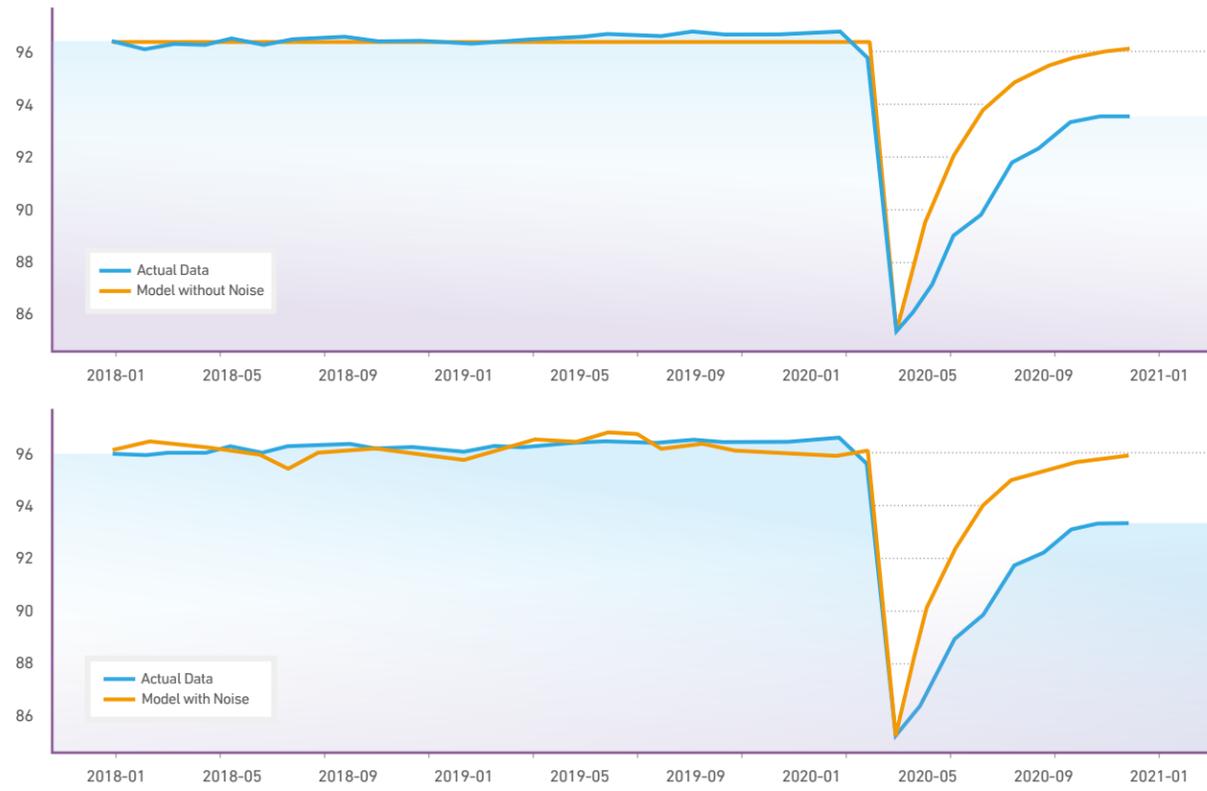


Figure 1: U.S. Employment Rate and Lake Model Simulation

Figure 1 presents the simulation of the Lake Model on the U.S. employment rate. The parameters are calibrated using the statistics before the pandemic. Before the pandemic, the Lake Model does a good job in simulation. However, a substantial difference can be observed after the pandemic. Further statistical tests also suggest a structural change in the U.S. labor market.

Part Two: Modeling for the Recovery Path Using Bayesian Regression

Finding out the parameter values that govern the recovery path is equivalent to finding the posterior distributions given the observations from May 2020 to December 2020. The process is described by the following workflow. Bayesian estimations are executed with the pymc3 package.

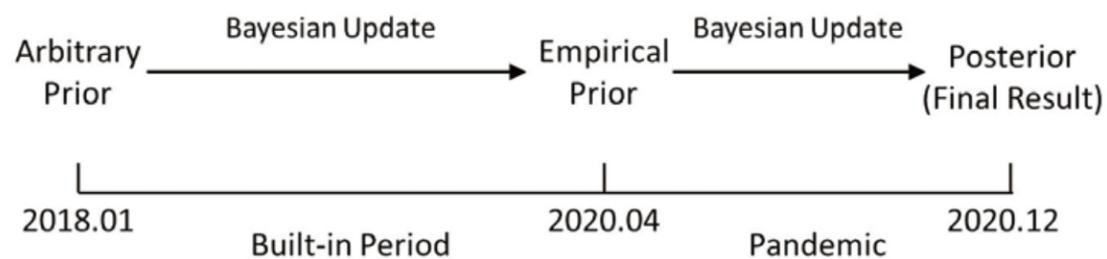


Figure 2: Workflow of Bayesian Estimation

Part Three: Prediction for 2021

The prediction for 2021 is done by randomly selecting parameters' values from posterior distributions and applying these values to the Lake Model. After simulating thousands of paths, we can draw the distribution of our prediction (See Figure 3). Moreover, the number of months needed for full recovery can be counted given a simulated path (See Figure 4).

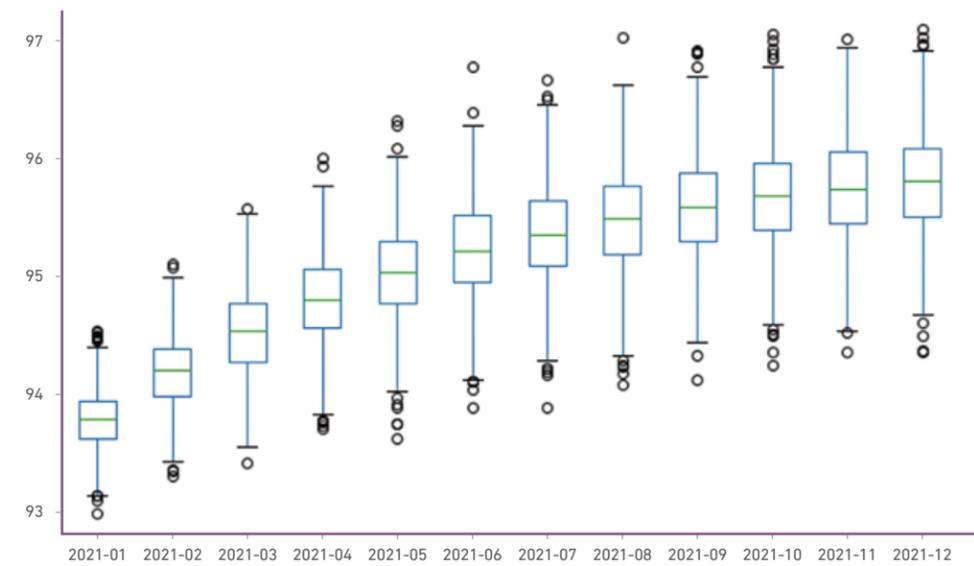


Figure 3: Prediction for the U.S. Employment Rate in 2021

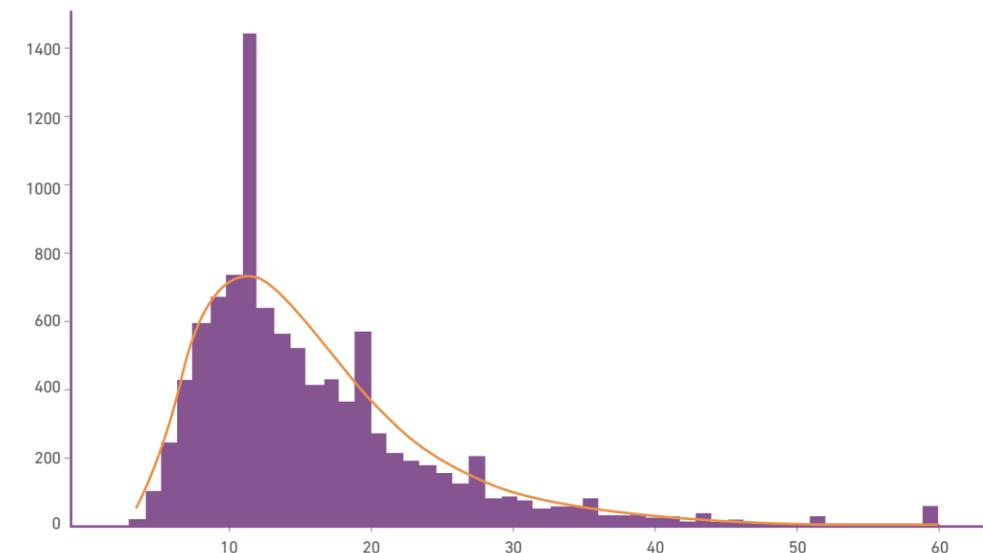


Figure 4: Months for Full Recovery in the U.S. Labor Market

On average, it will take 16 months (from December 2020) for the U.S. labor market to recover to the pre-pandemic level. Compared with the actual data in 2021, model prediction overestimates the employment rate and correspondingly underestimates the recovery time, probably due to the rise of the Delta variant of COVID-19 and the ensuing virus-containing measures.



Shanghai Second-hand Housing price Analysis and Conditional Recommendation

Authors of the paper: Jiaying Liu, Ye Tian

Project Outline:

This project takes an interest in Shanghai second-hand houses. It creates an interactive map that allows the user to see the average housing price in any given district. It analyzes and uncovers the most important determinants of housing prices. Finally, an interactive user interface is created to let a potential buyer browse for houses with desired characteristics.

Project Contents:

We use Python libraries to crawl, clean, visualize target data, and finish the related linear regression. We also make a tiny interaction to recommend houses that meet certain requirements. Specifically, this research is divided into the following four parts:

- Part 1: Data Ingestion: Web Crawling; Data Cleaning.
- Part 2: Data Visualization: Descriptive Statistics; District Distribution; Correlation Exploration.
- Part 3: Model Analysis: Linear Regression; Quadratic Programming.
- Part 4: Conditional Recommendations.

Project Outputs:

1. Visualization of Shanghai Housing Price

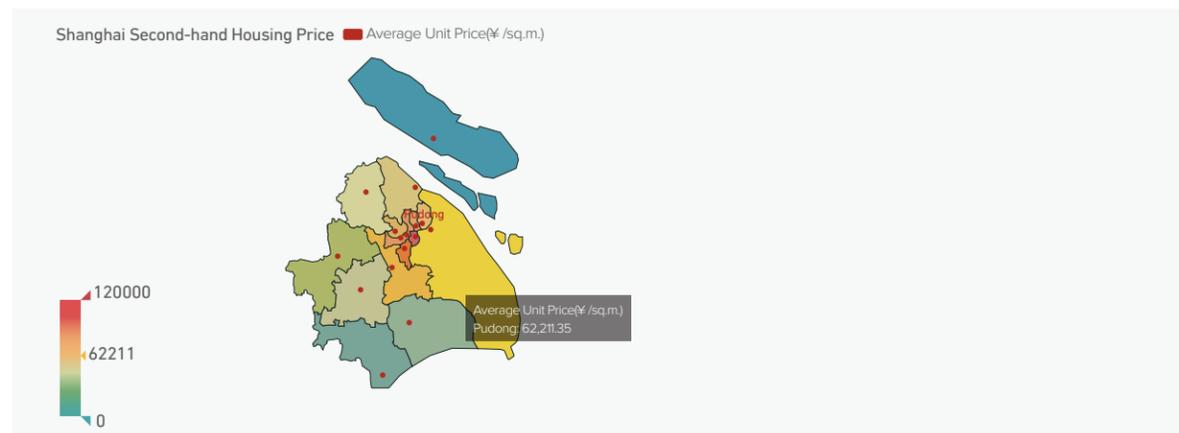


Figure 1: Price map (when mouse cursor is over one district, price will show in black box)

- Second-hand houses in the Huangpu District are the most expensive, and those in the Xuhui District are the second-most expensive.
- Second-hand houses in northeastern Shanghai are generally more expensive than those in southwest Shanghai.

2. What are the most important determinants of housing price?

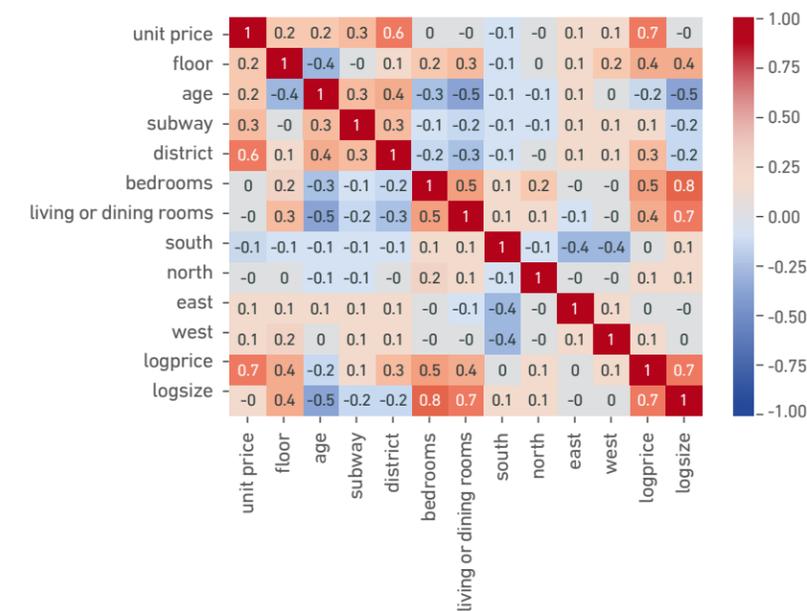


Figure 2: Heat map (demonstrates correlations among entries of the matrix)

- Unit price of a second-hand house is mainly influenced by district and whether it is in close proximity to subway stations. Districts differences have the biggest impact.
- Total price of a second-hand house is determined by house size, number of house floors and district. House size has the biggest impact.

3. Interactive House Hunting!

```

Please input the acceptable price range(0.000 RMB) lowest price:300
Please input the acceptable price range(0.000 RMB) highest price:600
Please input preferred district, e.g.Pudong:Minhang
Please input Yes or No for subway:Yes
The result list is as follow:
    
```

	address	total price	unit price	floor	age	size	subway	district	bedrooms	living or dining rooms	south	north	east	west
2609	红明一村	300.0000	73153	6	27	41.0100	1	Minhang	1		1	1	0	0
783	嘉丰花苑	300.0000	51520	6	24	58.2300	1	Minhang	1		2	1	0	0
169	虹梅路2666弄	309.0000	61702	6	27	50.0800	1	Minhang	1		1	1	0	0
352	曹郿小区	310.0000	47365	6	26	65.4500	1	Minhang	2		1	1	0	0
2106	虹浦新城南区	310.0000	40628	14	13	75.9300	1	Minhang	2		2	1	0	0
1781	三佳花苑	585.0000	90652	6	27	64.3200	1	Minhang	2		1	1	0	0
687	莲花公寓(闵行)	588.0000	74393	6	23	79.0400	1	Minhang	2		2	1	0	0
428	古龙苑	598.0000	81873	4	22	73.0400	1	Minhang	2		1	1	0	0
2484	平阳二村	599.0000	66615	6	24	89.9200	1	Minhang	3		1	1	1	0
1654	星河景苑	600.0000	46722	8	7	128.4200	1	Minhang	3		2	1	0	0

78 rows x 14 columns

Figure 3: Inputs and outputs of house hunting

- The chart above shows the personalized recommendation for second-hand house selection based on certain price range, certain district and whether it is in close proximity to the subway. The program will return a results list of second-hand houses which match the filters.