

CHINA REPORT

中国报告

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中国顾问理事会撰选

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China Report 中国报告

2017年12月，剑桥大学嘉治商学院中国顾问理事会在中国海南省三亚市举办的“三亚·财经国际论坛”上宣布将于2018年度启动专门针对中国经济发展的年度专题研究报告《中国报告》。

时隔一年，我们将多位理事会成员2018年度研究成果及主要观点汇编成册，作为首期年度中国报告工作呈现给读者。

客观认识中国，世界与中国有着一致的需求。

今天的中国，已经成为世界第二大经济体，在工业化进程、国际贸易、外汇储备等多个领域已雄踞世界之首。中国经济已经逐步成为全球经济发展的主要引擎和稳定器，中国对世界经济增长及发展模式正在发挥日益重要的影响。

即将过去的2018年，又一次见证并经历了世界经济的动荡和多变。由中美贸易摩擦为主导的世界贸易体系的演化极大地影响了全球经济的进程。面对未来多发的不确定性所引发的忧虑成为主流舆情，凸显了世界及中国自身对中国在国际经济中的真实地位及作用都缺乏全面、客观的认识。

中国以外的世界需要了解和认识中国，了解和熟悉这一世界最大的工业国和世界最大的消费市场，以便客观判断中国经济未来发展及其对世界经济的影响趋势，把握和顺应世界经济格局和治理模式的变化。处于扩大开放、改革发展进程中的中国也需要客观认识自身，除了客观认识自身的发展及优势，更需要全面了解和诠释世界眼中的中国，以期深度融入世界经济体系。

全面理解中国，是当今世界的共同难题。

始于上个世纪的中国的改革开放，中国真正开始进入世界经济格局只有短短的四十年。必须承认，中国经济发展的速度之快，中国在市场经济构建的力度之大是人们始料未及的。其结果就必然对中国这一庞然大物缺乏全面客观的认识。一方面，关于中国经济全面、系统而客观的信息相对缺乏；另一方面，部分明显偏颇的观点又频繁干扰着视听，片面甚至错误的观点比比皆是。

实际上，中国的政府、学术界、企业界以及国民对自身的客观认识也存在着偏差。纵观2018年世界经济中涉及中国的几大风波，其中的快速演变及转化凸显了对世界经济分工大格局背景下中国现状及地位的片面及非理性的曲解。

全面客观地认识及理解中国在国际经济格局中的地位与作用有着诸多困难。这些困难的内在原因，根源于中国的及现实的复杂性。独特的东方文化，区域发展的不平衡以及复杂而快速变化的社会阶层使得海外观察者、乃至中国国内学者往往难以全面、客观把握。

另一方面，随着中国经济和世界经济相互融合程度的不断提升，中国经济与世界经济形势的相互渗透和影响正在变得越来越明显。缺乏国际视角，囿于国际经济格局，忽视中国经济与世界经济的互动影响，已经成为中国国内众多学者的硬伤。

深度解读中国，我们提供独特的视角。

我们相信，中国全面融入世界经济，虽有波折，但大势所趋不可逆转。在这一过程中，客观认识、全面理解及深度解读中国尤其是中国经济，对于世界，对于中国，都将是至关重要的。剑桥大学嘉治商学院中国顾问理事会作为全新模式的中外联合智库平台，有责任也有能力为此做出应有的努力和贡献。

作为世界顶级商学院与中国顶级财经媒体发起的智库平台，我们有着根植于学界与媒体基因的独立态度；以中外融合、兼容并蓄为主旨，我们会以多元文化与经济背景思想碰撞后的独特角度，提供雄厚学术积淀和管理经验支持的独到观点。

我们深知我们所担负的职责和使命。在未来的 2019 年以及今后的若干年中，我们将继续努力，不负众望，汇集更多的顾问理事及其他社会贤达的精辟见解，以更新、更有深度和力度的《中国报告》回馈读者。

剑桥大学嘉治商学院中国顾问理事会

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Content

目录

前言

Preface.....2

Special: 40 Years Anniversary of the Great Reform in China

改革开放四十年

40 Years of China's Reform and Opening Up.....4

王波明,《财经》杂志总编辑

Economy

中国经济: 从追求速度转向追求质量

China's Economy: From Pursuing Speed to Pursuing Quality.....6

宫少林, 招商证券股份有限公司原董事长

Science and Humanity

三种技术的前瞻: 能源, 人工智能以及太空

Prospects for Three Technologies: Energy, AI and Space.....21

Martin Rees 教授、男爵, 英国皇家天文学家、皇家学会原会长、剑桥大学三一学院原院长

Technology and Innovation

5G 将会带来哪些改变?

How 5G Technology Will Change Our Lives and Reshape the World?.....31

王建国, 中国上市公司协会会长、中国移动通信集团公司原董事长

Manufacturing and Industrial Policy

中国智能制造发展的产业创新政策思考

Thoughts on Industrial Innovation Policy of China's Smart Manufacturing.....35

周源, 清华大学公共管理学院副教授、中国工程科技发展研究院助理院长

Wealth and Investment

在世界变局中的中国建立可持续的财富管理产业

Building a Sustainable Wealth management Sector in China in a Changing World.....39

Michael Morley, 德意志银行财富管理英国区首席执行官

Organisation and Ethics

在中国让道德责任融入公司战略: 从台湾信义集团受到的启示

Making an Ethical Strategy Work in China: Sinyi in Taiwan.....47

Christoph Loch 教授, 剑桥大学嘉治商学院院长



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The China Report was originated by the Cambridge Judge Business School China Advisory Council for its members to record and share their ideas. We are delighted, therefore, to launch the first issue on the 4th Anniversary of the Advisory Council with SEEC Group in Sanya as promised last year.

While global financial markets in 2018 have suffered one of their toughest years since the Financial Crisis, China faces unique opportunities and challenges as it passes the 40-year-anniversary of the Great Economic Reform. Although we now see slower growth, China has grown to be the second largest economy in the world, lifting 400 million people out of poverty. It is now poised to realise what we now call the 'China Dream'. Moreover, as China increasingly falls under the spotlight in the west, more and more Chinese are keen to diversify globally and participate more with western allies when investing accumulated wealth.

In the western world where we suffer information overload, terms such as Brexit, Trump, market volatility and populism are omnipresent. These terms are hitting you through social media before one even starts the day. A Cambridge graduate, Francis Bacon once said 'Knowledge is Power'. But, even knowing this, turning information into knowledge is ever more challenging nowadays. It's a truism that holds with respect to China, especially at this stage in its development. We hope The China Report and the Advisory Council's other activities help develop truly powerful knowledge about China and its interaction with the west. By looking through a lens from both sides, we firmly believe we are off to a good start.

What makes The China Report unique? As one would imagine, when you type in 'china report' into a search engine, you can find endless academic reports, news and commentary. It is rare, however, to have a publication with front-line practitioners, academics and scientists sharing their views on China in their own words, drawing from direct experience.

Our aim is to stimulate further debate and discussions from heads to heads, hearts to hearts and guts to guts. It sets to offer different perspectives, to test insights and to challenge ideas you may have heard or read elsewhere. From West to East, as well as East to West, we would like to be a leading forum for debate on current policy, economics and society.

In the first issue, we started with a special piece to celebrate the 40 years anniversary of the Chinese reform (1978-2018) written by one of the founding fathers of the China's securities market, followed by five areas that concerns us the most: Economy, Science and Humanity, Technology and Innovation, Manufacturing and Industrial Policy, Wealth and

Investment, Organisations and Ethics. Contributors use their own language without interpretation, providing you with their unique perspectives and latest observations on what they think matters most. These reports are just long enough to preserve the nuance of their thinking and aim to take you through their thought process beyond the conclusions.

It is an ambitious start but to fulfil that ambition the Advisory Council will welcome comments and external contributions for future editions. In future, for example, we will have a series of key individuals of the China's Reform discussing their experiences. By looking back at their life stories, foresights and understanding the origin of a major world market/society, we hope this might inspire you to better participate in its future endeavour.

In time, we would like to track the evolution of our views and ideas. We hope you find our first issue informative and that it helps you to form your own vision for China as well as ask critical questions. It would also be a real shame if these reports were only be downloaded, printed and read, we also seek opportunities to further engage in China as well as reach more people around the world who are interested in its development. It is our hope to form a consortium of interested companies/individuals that would like to explore these ideas together more that will provide a platform for additional educational, networking and collaboration opportunities together. The future is yet in your power.

Thank you for your attention.

On behalf of the Cambridge Judge China Advisory Council,



Xiyang Daniel He
Fellow, Cambridge Judge Business School
Secretary-General, China Advisory Council
剑桥大学嘉治商学院 院士
中国顾问理事会秘书长

改革开放四十年

40 Years of China's Reform and Opening Up

Professor Wang Boming (Tsinghua), Member of Cambridge Judge Business School China Advisory Council



Wang Boming
Editor-in-Chief
CAIJING Magazine

王波明 教授

总编辑

财经《杂志》

中国从 1978 年十一届三中全会开始走上改革开放之路，到今天，改革开放给中国带来了天翻地覆的变化。这种变化在中国四千年历史上是绝无仅有的，在世界历史上也是罕见的。从 1978 年到 2017 年的大约 40 年间，中国的 GDP 增长了 225 倍，人均 GDP 增长了 155 倍，中国贸易总额增长了 783 倍；而中国的外汇储备增长了 18800 倍，外汇储备最高的 2014 年曾经相当于 1978 年的 23000 倍。

我作为一个过来人，亲身经历过改革开放前的日子。我经历过改革开放前每月 30 块钱的工资收入，经历过每月只能吃二两肉的票证时代，经历过一年只能买一身衣服的紧缺生活。在改革开放初期，9 亿多人口经常连饭都吃不饱，经济处在崩溃的边缘。这种经历和改革开放后今天的生活有着巨大的反差。这也促使我经常在想：究竟是什么东西，在这四十年里驱动了这样一种翻天覆地的变化，并释放出这么大的发展动力？

反复思考后我觉得这得归功于邓小平先生的“两论”，一个是“摸着石头过河”的“摸论”；一个是“不管黑猫白猫，抓着老鼠就是好猫”的“猫论”。不管这“两论”看起来有多么简单，但在整个改革开放的第一个 10 年起到了决定性的作用，使中国改革能够破冰而出。人们在今天根本想不到，从计划经济体制浓郁的意识形态社会中搞改革有太多难以想象的阻力，甚至连方向在哪这样的问题都不清楚。但当时有一点是清楚的，就是计划经济体制肯定是行不通的，这种体制肯定是不会给中国人民带来福祉的。

“两论”使得前十年的改革在方向上得以进行大胆的探索。当时全国都是计划经济、国有体制，甚至连公司都没有，能够依据“摸论”和“猫论”进行探索是很了不起的事情。

八十年代初全国人民吃不饱饭，所以改革开放的第一件事就从农村“包产到户”开始做起。“包产到户”极大地释放了农民的积极性。结果就因为这么看似简单的一个改革措施，在短短五年的时间里，就使得中国的粮食连年增产超过 20%，且 5 年内总产量增加 1 亿吨。到了 1983 年基本解决人们的温饱问题。

吃饱饭了，还要怎么解决经济发展问题？为此先后通过出台了在深圳搞经济特区、国企改革、允许私营企业发展等一系列举措。短短十多年时间里，中国开始想清楚了要走一条市场经济的发展之路。“两论”在改革前 10 年所指导的实践，让人们彻底认清了市场经济方向。

1992 年中国召开“十四大”，明确了要建立社会主义市场经济体制。一旦这一体制方向确立，很多成建制的改革就开始出台。从资本市场建立

到金融体制改革，从国有企业“抓大放小”到民营企业突飞猛进，从以前的央行领导下的专业银行制度转变为商业银行体系，从打破国企垄断到房地产市场改革，从开放企业经贸权到加入 WTO，再到人民币汇率机制并轨，基本奠定形成了今天中国的市场经济格局。

现在回过头来看，中国的改革过程和发展路径中，这四十年到底做对了什么？在我看来就三件事：

第一件事就是改变了计划经济体制下的激励机制；

第二件事是启动了中国有史以来最大规模的对外开放政策；

第三件事是在整体上走上了市场经济的道路。

这三点释放出中国 13 亿人巨大的发展动力。使得中国能够在短短四十年的弹指一挥间，取得了四千年历史上最伟大的高速发展成就。这都是遵循了这几条原则的成果。未来中国，如果还要维持这种奇迹般的发展，那还是离不开这三条原则。如果违反了三条原则，不改变激励机制，不进一步开放，不去深化市场经济体制，那么中国的发展就将难以得到持续。

中国经济：从追求速度转向追求质量

China's Economy: From Pursuing Speed to Pursuing Quality

Dr Gong Shaolin, Fellow of Cambridge Judge Business School and Member of China Advisory Council

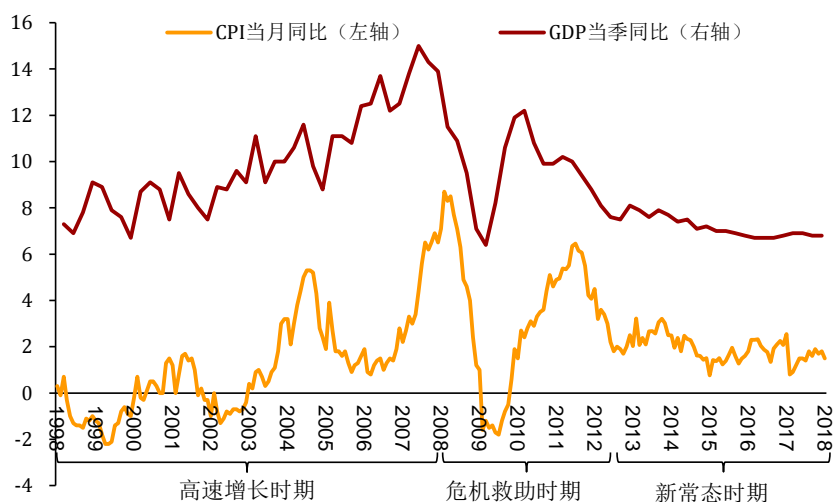


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中国经济增长的可持续性、中国的债务风险问题，是全球投资者关于中国最关心的两项问题。今天的报告，就是向大家介绍中国政府对这两个问题的回答和应对。

1. 宏观背景



中国经济在 2001 年加入 WTO 之后进入了高速增长时期，经济增长率从 2001 年的 8.3% 持续上升至 2007 年的 14.2%。而驱动经济高速增长的动力主要有两项，一是投资驱动。在 GDP 增速竞赛的助推之下，地方政府和国企成为投资的主力，基础设施、重工业、房地产成为投资的主要方向，这是中国经济中仍具有计划色彩的一部分。二是出口导向。沿海城市依靠区位优势和劳动力成本优势承接国外产能的转入，进而依靠价格优势去参与全球市场竞争，获得了巨额的贸易顺差，这是中国经济中相对更自由的一部分。在这一过程中，虽然需求结构、产业结构、区域结构都出现了失衡，但这些结构性矛盾都被宏观经济的高速增长所掩盖，也没有形成系统性的风险。

2008 年全球金融危机爆发之后，中国经济尤其是外向型部门受到很大冲击。面对经济下行压力，中国政府在 2008 至 2010 年出台了大规模的经济刺激计划。现在来看这一刺激计划虽然起到了短期稳增长的作用，但却加剧了长期的结构性矛盾。首先，大量资金投向了交通、水利、电力和农村基础设施，灾后恢复重建以及保障性住房建设，引发了上游能源和原材料行业投资过度，形成了大量过剩产能。其次，激增的社会融资需求不但推高了非金融部门的杠杆率，而且激励了监管规避型的金融创新，进而推高了金融体系内部的杠杆率。

2012 年，随着刺激政策的退出，中国经济增长降至 8% 以下，并呈现出长期下行态势。此时结构性过剩、杠杆率高企的问题开始凸显，并且有演化成系统性风险的可能。面对这一形势，经过渐进的认知过程和不断的探索实践，中国政府在 2015 年 11 月提出了“供给侧结构性改革”的政策理念，并于 2016 年初开始实施去产能、去库存、去杠杆、降成本、补短板五项重点工作。经过两年多时间的实践，这一揽子改革方案对中国宏观经济甚至是全球经济运行都产生了深刻的影响，特别是去产能和去杠杆两项工作，更是显著改变了工业生产的格局与工业企业的盈利状况，以及金融市场的表现和金融机构的行为。

2. 去产能

首先我们来看去产能的政策进展、实际效果、及其存在问题的反思。

a. 政策进展



资料来源：Wind

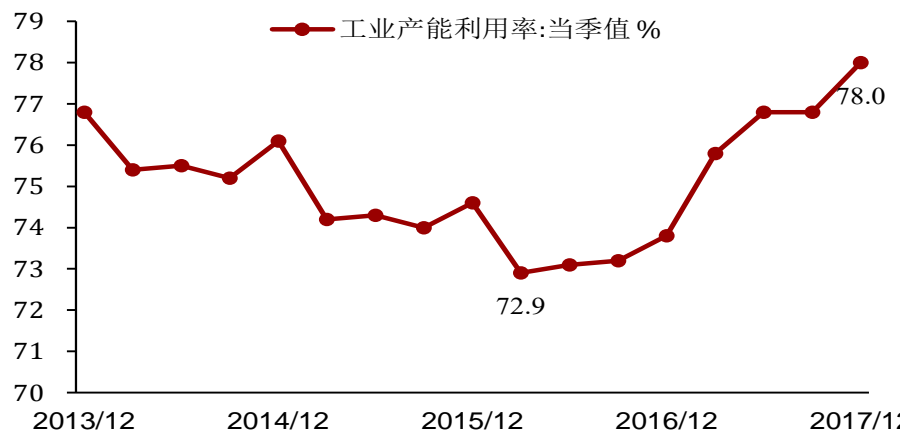
GDP 目标竞赛模式下的投资冲动，以及金融危机后的大规模刺激政策，共同导致了我国钢铁、煤炭等行业的产能过剩。我们可以看到，中国的投资率在 2001 年之前约为 33%，金融危机之前则上升到了 40% 以上，而 2009 年刺激计划实施之后进一步上升升至 45% 以上。而发达经济体则常年保持在 20% 左右，金融危机之后也没有出现逆周期的投资行为。

由于钢铁、煤炭行业的产能过剩最为突出，2016 年 2 月，国务院先后出台钢铁、煤炭两个行业化解过剩产能实现脱困发展的意见，提出从 2016 年开始，用 3 至 5 年的时间，退出煤炭产能 5 亿吨左右、减量重组 5 亿吨左右；用 5 年时间压减粗钢产能 1 亿至 1.5 亿吨。截止 2018 年 3 月：根据《2018 国务院政府工作报告》，过去五年来，退出钢铁产能 1.7 亿吨以上、煤炭产能 8 亿吨，安置分流职工 110 多万人。

b. 实际效果

首先我们可以看到，去产能实施之后全国工业产能利用率反弹上升，其中钢铁、煤炭行业最为显著，例如 2017 年全国工业产能利用率比上年提高 3.7 个百分点，其中煤炭采选业比上年提高 8.7 个百分点；黑色金属冶炼加工业提高 4.1 个百分点。

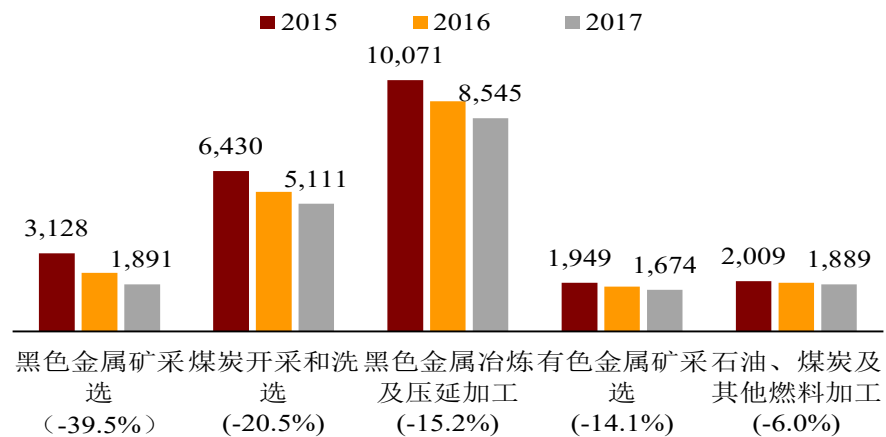
过剩产能出清：产能利用率的提高



资料来源：Wind

其次可以发现，随着过剩产能的关闭，去产能行业的行业集中度出现了上升，主要表现为行业内企业数量的减少。可以看到，从2015年到2017年，中国规模以上工业企业总数量从37.4万个增长到38.5万个，但钢铁、煤炭等5个行业的企业数量却出现了明显的减少。

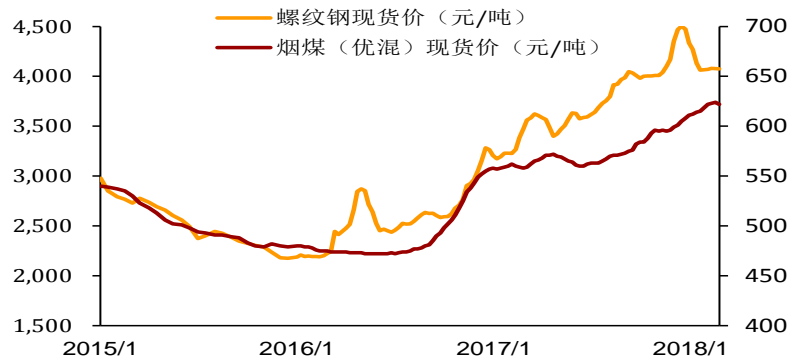
行业集中度：行业内企业数量的下降



资料来源：Wind

随着行业集中度的提升，行业供过于求的局面开始得到改善，企业的定价权也得到了强化，这使得工业品价格开始反弹上行。从2016年初至今，中国钢价的涨幅超过了85%，煤价的涨幅超过了30%，这也带动PPI增速由负转正，改变了工业生产中的通缩局面。

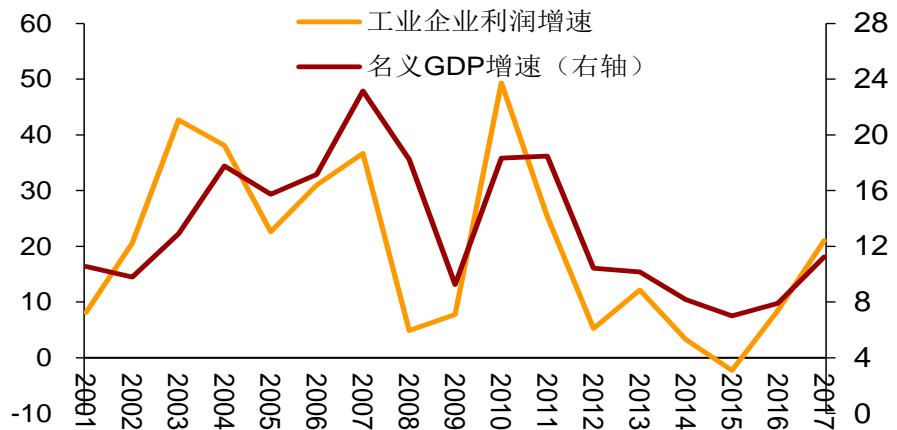
钢材、煤炭价格的回升



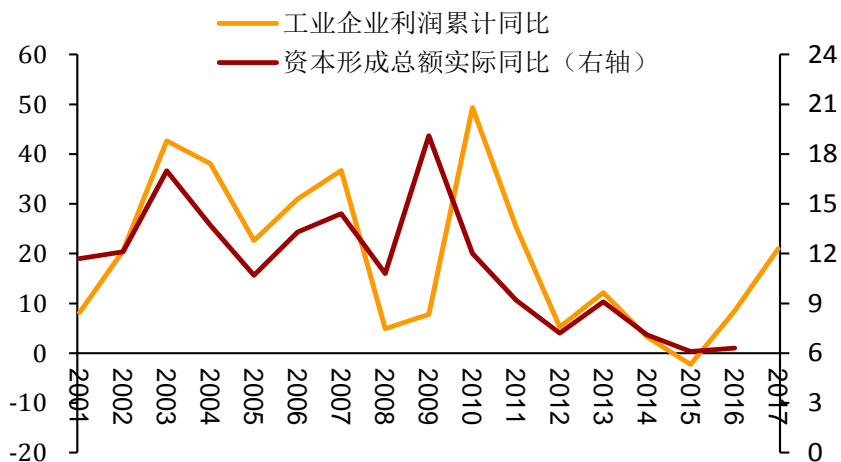
● 2016年初至今，钢价涨幅超过85%，煤价涨幅超过
资料来源：Wind

去产能的最终效果，体现为工业企业盈利的改善。可以看到，中国规模以上工业企业利润增速从2015年的-2.3%由负转正为2016年的8.5%，2017年进一步上升至21.0%。企业盈利的改善也带动了经济景气的上行，中国的名义经济增速也从2015年的7.0%升至2017年的11.2%。企业盈利改善，经济景气上升，这还有助于引致总需求的进一步增长，推动经济运行进入良性循环。

工业企业盈利改善，经济景气回升



企业盈利改善可能带动投资增长



资料来源：Wind

总之，去产能政策充分展现了一起“过剩产能去化——行业集中度提升——工业品价格上升——企业盈利改善”的逻辑。而这个逻辑，英国伟大的经济学家亚当斯密在《国富论》中早就有论述：“垄断者，通过经常保持市场存货的不足，以远远高于正常的价格出售他们的产品，从而无论在工资还是在利润方面都提高他们的报酬。”

c. 存在问题

虽然企业整体盈利改善，经济总体向好。但问题在于，去产能提高了钢铁、煤炭等上游行业的垄断性，使其通过价格的上涨实现了利润的成倍增长，这其实在一定程度上会挤占下游的利润。

去产能的反思（一）：上游垄断性提升，挤占下游利润

企业利润增速 (按行业分类)	2015全年	2016全年	2017年全年
工业整体	-2.3%	8.5%	21.0%
其中：采矿业	-58.2%	-27.5%	216.6%
其中：煤炭开采和洗选业	-65.0%	223.6%	290.5%
其中：制造业	2.8%	12.3%	18.2%
其中：黑色金属冶炼及压延加工业	-67.9%	232.3%	177.8%

而且，虽然去产能遵循了明确的技术标准，比如产成品质量、污染程度等，但由于钢铁、煤炭行业中国企业更为集中，因此在去产能的过程中收益最为明显的是国有及国有控股企业。

去产能的反思（二）：国进民退

企业利润增速 (按所有制分类)	2015全年	2016全年	2017年全年
工业整体	-2.3%	8.5%	21.0%
其中：国有及国有控股	-21.9%	6.7%	45.0%
：外商及港澳台商	-1.5%	12.1%	15.8%
：集体所有制企业	-2.7%	-4.2%	-8.5%
：私营企业	3.7%	4.8%	11.7%
：股份制企业	-1.7%	8.3%	23.5%

这两个问题，确实是需要我们反思的地方。虽然去产能政策提升了全社会的工业生产效率，但它也具有显著的利益分配效应。

3. 去杠杆（非金融部门）

去杠杆和去产能是紧密相关的。在宏观视角上，二者都成型于投资驱动型的增长模式，也同时得到了金融危机之后大规模刺激政策的强化，只是一个在实体层面，一个在金融层面。在微观视角上，资产负债率更高的企业也集中在产能过剩行业之中，我们可以看到钢铁、煤炭行业的资产负债率要远远高于工业整体。最后从去杠杆的途径来看，除了控制信贷的增长之外，去产能带来的企业盈利改善，也能为杠杆率的降低提供必要的条件。

我们知道杠杆可分为非金融部门杠杆和金融内部杠杆两部分，非金融部门杠杆又包括非金融企业、家庭与相关非营利机构、政府三类主体的杠杆率。下面我们首先介绍非金融部门，或者叫实体部门的杠杆率。

非金融部门的杠杆率一般采用BIS的定义和数据，其中杠杆率定义为未偿还信贷余额占名义GDP的比重。信贷的提供者包括国内银行、国内其他部门、国外主体三类，信贷工具则包括贷款、债券、M2等核心债务工具。

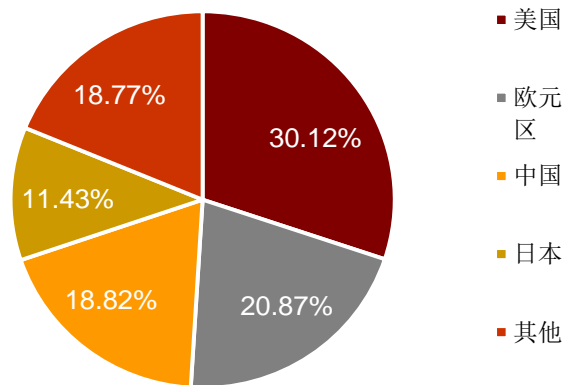
对于非金融杠杆的总体运行规律，英国金融局原主席特纳勋爵（Adair Turner）在《债务与魔鬼》（2015）一书中总结为：债务很难消除，更多只是转移。转移的途径一是国际转移，二是经济体内部的跨部门转移。我们也将下面的分析中观察到这一运行规律。

就全球整体而言，我们发现G20整体的非金融部门杠杆率在2009年、2016年都出现了中枢的跃升，幅度大约都是16个百分点。其中美国、欧元区、中国、日本的债务规模位居前四，合计占据G20债务总量的81.2%。第五名英国的占比为4.6%。

G20 非金融部门总杠杆率“上台阶”



2017Q2, 各国占 G20 整体信贷余额之比



这说明中国的加杠杆并不是独立的，而是有全球性的因素在起作用。根据杠杆率=信贷存量/名义 GDP 这一公式可以分解为两部分，一是金融危机之后，发达经济体普遍实施了超常规的宽松货币政策，这会提高分子的取值；二是危机后期全球经济复苏缓慢，这又会通过分母效应推升杠杆率。更进一步，我们可以认为全球杠杆率居高不下的核心因素在于，全球经济增长尚未摆脱对债务的依赖。

中国的杠杆率的运行规律也是一样的，只是走势更为陡峭。我们看到金融危机之后中国非金融部门杠杆率已经从 2008Q4 的 141.3% 持续上升至 2017Q2 的 255.9%，先后实现了对 G20、美国的赶超。不过好消息在于，2017Q2 的最新数据显示，中国的去杠杆政策取得初步效果，中国非金融部门杠杆率首次环比不增。

同样，我们根据杠杆率=信贷存量/名义 GDP 这一公式来分解杠杆率的成因。可以看到，虽然金融危机之前中国经济也是高度依赖投资与信贷，但信贷与经济是同时高速增长的，因此杠杆率并未上升；但金融危机之后：信贷

余额的增速下降较慢而名义经济增速的下降较快，这就导致了杠杆率的持续上升。

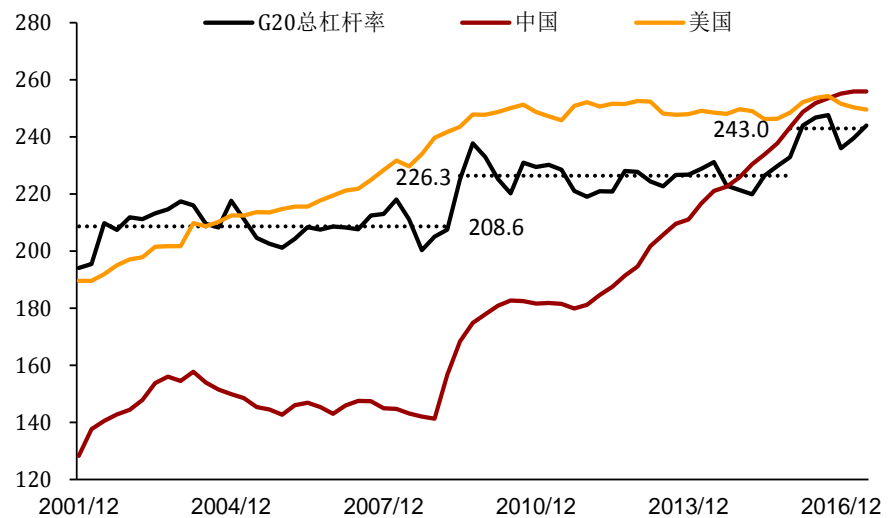
我们特别观察一下 2002、2007、2012、2017 这 4 个关键时点，会更清晰地发现分子与分母对杠杆率的作用。其实这 4 个时点把过去的十五年分成了三个时间段，每段 5 年：

在 2002 年至 2007 年：中国现价 GDP 从 12 万亿增长到 27 万亿，增长 2.2 倍；信贷存量从 17.6 万亿增长到 39 万亿，增长 2.2 倍，因此杠杆率没有变化。

但 2007 年至 2012 年：现价 GDP 从 27 万亿增长到 54 万亿，增长 2.0 倍，年均增速比之前五年有所下降；而信贷存量从 39 万亿增长到了 105 万亿，增长 2.7 倍，比之前五年加速了，因而杠杆率从 145% 升至 195%。

最近这五年，现价 GDP 从 2012 年的 54 万亿增长到了 2017 年的 83 万亿，增长 1.5 倍；年均增速进一步下降；但同期信贷存量从 105 万亿增长到了 201 万亿，增长近 2.0 倍。其实这五年信贷增速比前两个五年都要慢一些，但由于名义经济增速更慢了，导致杠杆率从 195% 升至 257%。

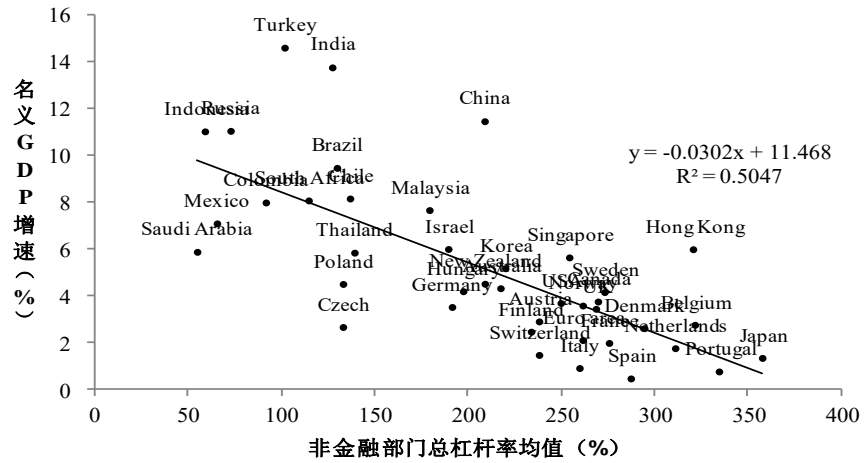
中国非金融部门杠杆率的长期走势



高杠杆率会带来哪些风险呢？理论上有两个方面，一是抑制潜在经济增长，二是增加危机爆发的隐患。

首先我们看到，金融危机之后，世界主要经济体的实体杠杆率与其名义经济增速是负相关的。具体实现机制是 1932 年欧文·费雪所提出的“债务—通缩”理论，即偿债压力过度，债务人会缩减开支、低价出售产品与资产，甚至破产，债权人会降低信贷供应，这会导致信贷收缩、支出下降、通胀收缩。

实体杠杆率过高的风险：抑制经济潜在增长率



其次，无论是 2008 年美国次贷危机，还是紧随其后的欧元区主权债务危机，其背后都有高杠杆的因素，区别仅仅在于加杠杆的主力部门不同。前者主要因为居民部门的住房信贷及其资产证券化导致了资产价格泡沫，后者则是危机后政府杠杆率激增的结果。

实体杠杆率过高的风险：增加危机爆发的隐患 (Vulnerability to Crisis)

危机	加杠杆机制	高杠杆部门
美国次贷危机	(1) 居民部门加杠杆购置房地产等存量资产，形成信贷规模与资产价格的上升循环。 (2) 金融体系内资产证券化等工具创新等进一步强化了这一循环。	居民部门
欧元区主权债务危机	(1) 经济增速下行导致财政收入下降，但以福利支出为主的财政支出是刚性的，导致财政赤字连年超过上限。 (2) 经济低迷迫使宏观经济政策趋于扩张，进一步加剧了政府杠杆率的提升。	政府部门

当前中国也面临杠杆率高企的问题，中国也会出现债务危机吗？我们认为中国的实体杠杆存在一些特殊性，使得系统性风险爆发的可能性较低：

一是中国仍然拥有不小的增长空间：而经济增长是化解债务问题最好的办法。目前的中国同日本 90 年代相比，增长空间是截然不同的。

二是中国总储蓄率较高：能在一定程度上缓冲债务危机的爆发。

三是中国借债主体是国有企业和地方政府：中国政府可以通过国企债转股、地方债置换等方式腾挪债务，避免债务问题的集中爆发。

中国外债占比较低：还拥有每年 4000 亿美元的货物贸易顺差和高达 3 万亿美元的外汇储备，而且资本管制相对有效，出现国际收支危机的可能性很小。

但即便如此，中国也需要严格控制各个部门的杠杆率，防止局部风险发展成系统性风险。

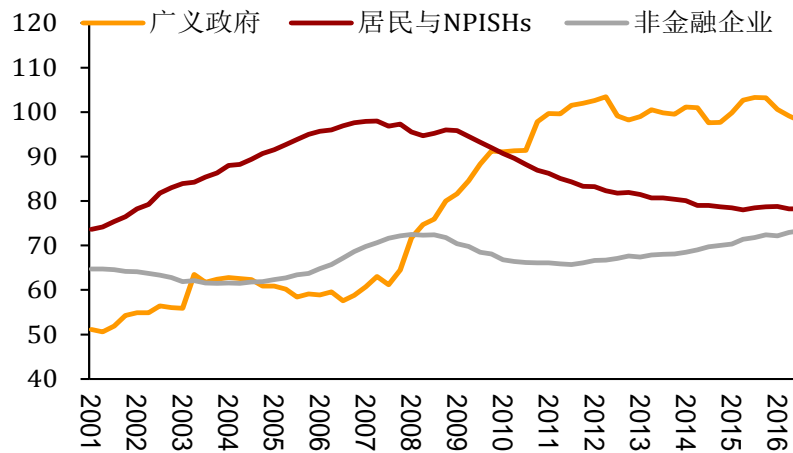
从杠杆率的部门结构来看，中国与美国等发达经济体存在明显差异。美国等发达经济体普遍呈现出危机之前居民部门加杠杆，危机之后政府部门加杠杆的特征。而中国杠杆率的部门结构变化如下：

(1) 非金融企业是金融危机后中国加杠杆的主力，但已经得到初步控制：企业杠杆率于 2016Q2 达到峰值 166.8%，之后开始下降，2017Q2 降至 163.4%。

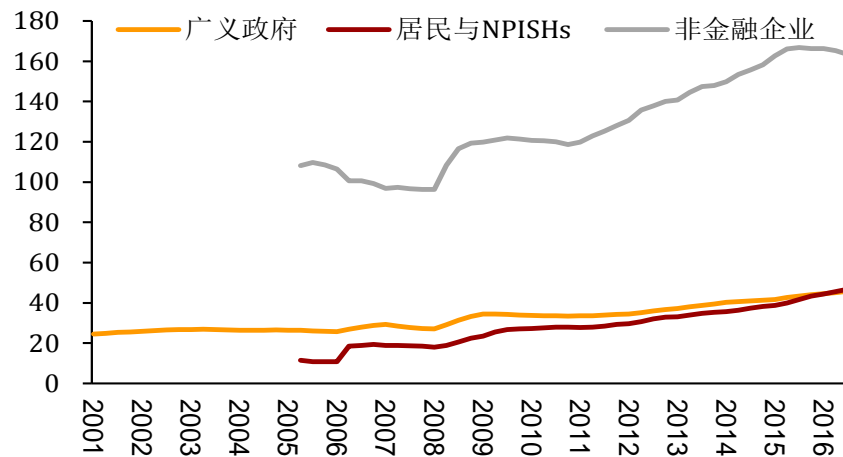
(2) 居民部门成为加杠杆的主力：中国居民与 NPISHs 部门已于 2016Q4 成为加杠杆的主力，虽然总体水平仍然不高，但需要予以关注。

(3) 政府平稳加杠杆：本轮政府加杠杆始于 2013 年，平均每年加杠杆 2.5 个百分点。

美国分部门杠杆率



中国分部门杠杆率



那么如何才能实现实体经济的去杠杆呢？

总体而言，实体经济去杠杆并不简单等于压缩信贷，因为压缩信贷可能导致总需求的收缩和GDP的下降，进而通过分母推高杠杆率。所以去杠杆的关键在于降低经济增长对债务的依赖。

非金融企业：提高企业直接融资比例。强化投资主体的预算约束，提升投资效率。转变投资驱动型经济增长模式，实现内生增长。促进过剩产能出清，提升企业盈利。

居民与相关非盈利组织：私人部门的信贷扩张与房地产等存量资产的价格上涨密不可分。因此有必要参考德国模式，建立住房信贷、房地产市场双层次的防控机制。

广义政府机构：平常时期通过转变政府角色保持财政平衡，留出危机时的政策空间；危机时期的托底政策应以效率为核心，及时安排退出计划，避免产生债务依赖。

4. 去杠杆（金融内部）

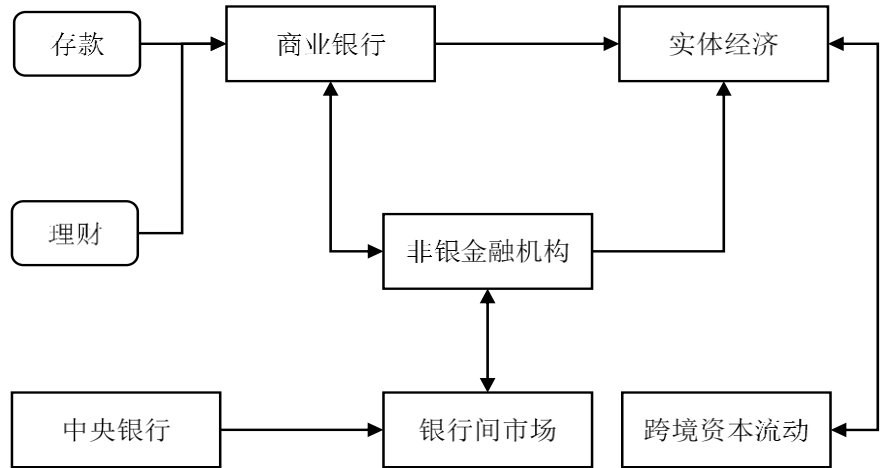
介绍了实体部门的杠杆率之后，下面我们来关注金融体系的杠杆率。主要介绍金融加杠杆的两个阶段和金融去杠杆的两种方法。

其实，实体杠杆率和金融杠杆率紧密相关，但却并不一致。

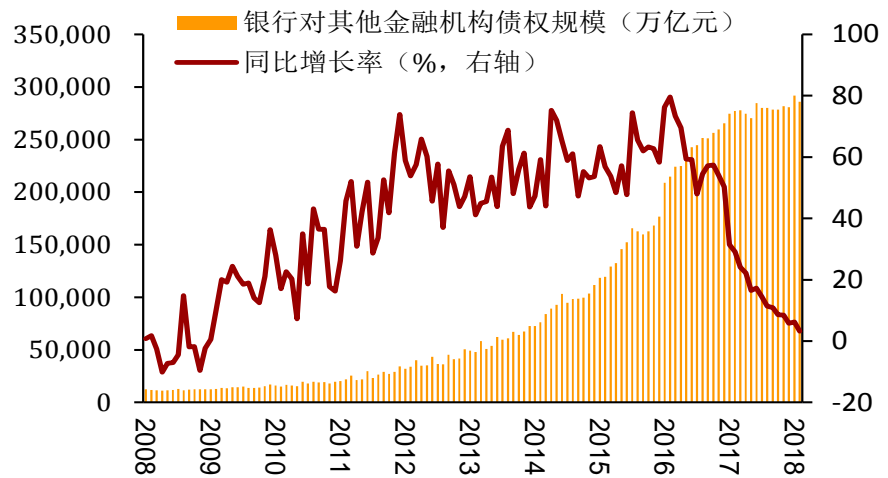
二者之间的相关性在于产生的背景是一致的。金融危机之后的大规模刺激政策，一方面在实体经济中产生了巨量的融资需求，这是实体部门加杠杆的动力所在。另一方面，由于中国的社会融资中超过70%来自银行贷款，而银行贷款又面临着投向和规模的限制，面对激增的融资需求，银行会怎么做呢？

在资产端，银行需要通过非银金融机构作为通道来绕开监管，这使得银行对其他金融机构的债权出现显著的上升。

资金流动路线上环节的增加



银行对其他金融机构债权的持续上升



在负债端，银行需要开拓存款之外的资金来源：主要包括两种方式，一是在银行间市场中发行同业存单，二是表外理财产品。

同业存单



理财产品



银行开展的这些监管规避型的金融创新，使得宽松货币政策释放的资金在流向实体经济的路线上首先进入了金融体系的空转，因此就难以实现降低企业融资成本的本来目的。除此之外，金融内部杠杆也是系统性风险的源头之一。

那么应该如何控制金融内部杠杆，化解金融风险呢？目前看是对应于货币政策和宏观审慎的双支柱调控框架：

一方面，保持货币政策稳健中性，提升资金链条成本。具体而言，2016年下半年以来，央行开始通过拉长资金期限的方式调控市场利率水平，挤压期限错配及杠杆水平。2017年，央行提高货币政策操作利率，引导市场利率进一步提升。

另一方面，实施宏观审慎考核，强化金融机构监管。具体而言，2016年央行开始试行宏观审慎考核，年底将表外理财纳入广义信贷考核。2017年监管风暴开启。2017年11月资管新规征求意见稿发布。

展望未来，如果从目前的政策定位来看，防控金融风险是未来三年的核心政策目标之一，因此金融监管工作将进一步常态化、制度化、系统化。毕竟，回归本源、服务实体才是金融改革最终的目的。

5. 中美贸易战

在当今的全球格局下，中美两个大国的关系似乎在发生微妙的变化。美国总统特朗普主动发起针对中国的贸易战，对于中国经济和去杠杆、去产能的外部环境、乃至全球经济都会产生影响。

本次美国以中美贸易逆差、中国知识产权问题、不公平贸易等发起贸易战。然而美国贸易逆差背后有极为深远的原因：

第一，从国际收支来看，美国贸易逆差产生的根本原因是美国国内的储蓄-投资失衡。美国国民储蓄率较低，不足以为本国的投资提供足够的资金，因而需要从其他国家借入储蓄，从而造成了经常项目逆差。

第二，在当前以美元为主导的全球货币体系下，美国需要通过贸易项下逆差输出美元，而获得美元的国家的投资需求使得美元可以以资本项下顺差的形式回流美国。

第三，具体到中美之间，美国对中国实行高技术产品等出口限制是造成美对华大规模贸易顺差的重要原因。贸易的本质是基于比较优势进行分工，从而提高效率、促进共同发展。美国在高技术产品的生产与出口上占有较大比较优势，但 1949 年以来，美国对华一直实行歧视性出口管制政策，这在相当程度上加剧了美中贸易失衡。

第四，美国的货物贸易逆差呈现顺周期特性，扩大往往反映美国内需上升。

军事（《国防军事战略报告》）、政治（《台湾旅行法》）、经济（贸易保护、限制投资）层面的全面发力指向美国的长期诉求是与中国的“强国竞争”、抑制中国发展。

美国短期诉求是解决知识产权问题、寻求削减中美贸易逆差，特朗普的短期诉求是为共和党在中期选举中争取支持和下届连任总统。因此，特朗普需要为美国争取到经济利益，谈判持续时间不可能太短，“雷声”要大，但不能以明显伤害国内产业和经济为代价，双方终将达成和解。

这需要：美方较大程度削减 600 亿加关税清单、对中国终止/豁免钢铁、铝关税、对中投资限制放宽；中国提出知识产权问题解决方案：对知识产权、技术转让等问题达成双边框架协议以及后续解决具体问题的谈判机制，对中国指向的改变包括：进一步开放美国对中国的投资要求和部分服务市场的准入、改善相关审批机制、接受敏感领域的投资限制、但理应在非敏感领域向美国要求对等的开放。

中美双方的局部政策调整可能带来一些行业结构性影响。缩小中美贸易逆差可能以中国加大进口形式实现，大体思路是支持美国强势产业，而非通过抑制进口来扶植不具备禀赋的弱势产业，并实现对美国消费者伤害最小。其实，从历史来看，美国削减逆差的政策效果往往很微弱。

适当削减农产品、运输设备（汽车）、油气的关税或加大这一领域进口，更符合中美双方利益。

中美双方很难发起激烈的贸易战。美方对机电类产品过于广泛收税不合理，中国是贸易链条的一环，这类政策将伤害所有国家。美方对自身无能力生产、不存在竞争的领域加关税无意义、较大伤害内需；对中国而言同样如此。

美日贸易战的历史经验

80年代美日贸易战升级，1985年美日等五国签署“广场协议”，联手干预外汇市场，同意并主动引导日元升值。美元对日元由1985年的接近250快速升值至1988年的120左右，有效汇率亦快速上升，致使日本制造业出口竞争力大幅下降，当期出口亦受到显著负面影响，贸易顺差下降，经济通胀双双下行。为弥补外需的下滑，日本采取的过度宽松货币政策带来隐患，86-87年日本央行的贴现率从5%大幅下降至2.5%，利率环境宽松，经济受挫使得实体对资金的吸引能力不足，大量资金助推房地产价格、股市上涨，日元大幅升值也吸引了大量海外资本涌入，吹大资产泡沫。

在股票市场与房地产双重泡沫的压力下，日本政府又错误地选择了主动刺破泡沫，并且采取了非常严厉的行政措施，调整了税收和货币政策。从1989年开始连续5次加息，货币供应增速大幅下滑，并对房地产贷款和土地交易采取严厉管制，调整了土地收益税。

房价下跌引起金融系统崩溃叠加日本人口老龄化的长期问题，日本陷入资产负债表衰退和深度通缩，消费下滑、政府在逆周期调控中债台高筑却收效甚微。

日本经验对中国的警示意义

中国与日本具备一些相同点：人口结构突显出老龄化问题，宏观杠杆率显示债务水平较高、出口依存度相对不低。

但是，后金融危机时代的经验也使得中国不会轻易犯日本的错误。中国目前正在处理的去杠杆、去产能问题，本质上也来自金融危机后外需下滑之后的种种应对；当前消费比重的上升、企业盈利的结构性回升、低失业率使得国内经济具备承受一定波动的条件，全球经济基本走出金融危机所对应的外需环境也更积极。接下来，应对全球竞争，着眼于长期的制度红利和技术进步是关键。

三种技术的前瞻：能源，人工智能以及太空

Prospects for Three Technologies: Energy, AI and Space

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These themes are discussed more fully in Martin Rees's book "On the Future: Prospects for Humanity" (published in October 2018 by Princeton University Press). A Chinese translation, published by Shanghai Jiao Tong University Press, will appear in 2019.

It's a privilege to be asked to contribute to this set of articles. I will highlight three interlinked technologies where China already has strength and where there are huge opportunities but also huge challenges: Energy; AI and Robotics; and Space.

1. ENERGY AND CLIMATE

It's now generally accepted that the world's climate will change to a dangerous extent – with the possibility of crossing irreversible 'tipping points' – unless all nations prioritise a shift towards low-carbon methods of generating energy. The pledges made at the 2015 Paris conference, with a commitment to renew and revise them every five years, are a positive step.

Many still hope that our civilisation can segue smoothly towards a low-carbon future. But politicians won't gain much resonance by advocating a bare-bones approach that entails unwelcome lifestyle changes—especially if the benefits are far away and decades into the future. Indeed, it is easier to gain support for adaptation to climate change rather than mitigation because the benefits of the former accrue locally. For instance, the government of Cuba, whose coastal areas are especially vulnerable to hurricanes and a rise in sea level, has formulated a carefully worked-out plan stretching for a century.

Nonetheless, three measures that could mitigate climate change seem politically realistic—indeed, almost 'win-win', especially (I'd venture to suggest) for China.

First, all countries could improve energy efficiency and thereby actually save money. There could be incentives to ensure 'greener' design of buildings. This is not just a matter of improved insulation—it requires re-thinking construction as well. Perhaps greater use of wood, and recycling of un-degraded elements of the structures—steel girders and plastic piping, for instance—when buildings are demolished. Appliances and vehicles could be designed in a more modular way so that they could be readily upgraded by replacing parts rather than by being thrown away.

A second 'win-win' policy would target cuts to methane, black carbon, and CFC emissions. These are subsidiary contributors to greenhouse warming. But unlike CO₂ they cause local pollution too—in Chinese cities, for instance—so there's a local short-term benefit and therefore stronger incentive to reduce them. Electric cars could be encouraged—and could be dominant by 2040. This transition would reduce pollution (and noise) in cities. But its effect on CO₂ levels depends, of course, on where the electricity comes from that charges the batteries.

But the third measure is the most crucial. Nations should expand Research and Development (R&D) into all forms of low-carbon energy generation (renewables, fourth-generation nuclear, fusion, and the rest), and into other technologies where parallel progress is crucial—especially storage and smart grids. In all these areas, China could lead the world – deriving environmental benefit for itself, as well as economic benefit by dominating the international market for zero-carbon energy generators.

The impediment to 'decarbonising' the global economy is that renewable energy (except perhaps for hydro, which of course is important for China) is still not cheap enough to generate. The faster these 'clean' technologies advance, the sooner their prices will fall so they will become affordable to developing countries such as India , where more generating capacity will be needed, where the health of the poor is jeopardized by smoky stoves burning wood or dung, and where there would otherwise be pressure to build coal-fired power stations (burning cheap coal from Australia) .

If the Sun (or wind) is to become the primary source of our energy, there must be some way to store energy, so there's still a supply at night and on cloudy days when the wind doesn't blow. There's already a big investment in improving batteries and scaling them up. Other energy-storage possibilities include thermal storage, capacitors, compressed air, flywheels, molten salt, pumped hydro, and hydrogen. The transition to electric cars has given an impetus to battery technology (the requirements for car batteries are more demanding than for those in households or large 'battery farms', especially in terms of weight).

We'll need high-voltage direct current grids to transmit efficiently over large distances. In the long run these grids should be transcontinental. They should transmit solar energy from North Africa and Spain to the less sunny northern Europe. More important, they should transmit energy East-West across the whole of Eurasia, to smooth peak demand over different time zones. This could surely be a globally-beneficial element of the Belt and Road initiative.

It would be hard to think of a more inspiring challenge for young engineers than devising clean energy systems for the world – and a more important opportunity for Chinese industry since they already have a manufacturing lead in solar energy. China is also actively engaged in researching 4th generation nuclear reactors. Despite the ambivalence about widespread nuclear energy, it's worthwhile to boost R&D into a variety of such concepts, which could prove to be more flexible in size, and safer. The industry, worldwide, has been relatively dormant for the last twenty years, and current designs date back to the 1960s or earlier. In particular, it is worth studying the economics of standardized small modular reactors which could be built in substantial numbers and are small enough to be assembled in a factory before being transported to a final location. Moreover, some designs from the 1960s deserve reconsideration—in particular, the thorium-based reactor, which has the advantage that thorium is more abundant in the Earth's crust than uranium, and also that it produces less hazardous waste.

Attempts to harness nuclear fusion—the process that powers the Sun—have been pursued ever since the 1950s, but the history encompasses receding horizons; commercial fusion power is still at least thirty years away. The challenge is to use magnetic forces to confine gas at a temperature of millions of degrees—as hot as the centre of the Sun—and to devise materials to contain the reactor that can survive prolonged irradiation. Despite its cost, the potential payoff from fusion is so great that it is worth continuing to develop experiments and prototypes. The largest such effort is the International Thermonuclear Experimental Reactor (ITER), in France. But there are now ten other smaller prototypes being built elsewhere in the world – another opportunity for China.

This is the first era in which humanity can affect our planet's entire habitat: the climate, the biosphere, and the supply of natural resources. Changes are happening on a timescale of decades. This is far more rapid than the natural changes that occurred throughout the geological past; on the other hand, it is slow enough to give us, collectively or on a national basis, time to plan a response—to mitigate or adapt to a changing climate and modify lifestyles. Such adjustments are possible in principle—though there is a depressing gap between what is technically desirable and what actually occurs.

2. AI AND ROBOTS

We should be evangelists for new technologies—we owe to them much of what makes our lives better than the lives of earlier generations. It is a technical challenge (as described above) to meet the world's energy needs. Moreover, without technology the world can't provide food, and good health, for an expanding and more demanding population. But we need wisely directed technology. Renewable energy systems, medical

advances, and high-tech food production (artificial meat, and so forth) are wise goals. But advances in some technologies can happen so fast and unpredictably that we may not properly cope with them; it will be a challenge to harness their benefits while avoiding the downsides. There have been especially vocal concerns about the role of artificial intelligence (AI).

Machine learning, enabled by the ever-increasing number-crunching power of computers, is a potentially stupendous breakthrough. It allows machines to gain expertise—not just in game playing, but in recognizing faces, translating between languages, managing networks, and so forth—without being programmed in detail. Moreover, AI is just at the ‘baby stage’ compared to what its proponents expect in coming decades. I think the Chinese Government is right to seize on the vast potential of this technology and to prioritise a massive investment in it.

Twenty years ago, few people envisioned the extent to which smartphones and IT have by now changed the pattern of our lives. So it would be rash to predict how transformative AI could be in the next 20 years.

Already AI can cope with complex fast-changing networks: traffic flows, or electric grids. It could enable a government to gather and process all the information needed run a planned economy with an efficiency that Marx could only dream of. And in science, its capacity to explore zillions of options could allow it to find recipes for better drugs, or for a material that conducts electricity with zero resistance at room temperature (crucial for efficient electric grids transmitting power over long distances).

But the implications of AI for our society are already ambivalent. If there is a ‘bug’ in the software of an AI system, it is currently not always possible to track it down; this is likely to create public concern if the system’s ‘decisions’ have potentially grave consequences for individuals. If we are sentenced to a term in prison, recommended for surgery, or even given a poor credit rating, we would expect the reasons to be accessible to us—and contestable by us. If such decisions were entirely delegated to an algorithm, we would be entitled to feel uneasy about hidden biases or bugs, even if presented with compelling evidence that, on average, the machines make better decisions than the humans they have usurped.

Integration of these AI systems has an impact on everyday life—and will become more intrusive and pervasive. Records of all our movements, our interactions with others, our health, and our financial transactions, will be in the ‘cloud’. The data may be used for benign reasons (for

instance, for medical research, or to warn us of incipient health risks), but its availability to internet companies is currently shifting the balance of power from governments to the commercial world. Indeed, employers can now monitor individual workers far more intrusively than the most autocratic or 'control freak' traditional bosses. There will be other privacy concerns. Are you happy if a random stranger sitting near you in a restaurant or on public transportation can, via facial recognition, identify you, and invade your privacy? Or if 'fake' videos of you become so convincing that visual evidence can no longer be trusted? Or if a machine knows enough about you to compose e-mails that seem to come from you?

A report published in February 2018, in which my colleagues at Cambridge's Centre for the Study of Existential Risks (CSER) were heavily involved, was entitled 'The Malicious Use of AI: Forecasting, Prevention and Mitigation'. Its focus was on the near-term. Three concerns are highlighted in the report:

(i) AI would allow existing types of cyber-attack to be achieved with less effort, and therefore by more actors.

(ii) By use of, for instance, coordinated drones it would facilitate physical attacks. And cyberattacks on the software of driverless cars.

And (iii) it could allow more effective targeting of misinformation, denial of information, surveillance, and so forth.

The 'arms race' between cybercriminals and those trying to defend against them will become still more expensive and vexatious.

The academic and commercial communities now speak with one voice in highlighting the need to promote 'robust and beneficial' AI, but tensions may emerge when AI moves from the R&D phase to being a potentially massive money-spinner for global companies.

It is of course well established that we need to adapt to incipient shifts in the nature of work – an issue addressed in several excellent books by economists and social scientists. Clearly, machines will take over much of the human effort in manufacturing and retail distribution. They can also replace many white-collar jobs: routine legal work, accountancy, computer coding, medical diagnostics, and even surgery. Many 'professionals' will find their hard-earned skills in less demand. In contrast, some skilled service-sector jobs—plumbing and gardening, for instance—require non-routine interactions with the external world and so will be among the hardest jobs to automate.

The digital revolution generates enormous wealth for an elite group of innovators and for global companies, but preserving a healthy society will surely require redistribution of that wealth – via, for instance, an effective and fair system of taxing multinational companies in every country from which they derive revenue. There is talk of using such a tax to provide a universal income. But it is better when all who are capable of so doing can perform socially useful work rather than receive a handout. These resources should certainly help to fund higher levels of public welfare (as exemplified now by Scandinavian countries).

Indeed, to create a humane society, governments will need to vastly enhance the number and status of those who care for the old, the young and the sick. There are currently far too few such people to meet demand, and they're poorly paid, inadequately esteemed, and insecure in their positions. (It's true that robots can take over some aspects of routine care—indeed, we may find it less embarrassing for basic washing, feeding, and bedpan routines to be handled by an automaton. But those who can afford it want the attention of real human beings as well.)

And there are other jobs that would make our lives more comfortable and secure, and could provide worthwhile employment for far more people—for example, gardeners in public parks, custodians, police on the street and so forth.

AI earns its advantage over humans through its speed in analysing vast volumes of data, and its capability to rapidly manipulate and respond to complex input. It excels in optimizing elaborate networks, like the electricity grid or city traffic. But there are still limitations. The hardware underlying AlphaGo used hundreds of kilowatts of power. In contrast, the brain of Lee Sedol, AlphaGo's Korean challenger, consumes about thirty watts (like a lightbulb) -- and he can do many other things apart from play board games.

But what about the longer-term prospects? These are murkier, and there is no consensus among experts on the speed of advance in machine intelligence—and indeed on what the limits to AI might be. It seems plausible that an AI linked to the internet could 'clean up' on the stock market by analysing far more data far faster than any human. To some extent this is what 'quant' hedge funds are already doing. But for interactions with humans, or even with the complex and fast-changing environment encountered by a driverless car on an ordinary road, processing power is not enough; computers would need sensors that enable them to see and hear as well as humans do, and the software to process and interpret what the sensors relay to them.

But let's look further ahead. If robots could observe and interpret their environment as adeptly as we do they would truly be perceived as intelligent beings, to which (or to whom) we can relate. Such machines pervade popular culture. But then new ethical issues arise. Would we have obligations towards them? We worry if our fellow-humans, and even animals, can't fulfil their natural potential. Should we feel guilty if our robots are under-employed or bored?

What if a machine developed a mind of its own? Would it stay docile, or 'go rogue'? If it could infiltrate the internet of things, it could manipulate the rest of the world. It may have goals misaligned to human wishes – or even treat humans as an encumbrance. Some AI pundits take this threat seriously, and think the field already needs guidelines – just as biotech does. But others regard these concerns as premature – and think it will be a long time before artificial intelligence is a bigger worry than real stupidity. Be that as it may, it's likely that society will be transformed by autonomous robots, even though the jury's out on whether they'll be 'idiot savants' or display superhuman capabilities.

But it's away from the Earth, in deep space, that robots offer the clearest advances over humans, and where the downsides of their deployment are less. So I turn now to discuss how robots may already be weakening the case for manned spaceflight.

3. SPACEFLIGHT: BY ROBOTS OR BY HUMANS?

The US Apollo programme, which landed astronauts on the Moon and brought them back, remains, a half century later, the high point of human ventures into space. It was the outcome of a 'space race' against the Russians—a contest in superpower rivalry. Had that momentum been maintained, there would surely be footprints on Mars by now; that's what my generation expected. However, once that race was won, there was no motivation for continuing the requisite expenditure. In the 1960s, NASA absorbed more than 4 percent of the US federal budget. The current figure is 0.6 percent. Today's young people know Americans landed men on the Moon. They know the Egyptians built pyramids. But these enterprises seem like ancient history, motivated by almost equally bizarre national goals.

Hundreds more have ventured into space in the ensuing decades—but, anticlimactically, they have done no more than circle the Earth in low orbit. The scientific and technical payoff hasn't been negligible, but it has been less cost-effective than unmanned missions. Nor are these voyages inspiring in the way that the pioneering Russian and US space exploits were.

The hiatus in manned space exploration exemplifies that when there's no economic or political demand, what is actually done is far less than what could be achieved. (Supersonic flight is another example—the Concorde airliner went the way of the dinosaurs. In contrast, the spin-offs from IT have advanced, and spread globally, far faster than forecasters and management gurus predicted.)

Space technology has burgeoned since the 1970s. We depend routinely on orbiting satellites for communication, satnav, environmental monitoring, surveillance, and weather forecasting. . There is also a growing demand for relatively inexpensive miniaturised satellites, which several private companies are aiming to meet. The San Francisco-based company Planet Lab has developed and launched swarms of shoebox-sized spacecraft with the collective mission of giving repeated imaging and global coverage, albeit at not-specially-sharp resolution (about 3 metres): the mantra (with only slight exaggeration) is to observe every tree in the world every day. Eighty-eight of the craft were launched in 2017 as payload on a single Indian rocket; Russian and US rockets have been used to launch more, as well as a fleet of somewhat larger and more elaborately equipped Sky Sats (each weighing 100 kilograms). For much sharper resolution, a larger satellite with more elaborate optics is needed, but there is nonetheless a commercial market for the data from tiny 'CubeSats' to monitor crops, construction sites, fishing boats, and suchlike; they are also useful for planning a response to disasters. Even smaller wafer-thin satellites can now be deployed—exploiting the technology that has emerged from the colossal investment in consumer microelectronics.

During this century, the entire Solar System—planets, moons, and asteroids—will be explored and mapped by fleets of tiny robotic space probes, interacting with each other like a flock of birds. Giant robotic fabricators will be able to construct, in space, solar energy collectors and other objects. The Hubble telescope's successors, with gigantic mirrors assembled in zero gravity, will further expand our vision of exoplanets, stars, galaxies, and the wider cosmos. The next step would be space mining and fabrication.

But will there be a role for humans? There's no denying that NASA's Curiosity, a vehicle the size of a small car that has since 2011 been trundling across a giant Martian crater, may miss startling discoveries that no human geologist could overlook. But machine learning is advancing fast, as is sensor technology. In contrast, the cost gap between manned and unmanned missions remains vast. The practical case for manned spaceflight gets ever weaker with each advance in robots and miniaturization.

If there were nonetheless a revival of the 'Apollo spirit' and a renewed urge to build on its legacy, a permanently manned lunar base would be a credible next step. Its construction could be accomplished by robots—bringing some supplies from Earth, but mining some from the Moon. An especially propitious site for a lunar base is the Shackleton crater, at the lunar south pole, 21 kilometres across and with a rim 4 kilometres high. Because of the crater's location, its rim is always in sunlight and so escapes the extreme monthly temperature contrasts experienced on almost all the Moon's surface. Moreover, there may be a lot of ice in the crater's perpetually dark interior—crucial, of course, for sustaining a 'colony'.

It would make sense to build mainly on the half of the Moon that faces the Earth. But there is one exception: astronomers would like a giant telescope on the far side because it would then be shielded from the artificial emission from the Earth—offering a great advantage to radio astronomers seeking to detect very faint cosmic emissions. And the Chinese are already planning to land a probe on the far side.

China has the resources, the dirigiste government, and maybe the willingness to undertake an Apollo-style programme. If it wanted to assert its superpower status by a 'space spectacular' and to proclaim parity with (or superiority over) the US, China would need to leapfrog, rather than just rerun, what the United States had achieved fifty years earlier. It already plans a 'first' by landing on the far side of the Moon. A clearer-cut 'great leap forward' would involve footprints on Mars, not just on the Moon.

But if I were Chinese I wouldn't advocate the huge expenditure of public money that would be necessary to undertake this venture at a reliability level that ensured the high enough probability of success in sending astronauts – and bringing them safely back -- that the public would expect of a national prestige project. (And for similar reasons, if I were an American I would not support the 'manned' part of NASA's programme)

I hope that some people now living will walk on Mars. But I think the future of manned spaceflight lies with privately funded adventurers, prepared to participate in a cut-price programme entailing far higher risks than could be imposed on publicly supported civilians.

There would still be many volunteers—some perhaps even accepting 'one-way tickets'—driven by the same motives as early explorers, mountaineers, and the like. Indeed, it is time to eschew the mind-set that space ventures should be national (even international) projects—along with pretentious rhetoric where the word 'we' is used to denote

the whole of humanity. There are some endeavours—tackling climate change, for instance—that can't be done without concerted international action. The exploitation of space need not be of this nature; it may need some public regulation, but the impetus can be private or corporate.

By 2100 thrill seekers in the mould of (say) Felix Baumgartner (the Austrian skydiver who in 2012 broke the sound barrier in free fall from a high-altitude balloon) may have established 'bases' independent from the Earth—on Mars, or maybe on asteroids. But don't ever expect mass emigration from Earth. And here I disagree strongly with my late and great Cambridge colleague Stephen Hawking who enthused about rapid build-up of large-scale Martian communities. It's a dangerous delusion to think that space offers an escape from Earth's problems. We've got to solve these problems here. Coping with climate change may seem daunting, but it's easy compared to terraforming Mars. No place in our solar system offers an environment even as clement as the Antarctic or the top of Everest. There's no 'Planet B' for ordinary risk-averse people.

But we (and our progeny here on Earth) should cheer on the brave space adventurers, because they will have a pivotal role in spearheading the posthuman future and determining what happens in the twenty-second century and beyond.

The pioneer explorers of Mars will be ill-adapted to their new habitat, so they will have a more compelling incentive than those of us on Earth to re-design themselves. They'll harness the super-powerful genetic and cyborg technologies that will be developed in coming decades. These techniques will, one hopes, be restrained here on Earth, on prudential and ethical grounds; but 'settlers' on Mars will be far beyond the clutches of the regulators. We should surely wish them good luck in modifying their progeny to adapt to alien environments. This might be the first step towards divergence into a new species.

So it's these spacefaring adventurers, not those of us comfortably adapted to life on Earth, who will spearhead the post-human era. – evolving within a few centuries into a new species.

If posthumans make the transition to fully inorganic intelligences, they won't need an atmosphere. And they may prefer zero-g, especially for constructing massive artefacts, and venture far beyond. So it's in deep space – not on Earth, nor even on Mars -- that non-biological 'brains' may develop powers that humans can't even imagine. But this is far beyond any realistic planning horizon – and therefore best left for writers of science fiction.

5G 将会带来哪些改变？

How 5G Technology Will Change Our Lives and Reshape the World?

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移动通信自上世纪 80 年代问世以来，大约每 10 年升级换代一次，移动通信每次升级都会给我们的生活带来很大的变化。

我们为什么需要 5G？

说实话，4G 出现距今时间并不长，人们利用 4G 技术，已经可以畅通地遨游在各种移动应用的空间。4G 技术拓宽了移动互联网和物联网的应用，这些年，社交网络、即时通讯、移动视频等应用都在快速地增长，这些业务的发展又导致数据流量的爆炸式增长。据统计，3G 手机的每人月均流量是 300 MB，4G 刚开通的时候，每人月均流量是 1 GB，但是，今天 4G 手机的每人月均流量已经超过 5 GB。随着大数据的发展，手机的流量还会继续快速增长。如果现有的网络不升级，就无法满足大数据快速发展的需要，还会出现人们实际体验的网速下降的情况。而 5G 的首要特点就是“超高的速率”，按照国际电信联盟（ITU）提出的对 5G 的技术要求，5G 的下行峰值速率要达到 20 Gbps，远超过 4G 的峰值速率。5G 的这一特点将能确保在手机月均流量继续大幅增加的情况下，仍然保持很高的实际体验速率。

5G 将会带来一个万物互联的世界。过去的移动通信，主要是实现人与人之间的连接，随着 5G 的出现，移动通信将延伸到人与物、物与物之间的连接，而万物互联需要海量的连接能力。5G 的另一个特点是“超高的密度”，每平方公里可以实现 100 万个设备的连接。

5G 还会对人工智能的发展创造更好的基础条件。5G 的性能中包括“超低时延”这个特点，5G 对时延的要求是 1 毫秒，也就是千分之一秒。人工智能需要高可靠低时延的网络支持，5G 就是这样的网络。

现代信息网络是数字经济的载体。当今世界，网络的发达程度已成为衡量一个国家经济实力的重要标志。5G 网络建成后，将大幅度提升网络能力，有力地促进数字经济的发展。

5G 有哪些用途？

国际电信联盟确定了 5G 的三个应用场景：

5G 的第一个应用场景是增强型移动宽带（eMBB）。增强型移动宽带将会是 5G 网络建成之后早期的最主要的应用，满足移动数据流量快速增长的需要。增强型移动宽带将会推动大流量移动宽带业务，有些新颖的服务如 AR、VR，在技术上已经可以实现了，但是由于对带宽的要求比较高，给实际使用带来了很大的困难，有了 5G，带宽的问题就解决了。在平昌冬奥会上，韩国的电信运营商就利用 5G 网络在比赛场馆提供了 VR 服务，观众可

以通过 VR 设备，用 360 度的视角观看比赛。有了 5G，还可以在移动设备上观看 4K/8K 超高清视频。

5G 的第二个应用场景是大规模机器通信（mMTC）。万物互联对移动通信网络有特别的要求。首先是海量连接，如果我们要把城市的每一颗树都连接起来，这样就可以随时了解树木的生长情况，并根据需要进行滴灌，这个连接数量是巨大的，但 5G 能够满足这个需求。在万物互联时，会有许多小数据量的物体连接，这就需要低成本和低功耗。我们可以用物联网把家用的水表和燃气表都连接起来，这些应用的数据量很小，但人们会担心成本，又不想经常换电池。5G 可以解决这些问题，业界已提出目标，对这一类的物联网应用，可以 10 年换一次电池。

大规模机器通信将广泛应用于物流管理、智能农业、远程监测、旅游管理、智慧家庭、智慧社区、共享设备等方面。

5G 的第三个应用场景是高可靠低时延通信（uRLLC）。这些应用是针对那些对可靠性和时延要求特别高的业务的，例如在工业自动化、自动驾驶、交通控制、远程制造、远程施工、远程医疗、同声翻译等方面的应用。

以自动驾驶为例，联网的自动驾驶可以提升道路的利用率和行车的安全性。业界已经提出 V2X 的设想，V 是车辆，X 就是所有的相关物体，也就是说，利用 5G 网络，将行驶中的某一辆车与附近的其它车辆连接，与交通指挥系统连接，与道路连接。如果把高速公路上行驶的一个车队中的每一辆车都用 5G 网络互相连接起来，该车队的所有车辆可以同步加油和制动，这样就可以缩短车辆之间的间距，提升道路利用率。

远程医疗也是高可靠低时延的应用。我们已经看到了这样的演示，利用 5G 网络，可以远程操作 B 超等医疗仪器，还可以远程缝合人体的皮肤。

中国企业进入 5G 领先者行列

在移动通信从 1G 到 5G 的发展进程中，中国的移动通信业经历了从无到有，从小到大，从弱到强的过程。在 1G 阶段，无论网络设备还是手机，都是依赖进口；在 2G 阶段，我们具备了制造能力，但没有自己的技术专利；在 3G 阶段，我们开始使用自己的技术。4G 阶段，中国企业实现技术跨越，中国主导的 TD-LTE 成为 4G 的主流技术之一，全球 50 多个国家和地区建设了 TD-LTE 商用网络，我们实现了从追随到同步的跨越。

中国企业在 5G 国际标准制定进程中发挥重要作用。中国移动、华为、中兴、大唐等企业积极参与 5G 标准的制定，他们中有 30 多人在 5G 标准化组织担任了关键职务。华为主推的极化码（Polar Code）被确定为 5G eMBB 的控制信道编码方案。中国移动主编了 3GPP 的 5G NR 中 5G 空口技术的框架性文件。中国制造企业在 5G 芯片和终端设备的研发中进入领先行列。中国的电信运营商也正在厉兵秣马，准备建设 5G 网络。

5G 带动新一轮创新

根据中国信息通信研究院发布的《5G 经济社会影响白皮书》， 预计 2030 年，5G 直接创造经济增加值 2.9 万亿元，间接拉动经济增加值 3.6 万亿元。这就为我们带来了很多的创新的机会。

首先是网络创新。5G 之所以效率高，就是因为在网络上使用了很多新的技术，例如大规模天线阵列、毫米波等技术。5G 还会给电信网络的结构带来变化，例如使用网络切片技术，通过软件定义网络（SDN），实现网络功能虚拟化（NFV）。无论电信设备制造商还是电信运营商都将面对这种变化。

5G 究竟能够发挥多大的作用，关键是取决于应用开发。

记得 2000 年左右，3G 刚出现，那时有人问我们，3G 有什么用？我们说，3G 可以用手机实现数据通信。人们不明白数据通信是什么。直到 2007 年，智能手机问世，并且带来了大量的 APP 应用，大家都明白了，原来 3G 手机可以通过上网干那么多事情。现在的情况与 3G 初期很像，人们都在问，5G 有什么用？

其实，我们目前在展览和演示中看到的一些 5G 应用，都是技术人员根据 5G 的技术特性设想出来的场景，真正的应用，还等待着更加深入的开发。实践证明，当一项重大技术已经问世，但是人们还不知道这项技术究竟有什么用的时候，正是创新与创业最好的机会。现在，看到先机的创业者已经开始启动 5G 应用的创新项目，投资者们也已经关注 5G 应用项目。创业者和投资者的进入，将会快速推动 5G 的实际应用。

当然，就像当年 3G 一样，5G 新应用的全面爆发还是需要一定的时间的。可以预见的是，5G 与人工智能的结合，将会成为 5G 应用的爆发点，特别值得期待。

移动通信的每一次更新换代的成果，往往都是通过手机终端表现出来的。随着 5G 的到来，智能手机也将出现新的变化。今天，手机已经是我们每一个人的“个人信息中心”，当我们需要获取某个信息的时候，首先会想到使用手机；可以设想，到了 5G 时代，智能手机将会延伸成为我们每一个人的“智能控制中心”，那时，当我们需要控制或使用某个物品的时候，我们也首先会想到使用手机。

可以预见 5G 时代智能手机的一些变化。折叠手机会深受欢迎，折叠手机将个人电脑、平板电脑、手机合为一体，方便用户使用。大屏幕的折叠手机更能体现 4K/8K 视频的效果。5G 手机的超大流量对手机电池提出了更高的要求，用户急需那些续航时间长、充电时间短的电池。智能手机的操作系统也会发生变化，操作系统除了要配合折叠手机等新型终端的变化以外，还应该适应物联网和各种实时处理的需要。

当然，5G 的商业模式也需要创新。5G 的三种应用场景需要不同的商业模式。总的来说，增强型移动宽带（eMBB）只是一种演进，原有的商业模式基本上会继续有效。大规模机器通信（mMTC）就需要转型，就商业模式而

言，人与人之间的通信和机器与机器之间的通信是大不一样的。无论电信运营商还是应用提供商都要经历一次转型。

而高可靠低时延通信（uRLLC）是前所未有的，因此，这种应用的商业模式将是一种全新的开拓。

中国智能制造发展的产业创新政策思考

Thoughts on Industrial Innovation Policy of China's Smart Manufacturing

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2018年5月，习总书记在两院院士大会上强调“要以智能制造为主攻方向推动产业技术变革和优化升级”。“制造强国战略”提出的以智能制造为主攻方向和突破口的战略和对策，强力助推智能制造的发展与推广应用。全国范围内，各地方政府都根据地方的特点，规划了各自发展制造业的蓝图，并以智能制造作为制造业发展的抓手。产业层面内，企业对智能制造战略和相关技术的发展也赋予了极大地关注，特别是在经济发达地区的企业以及行业的龙头企业，实施智能制造的内生动力十分强劲。另外，学术界与媒体也以智能制造为热点，对智能制造进行大力宣传和诠释，使大众对智能制造有了充分的认识。

中国制造业升级作为经济发展的主要驱动力备受关注，而智能制造技术创新则是制造业升级的核心抓手和驱动力。中国制造业升级包括少量前沿技术突破创造新生产业，而更多是依靠智能制造的创新技术在量大面广的成熟工业部门中扩散，使其规模化地显著提升生产率和工业附加值，实现基础广泛的产业范式升级。“制造强国战略”强调，中国仍远未完成工业化发展阶段，不同区域和领域的制造业发展水平参差不齐；要在已有的制造业基础上继续工业生产率的高增长，需要动员制造企业主动学习并采纳新型工业技术，使企业的技术创新和制造能力得到广泛升级，从而提高相关产业部门的综合经济和社会效益，实现我国从传统工业 2.0 阶段到“3.0 普及，4.0 试点”的智能制造范式升级¹。

智能制造范式升级的核心是在制造企业中广泛推广先进、高效的智能制造共性使能技术。这种平台型共性使能技术的扩散会带动大量企业专有技术的研发，驱动多个相关产业集群的技术进步与突破^[1]。例如，在智能制造综合标准化与新模式应用项目、智能制造试点示范专项行动的大力支持和带动下，我国高档数控机床、工业机器人、增材制造装备等智能制造的共性使能技术平台取得了一系列重大突破，包括大族激光突破了三维五轴联动光纤激光切割机床，宁夏共享研制出大尺寸高效砂型 3D 打印机，秦川机床、苏州绿的突破了高精度 RV 减速器、谐波减速器等机器人关键零部件。同时，一批智能制造成套装备也研制成功，例如，青岛四方突破了高铁转向架智能化焊接及检测组装成套装备，埃夫特、奇瑞汽车合作研制的汽车焊接自动化生产线打破了国外长达 30 年的垄断。²

¹ 工业 1.0 是以蒸汽机技术为驱动的机械化时代；工业 2.0 是以电气技术为核心的电气化时代；工业 3.0 是以数控技术推动的数字化时代；而工业 4.0 是智能制造技术推动的智能化时代。

² 需要强调的是，虽然我国取得了智能制造共性使能技术的重要突破，但与发达国家的差距仍然明显。例如，我国在高档数控机床与工业机器人、增材制造装备、智能传感与控制装备、智能检测与装配装备、智能物流与仓储装备等关键技术装备仍十分薄弱，数字化设计与制造等关键核心技术亟待提升，严重制约我国智能制造的发展。据统计，目前我国国内工业机器人市场约 60% 由外资品牌把持，90% 的高档数控系统、高性能传感器和 85% 以上的可编程逻辑控制器（PLC）依赖进口。

但是，智能制造共性使能技术扩散不同于一般的技术扩散，其特有的基础知识属性带来的准公共物品属性、正外部性都使得其扩散过程中面临着市场失灵的困境，单纯依靠市场机制配置资源，很可能导致共性技术供给不足。特别是共性使能技术扩散还涉及到量大面广的中小型民营企业，它们普遍缺乏技术、资金、人力等创新能力^[2]，其在范式升级混沌期下进行自主决策，往往倾向于沿着原有制造范式选择低价低质技术，使得门槛较高的共性技术升级面临劣币驱逐良币的风险^[3]。这些问题都需要政府进行干预^[4]。近几年，我国政府发布了《智能制造发展规划（2016-2020年）》、《智能制造工程实施指南》、《国家智能制造标准体系建设指南（2015年版）》等等，已构建了推进智能制造基本政策体系。另外，2015-2017年工业和信息化部通过智能制造综合标准化与新模式应用项目和智能制造试点示范专项行动共支持了308个新模式应用项目和206个试点示范项目，都体现出了政府的大力支持。

可是理论界对政府如何干预此类共性技术扩散一直存在疑虑。第一，传统经济学认为产业政策配置资源效率不高。政府选择技术面临信息不对称，容易造成市场扭曲反而阻碍创新；尤其是涉及到路线选择、价格选择、服务选择、交易模式选择等微观市场行为，更应该由企业来自发做出决定^[5,6]。第二，政府本身能力不足存在“失灵”，在实践中，传统“自上而下”或“命令控制型”的政策模式确实在技术的广泛推广上缺乏效率^[2,7]；尤其是共性使能技术扩散并非公共知识的传播，政府行为无法具有强制性^[8]。第三，范式升级中共性使能技术扩散是“知识+产品”的复合型技术扩散，需要在共性使能技术平台上的再次应用开发，才能满足终端用户需求^[9]。这些应用开发虽然存在知识正外部性，但其开发对象却是产品而非公共品，政府无法通过完全投资公共科研部门形成有效供给^[10,11]。而且应用开发存在多样性，领域知识强，需要技术供给方与用户方协同参与，单个研究机构、第三方企业或用户企业自身均无法解决，因而传统共性使能技术推广项目中普遍存在着开发责任主体模糊、开发主体缺失问题^[12]。上述问题都为制造范式升级中共性使能技术示范推广的政府角色和介入方式提出挑战，尤其是以下三个问题需要深入讨论。

第一，政府需要慎重考虑智能制造共性使能技术的成熟度问题。共性使能技术扩散的成功表征为制造企业升级决策的实施，而共性技术的就绪水平是企业升级决策考虑的最重要因素之一^[23]。技术不成熟会成为示范推广的最大风险和障碍^[24]。¹现有文献表明，制造企业对技术基础性能的顾虑非常突出，例如“该技术是否适用于不同行业和工况的运行特点、技术升级改造是否会影响企业的正常生产等”^[2]，具体的技术性能包括技术先进性、安全性、可靠性、操作性、适用性和节能技术兼容性等。此外，针对制造范式升级，本研究认为，共性技术就绪度还包括共性使能技术对第三方开发者的开放度。共性使能技术扩散需要在其基础上进行再次应用开发来满足广泛的用户企业需求。这些应用开发通常并非是有共性技术平台提供方进行，尤其是本文涉及的智能制造共性使能技术更是门槛很高，全世界范围内仅仅有通用电气、西门子、法兰克等数家国际企业以及国内少量领先

¹ 例如美国在1976年通过《电动与混动汽车示范推广（RD&D）法案》，但是这个法案因为新能源汽车技术远远没有成熟而失败了，尤其是在新能源汽车的安全性、可靠性和综合表现上，无法与当时的燃油汽车技术相比较，这个著名的案例被定义为“技术早产”。

企业能够提供。这些企业通常不会进行附加值较低的再次应用开发，所以这就要求共性技术提供者能够开放权限，使第三方或用户企业能进行再开发^[12]；因此开放度应该也会影响智能制造技术扩散升级。

第二，预期经济收益以及商业模式一直是智能制造平台技术采纳企业升级决策考虑的核心因素，预期收益愈强则企业愈有动力进行技术采纳与升级^[5,18]。预期经济收益度既包括投入回报收益，也包括企业能力的战略性提升等等。第一，制造企业关注投资回报周期。通常来说，由于共性技术升级需要资金量大，政府补贴通常无法完全支持，制造企业一般需要使用自有资金或进行市场融资。但受经济下行和市场需求疲软的双重影响，制造企业的自有资金现金流压力大，也就急于回收资金投入^[25]。而我国制造业产业投融资机制往往倾向于短期化、投机化，通常无法承受太长的回报周期。在本研究的前期实地访谈中，当地制造业技术升级投资回报期超过三年就很难得到认可^[26]。第二，制造企业也非常注重计算技术升级可能带来的战略性提升，包括市场份额提升、产品质量的提升、品牌形象提升等等^[3,21]。另外，可持续的商业模式对预期收益保障极为重要，例如，以满足用户个性化需求为引领的大规模个性化定制模式、以缩短产品研制周期为核心的产品全生命周期数字一体化模式、以打通企业运营“信息孤岛”为核心的互联工厂模式、以供应链优化为核心的网络协同制造模式等等。

第三，共性使能技术的扩散存在公共品属性及正外部性，单独企业缺乏能力和意愿去承担。尤其是在范式升级期，其共性技术不一定是现行市场条件下生产者必然的选择，容易形成劣币驱逐良币的现象，需要政府干预^[2,22]。政府对创新的干预手段一般包括“政府直接干预”和“政策间接支持”两大类^[27]。“政府直接干预”型政策包括政府的研发资助、对企业的各种补贴、对于采用新技术实施税收减免或折扣、实施政府采购、对技术的采纳实施强制要求、制定技术标准等^[28,29]。¹而“政策间接支持”的手段更强调从创新环境等方面开展工作，包括开展示范宣传和培训、培育企业技术学习能力、加强知识产权保护、等等^[23,28]。另外的一些政策也算“间接支持”型政策工具，比如为增加金融市场认可度、降低第三方风险等担保政策，以及为吸引私人投资而设置的奖励政策等^[30]。值得强调的是，现有文献认为政府应该综合平衡直接干预与间接支持手段；而不应该仅仅采用其中一种。

历史上我国曾经采用自上而下的直接干预手段进行了一些技术升级，但那些大部分是对大型或国有企业而且扩散规模较小，命令控制型手段还是比较有效，可是应对大规模扩散的示范推广项目就难以推进、效率不高^[19]。政府与广泛中小企业对接有限，直接干预的命令控制型政策执行时会遇到

¹为加快智能制造标准体系建设，工信部、国标委联合发布了《国家智能制造标准体系建设指南（2015年版）》，并组织成立国家智能制造标准化协调推进组、总体组和专家咨询组。目前，按照标准体系动态更新机制正组织开展制（修）订《国家智能制造标准体系建设指南（2018年版）》。近三年，通过智能制造综合标准化与新模式应用，共支持开展 188 项智能制造相关国家标准的制定工作，其中 22 项已正式发布，32 项获得国家标准立项。已制（修）订的标准基本覆盖了智能制造标准体系中的基础共性和关键技术标准。另外，石化、民爆、家电、船舶等行业也加速推进本行业智能制造标准制定。2018 年，《国家智能制造标准体系建设指南（2018 版）》完成修订。同时，在智能制造综合标准化与新模式应用项目的支持下，智能制造标准的立项工作将进一步加快，80 项以上的智能制造国家标准将完成制（修）订，一批标准试验验证平台将建成，智能制造标准体系将进一步完善。

很大障碍，一方面中小企业的自主决策也受其他较多因素影响，另一方面直接干预型政策易扭曲市场，吸引很多非目标企业盲目投资升级，导致无序竞争或一哄而上的混乱局面^[30]。因此，本研究认为，针对共性使能技术的大规模采纳推广，政府可以加强政策干预与扶持度，既有政策直接干预也有间接支持^[18]。在此之上，我们更需要“直接+间接”的整合性发展战略，完善智能制造创新体系、夯实智能制造发展基础、积极培育系统解决方案供应商、强化智能制造人才培育。我们需要更加聚焦智能制造创新体系与创新生态的长期建设，破除在扶持政策、激励机制、服务体系、社会环境等方面仍存在的体制性创新制约，建设跨学科、跨领域的“用产学研金政一体化”协同创新的生态体系；另外，推进建设支撑企业科研和创新的公共服务平台，积累建设通用平台、测试验证、市场推广等方面的经验，开放共享大型科研设备和创新资源，充分发挥实质作用的联盟、协会和共性技术研发机构来促进行业、企业和跨界的协同创新。

在世界变局中的中国建立可持续的财富管理产业

Building a Sustainable Wealth Management Sector in China in a Changing World

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Introduction

There was a time of course when the only wealth worth having was land. It was legal control over real estate that gave the global medieval elites access to both physical security and leverage with rulers, whether Kings, Emperors or local warlords.

Today, if we have it, we think of wealth as something that enables us to plan our lives. Partha Dasgupta, emeritus professor of economics at Cambridge University, has written that “wealth is [essentially] what enables you to plan by converting one form of capital into another.”¹

Wealth Management has traditionally been thought of as a branch of financial services that is concerned solely with looking after the needs of very wealthy individuals and their families. However, the need to plan, to ensure an efficient conversion of all types of income and capital, both tangible and intangible, into a range of asset and liability outcomes that support the life of an individual or family, is a recurring need, whether you are very rich, of middle income, or of modest means.

Research from a range of independent organisations who produce regular commentary on how private client wealth is distributed across the global regions of the world has tended to confirm that over the last 25 years wealth has become ever more concentrated: i.e. the wealthy have become wealthier, and the very wealthy - so called UHNWIs² - have become wealthier still, confirming the rise of a phenomenon that William Rees Mogg and James Dale Davidson described in 1997 as the Sovereign Individual.³

Concentration of wealth appears to be one of the factors which has led to growing dissatisfaction amongst western electors and the rise of populism in a number of countries. The rise of the Sovereign Individual, with global resources at his/her fingertips equivalent to those of small sovereign nations potentially threatens the authority of governments in both western and eastern states.

¹ Measuring the wealth of nations, The Annual Review of Resource Economics, Vol 6. (2014)

² Ultra High Net Worth Individuals

³ The Sovereign Individual (1997 – Simon and Schuster)

Wealth management as a strategic industry sector.....

Having spent the last twenty years running large, medium-sized and small wealth management organisations, and having had literally hundreds of conversations with wealthy men and women and their families over this time I have reached the conclusion that a part of the business of a Wealth Manager is to have a view on how countries should organise themselves to ensure that they successfully harness the private client capital resources that they need to drive growth in their respective economies. It is also to recognise that there is a vital social dimension to managing wealth. Ensuring that all citizens have access to high quality advice and resources to enable them to take the appropriate decisions on what makes sense for them to plan for their own lifetime goals turns out to be both a macro-economic necessity and a social good.

The philanthropy practiced by many wealthy individuals and their families through foundations and institutes has had many positive benefits for societies across the world. John Ruskin, the 19th century art critic and author, wrote in his essay *Unto this Last*: *"that country is the richest which nourishes the greatest number of noble and happy human beings; that man is richest who, having perfected the functions of his own life to the utmost, has also the widest helpful influence, both personal and by means of his own possessions, over the lives of others"*. He had a point.

But governments cannot rely on philanthropy alone to get the job done, and as already mentioned, relying on so-called Sovereign Individuals to make objective choices for their fellow citizens, be they global or local, has its limits.

This paper will argue that investing in advice-led wealth management propositions which educate both those who have wealth, however modest, and those who pretend to advise on it, is a strategic necessity for China as a buttress to its Belt and Road strategy.

But what do we mean by wealth management?

To be in the business of "Wealth Management" means a whole lot of different things to different audiences. For some it means to be in the business of asset gathering and then managing the assets that have been "gathered". For others it means to be in the business of private banking and to provide bespoke current and capital account services. For some it means to be in the business of providing structured lending facilities to enable better liability management for clients. For others it means to be in the business of providing stockbroking or platform execution services.

All of the services mentioned above may be valuable in and of themselves - but as stand-alone services to drive forward a growth agenda for a sustainable wealth management industry they are unlikely to be sufficient. Businesses which focus solely on providing investment management services may unintentionally end up in pushing products that may or may

not be suitable for clients; simply concentrating on credit and current account banking runs the risk of too narrow a focus on a client's overall needs; merely being a stockbroker runs the risk of making Woody Allen's often quoted dictum come true: i.e. that a stockbroker is someone who invests your money until there isn't any left!

The thing that almost all clients require is someone who takes the time to understand *their* needs and *their* lifetime goals: someone who has skills that are more akin to those of a professional services adviser, able to advise on both sides of a client's personal financial balance sheet. The aim of the wealth management adviser is to make a positive impact on a client's life by helping them to achieve their client's lifetime goals. It is in this sense that the wealth manager of this century is in the life planning business, aiming to be the trusted adviser in ensuring that a financial or wealth plan is in place that supports the client's life plan.

If the service *begins* with a comprehensive financial or wealth plan which looks to advise clients on both sides of their personal balance sheets, credibility and trust are more easily established. The adviser is then much more likely to be entrusted with the job of executing the plan, bringing to bear the skills and services of other parts of his/her wealth management operation (banking, credit, investments etc.) and enabling further expertise to be established, deepening the trust between client and service provider.

Most wealth management organisations that developed in the west began as product organisations, often with strong links to their retail, commercial or investment banking arms. Experience has shown that, whilst innovative and effective products are essential, a wealth management business needs to start by building long-term trusting relationships. As China begins to develop its own wealth management industry, it can build effectively on some of the lessons which have been learnt empirically over many years in the west.

There are a number of key attributes that are essential in establishing the right culture and framework for a successful wealth management industry.

Let's start with the attributes needed for looking after those who have significant capital wealth - so-called High Net Worth Individuals (HNWIs), and we will then consider the needs of both the super rich and those of modest means.

1. The first attribute is: understanding what it means to be wealthy

Scott Fitzgerald and Ernest Hemingway supposedly agreed that the rich were different: they have more money than the average citizen. If you work in the wealth management sector, one of the challenges is that you may find yourself advising someone who has been more successful than you are and is richer. Why should they take advice from you - an employee, even if a very hard working one, a salaried individual, not an owner nor an

entrepreneur?

There is of course no short cut to solving this dilemma. Time, wisdom, experience and professional qualifications eventually help you out. But the key skill set is to be good at putting yourself in other people's shoes; to try and see things from others' perspectives; to spend time getting to understand their goals, their background, their families, their likes and dislikes, their passions, their weaknesses.

It was Mme de Staël in 19th century France who said that "*to understand all is to forgive all*". In wealth management "*to understand all is to advise well*".

2. The second attribute is: empathy

Wealth Managers who hope to be appointed as a trusted adviser to their clients need to start by showing that they care. *Nobody cares what you think until they think that you care.*

Showing that you care can manifest itself in many different ways: it might be spending time getting to understand a client's particular interests, understanding the way their family thinks about next generational planning or the legacy of their family business, or it might simply be about showing that you care about a favourite wine that they drink or a piece of music that means a lot to them.

Showing that you care about them and their life goals is often a much more important starting point than the traditional product led strategies of many wealth management houses.

3. The third attribute is: integrity.

Not so very long ago integrity would have been synonymous with what was expected from a financial services professional. "*My word is my bond*" was a motto famously used in the City of London over many centuries to characterise the trust embodied by the City's financial community.

Today in the post "great crash" era, banks need to re-establish their professional credentials and their moral integrity. This will be a slow job, but a necessary one and it is an essential pre-requisite for success as a wealth management firm. For it is integrity that builds trust and it is trust that sustains wealth management relationships for the long term. And it is this sustainability that creates the virtuous circle of profitable service provision for customers and clients, based on *their* needs - *not* the needs of the financial services provider.

But what is integrity exactly? There will be many views as to what it really is or indeed how to define it. As someone who believes in the benefit of pursuing life-long learning as a habit acquired at school and university, I wonder if the importance that academic communities attach to the freedom to search for the truth may not be a part of it? Being open and honest and truthful about the needs of your client and your ability to serve

them is certainly a good start. As John Milton, the English poet and alumnus of my own college at Cambridge put it: *“let her and Falsehood grapple; who ever knew Truth put to the worse in a free and open encounter”*¹

4. And the fourth attribute is: professional competence and behaviour

Wealth Managers look to advise their clients on both sides of their personal balance sheets. So they need to be extremely well qualified. Those offering banking services need to have sat and passed the relevant banking exams. Those offering financial planning and investment services need to have sat and passed the relevant chartered financial planning and securities exams. All need to have a good understanding of the professional standards that are expected of them

In the UK we have a number of organisations (e.g. the Banking Standards Board, the Personal Investment Management and Financial Advice Association (PIMFA)) which look to set the standards of competence and behaviour that are expected in our market, and against which financial services professionals can expect to be measured and held accountable.

Is wealth management just about looking after wealthy people?

One of the challenges for the wealth management industry has been whether the advice-led model and the attributes required for success for HNWI are applicable for all levels of wealth. The needs of the super-rich, it is claimed, are very different to those who have mere millions. And it is regularly stated that the very high costs of delivering the personalised HNWI model to those of modest means effectively renders it uneconomic to deliver the HNWI model to less wealthy people who may lack the means to pay for it.

In the case of the super wealthy, it is true that often much of the financial/wealth planning advice that is provided as part of the wealth management package for HNWI is either in-sourced to a single family office, or outsourced to a multi-family office or to discrete single service providers. The wealth manager in these circumstances becomes more akin to an institutional product and service provider, focussing on the particular investment or structural financing needs of the client, and often utilising the resources and capabilities of an in-house investment bank. But the validity of an advice-led wealth management model has not changed; it is simply that the packaged integrated service gets unbundled and delivered by a range of different specialist providers. There are a few cases around the world of integrated multi-family offices who provide a holistic service - but scalability and the logistics and costs of delivery prove challenging.

In the case of mass affluent and retail sectors the challenge remains how to deliver an advice-led model at a price point that is bearable for the

¹ From Areopagitica (John Milton: 1644)

consumer and profitable for the provider. And in many ways, solving for this conundrum is the most pressing and relevant issue for the global wealth management sector.

It is no less critical for an individual or a family of modest means to get good advice on how to save, how to spend their income, and how to use their resources to plan for the future. In fact for an individual of modest means it will often be relatively *more* important to get good advice and to make the right choices than for those with greater resources.

The working assumption is that the knowledge engineers and data scientists working in Fintech (or perhaps outside Fintech) will find an AI solution to enable true RoboAdvice. To date what some industry practitioners have termed "RoboAdvice" is in fact simply a digitised way of enabling strategic asset allocation and fund manager selection to take place online in a convenient way for consumers. As far as it goes it's a good innovation, but it's really focussed on just one side of a client's balance sheet and on arguably the most commoditised component of that balance sheet.

The real prize is to be able to offer a digitised solution for a comprehensive financial planning service that looks to probe client needs and give relevant personalised advice, based - as in other segments - on individual life goals. Many say that this cannot be done and that the intervention of a human adviser will always be necessary.

But it may be the case that millennial knowledge engineers will indeed find a true "Robo" solution - either entirely AI based, or part AI, part human. It feels like an exciting area where innovation and data science will combine to solve a much demanded consumer need and which will provide governments and the industry with a solution to a much demanded social need. China's commitment to AI, its significant scale population with long-term financial planning needs, and determination to progress quickly to a technology-led economy will give her a potentially strategic advantage here.

A wealth management road for China

So what advice might one give to the leaders of the China Wealth Management industry as they set about the great task of convening private client capital as a strategic imperative to support OBOR and as a social good to bring advice-led wealth management services to the greatest number of people?

For wealthy individuals, one important starting point is to understand how individuals make their wealth in the first place. Here there are essentially two basic profile types: those who are accumulating capital and take the full spectrum of a working life to accumulate it; and those who suddenly acquire capital, for example by selling a business - a so-called monetisation

event - or perhaps by inheriting money from a family member.

The needs of a client who is accumulating capital are different to the needs of a client who has an immediate capital investment sum. So the advice they get has to be different and the products and services they require will be different too.

If you are a bank, the good news is that you should have the balance sheet capacity to lend your clients money as they are accumulating their wealth, as well as the ability to develop planning and investment services to advise them once they have made and realised a capital sum.

For less wealthy individuals it will also be important to develop a range of services which are based on how income is generated, the extent to which savings can be made now and in the future, and the scope and appetite to take on debt - but above all looking to understand and care about the goals, hopes and fears of the client and their family.

At a high level, my recommendations would be:

- a. At country, industry and individual service provider level conduct a detailed customer survey to ensure that you truly understand customer needs and how they generate income and accumulate capital.
- b. Be certain that you understand their attitude towards risk. They may have a very different attitude towards risk once they have made their money as opposed to the attitude they had when they were making it in a business in which they were expert.
- c. Make client profiling a skill set that everyone in the organisation, from the CEO downwards, practices every day. Become the financial services equivalent of the local doctor. Be sure that you understand your clients' goals, dreams and fears: and update your knowledge often. Let them see that you care.
- d. Develop appropriate value propositions for the different levels and complexities of client balance sheets. The way you reach out to billionaires and family offices will be different to the way you reach out to HNWIs and retail and mass affluent clients. But the first engagement point of a clear plan that supports long term goals and objectives will be the same starting point for each segment. It's just the delivery that is different.
- e. Put in place a comprehensive educational programme, starting at school for all pupils so that they understand the importance of

saving, planning and managing their own personal balance sheets from the moment they enter the workforce. Understanding the need to have a personal financial plan alongside a personal health plan is likely to be a critical component of a long and happy life.

- f. Aim to make technology and the knowledge engineers your friends. They are writing the next chapter of the wealth management business, both in terms of the ability to solve the provision of the advice gap to less wealthy households, but also in terms of ensuring that our personal data remains secure, accurate and private.

Conclusion

In summary, build a wealth management culture which will stand the test of time based on long term relationships and advice, not short-term transactions. China has a renowned reputation for thinking strategically and planning for the long term. Wealth management is a slow-burn business but it's very sticky once you get it. Building a sector on solid foundations with care paid to individual needs will serve both to convene private client capital and to serve the public good.

在中国让道德责任融入公司战略：从台湾信义集团受到的启示

Making an Ethical Strategy Work in China: Sinyi in Taiwan

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1. Strategy and Ethics

The role of the corporation is to make profits --- this is the creed of neoclassical economics, which claims to produce also prosperity for all members of society, and it is what company boards in the United States are responsible to prioritize by law (shareholder value). However, profit-maximizing companies find it hard to consider their effects on society, apart from stakeholders and customers, because there are no incentives for them to do so (above and beyond the law). But society is increasingly expecting businesses to care about their impacts on society --- this is true in the West as well as in China. Some say, "This is trivial; it is merely good business to care about the community," but while this may be true for local businesses whose community is its customers, larger businesses typically argue, "Don't hold me responsible for society's ills because my competitors don't have to worry about it, and if I do, I will get swept away by competition."

One pressure on companies to be mindful on their effect on society is public pressure and reputation, and many companies respond to this pressure by engaging in "Corporate Social Responsibility" (CSR). Indeed, some companies publish annual CSR reports that are fatter than their annual financial reports. The cynical view of this is that CSR is represents mostly lip service --- "Companies talk about some nice things they do for some people in order to distract from the nasty things that their normal operations do to many people". There is indeed some evidence for this, although there is also evidence that social and environmental CSR activities reflect internal discipline and process capabilities which are then related to positive business performance.

But the question remains --- is caring about society sustainable (does it allow success) for a business that does not enjoy help from the government? "Ethics" refers to "doing the right thing not only for yourself but also for others", so in essence, the question is, as pertinent in Western countries as in China, whether an ethical strategy can be a good business strategy? In this article, we show an example from China, where by being creative, a company found an ethical strategy that provided it differentiation and business sustainability as well as ethical benefits for society.

2. Ethics as a Business Strategy: Sinyi Realtors Taipei

The Taipei-based real estate broker Sinyi Co was founded by Chou Chun-Chi in 1981 and has since become the largest and most respected Real Estate Brokerage in Taiwan, with a 15% market share, revenues of US\$190m, profits of US\$27m and 3,000 employees in 2016. At the start, Mr Chou found a scattered industry where the practice of “earning the price spread” was common --- if the final purchase price was higher than the seller’s original minimum price, the agency would appropriate the difference between the two prices in addition to the (legal) commission. One of the first things Mr Chou introduced was the principle that Sinyi would not take advantage of this (unethical) information arbitrage, but offer the customer transparency. This first practice was then expanded in a large number of service innovations over time, all aimed at serving the customer in a clean and transparent way. This has been formalized in the company’s mission:

Our purpose is to foster secure, speedy, and reasonable realty transactions through the synergy of expertise and teamwork, providing Sinyi’s employees with a secure working environment in which to grow while generating reasonable profits to sustain the group’s survival and development.

This mission statement explicitly sets multiple goals, in the words of the Chief Ethical Officer, “Balancing the benefits among the broader set of Sinyi’s stakeholders: customers, employees, shareholders, society and the environment.” Sinyi is a for-profit organization, but rather than maximizing profits, it pursues *reasonable* profits while sharing with stakeholders --- an ethical mission. Starting with the principle of foregoing the price-spread arbitrage, it has introduced additional customer benefits over the years without compensation, such as full coverage of customers against negative surprises in a house. Sinyi is also leading in its environmental footprint reporting and makes significant contributions to civic projects in its communities.

Is this only lip service? The reality of Sinyi’s mission becomes apparent when we look at the operational goals with which Sinyi executes its strategy. As the ethical strategy has two main components --- ethics as customer value and differentiation, and ethics as principles that ensure sharing with stakeholders --- we summarize the strategy implementation in two pictures. The first is revenue achievement, based on a differentiated strategic position of “customer service and customer trust.” This positioning is cascaded into operational targets and processes as is shown in a simplified way in Exhibit 1.

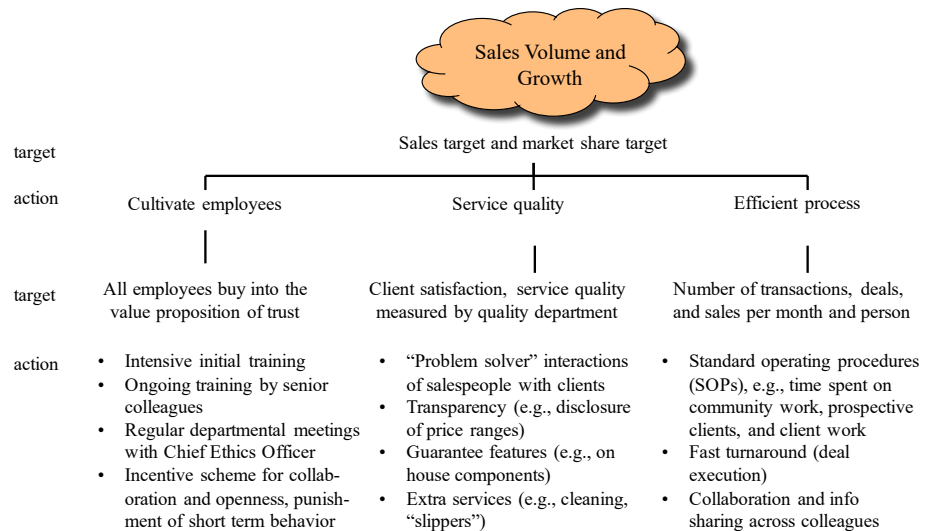


Exhibit 1: Cascading of Sales Targets at Sinyi (numerical target values not shown to preserve confidentiality)

The exhibit shows the sales target (revenues and market share, without numerical values to preserve confidentiality). Below the targets are high-level actions that pursue the strategic priorities: employees must buy into and "live" the premise that customer trust and ethical behaviour translate into business, Sinyi sells not just houses but a service, so achieving high service quality is a high-level action, and efficient processes must support selling (consistency and speed). Each high-level action has a target --- all employees must buy into the trust value; service quality is formally measured by various customer satisfaction measures that are administered not by the sales organization and its branches, but buy a separate quality department; and there is a variety of efficiency measures in terms of customer interactions and conversions per branch and month.

The next implementation level shows actions that, in turn, support the higher-level targets. On the left of Exhibit 3, Sinyi places priority on employee training, formally and through cultural immersion. In the center, client satisfaction is formally supported by emphasizing the help and problem solving nature of the individual realtor's work, transparency built into the processes (such as openness on the price range or the status of the deal, including multiple bidders), additional services such as guarantees, and add-on services on a case-by-case basis depending on what individual customers need or value. On the right, the processes support this in the form of SOPs, which structure the sales person's work, structure the legal deal execution (for the legal execution department, there is an entire set of lower-level process goals through which they have reduced the legal turnaround by a third over the last 5 years), and enforce team collaboration and information sharing.

These formal business goals do not fully capture the ethical principles of “sharing benefits with stakeholders” --- the sales goals build on the assumption that being ethical also builds trust and good business, but the stakeholder ethics are also a goal in their own right. Therefore, they also need to be connected to operational activities across the company, as shown in Exhibit 2.

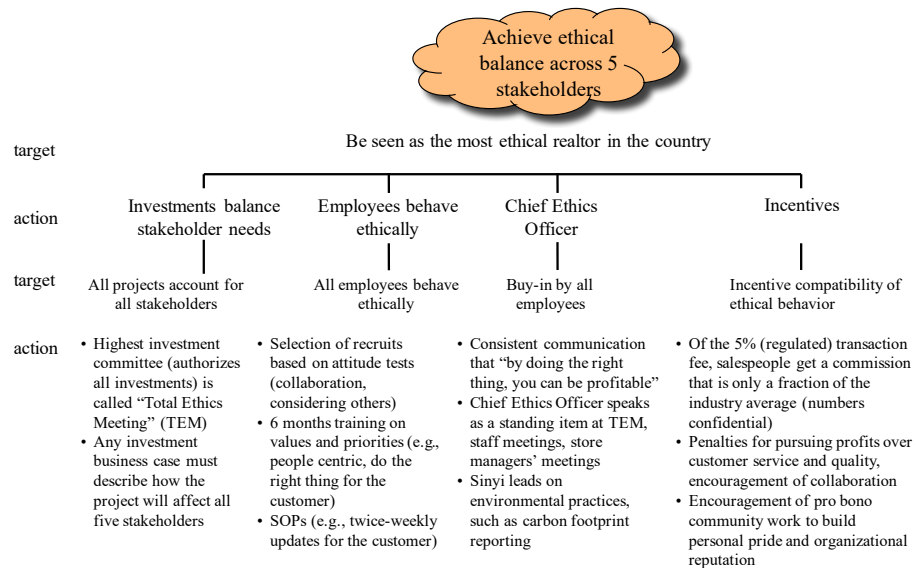


Exhibit 2: Cascading of Ethics Across the Company

The target that “implements” the vision is to achieve a clear reputation as the most ethical player in the industry. This is supported by three high-level actions: by having investments explicitly acknowledge the needs of all stakeholders, by employees behaving ethically (according to these norms), by having installed a Chief Ethics Officer in 2010 who embodies the culture of employee centeredness and ethical behaviour, and by explicit incentives. Each goal has again a target, from “all projects following the principle” to “achieving incentivization of ethical behaviour throughout”.

The actions reach from naming the investment committee “Total Ethics Committee” to requiring each business case discussed in this committee to explicitly consider effects on all stakeholders (and the committee then judges the quality of the balance). We see again the strong emphasis on HR practices, not only training (as discussed in Exhibit 1), but also formal selection of new employees according to their interest in others and ability to consider others and collaborate with them.

The Chief Ethics Officer (third action) has a combined role of being the “conscience” of the organization, informally prodding compliance with the

ethical principles, and of catalyzing ethics-oriented innovation. This fundamentally rests on a close relationship between the CEO and the Chief Ethics Officer. For example, the Chief Ethics Officer gives a short presentation in every meeting of the TEM, reminding every senior office that the ethical principles of the business are a priority. Second, the Chief Ethics officer tangibly resolves dilemmas and conflicts in the organization. In one case, there was a dispute about the sharing of a commission between two salespeople who both contributed to a large sale. The Chief Ethics Officer went back to the principle within Sinyi that “taking advantage of others is a sin”, and advised that the more senior salesperson should concede more of the commission to the more junior person in the spirit of senior staff’s responsibility to help and develop junior staff.

This example is directly related to the incentive structures in Sinyi: the balance of commissions to salaries is lower at Sinyi than elsewhere, which emphasize team work and ethical (customer-oriented) service more relative to revenues than at the competitors. Violations of customer service quality (to get a deal) are explicitly penalized (for example, shaming as well as explicit fines, where the shaming in front of colleagues is perceived as more important), and team work and engagement in external activities *pro bono* are encouraged and informally rewarded.

Resilient Organization: Communication and Bottom-Up Innovation

These practices have visibly resulted in all employees understanding the company values and what these stand for. In our interviews in the company, employees at all levels demonstrated a clear understanding of what makes Sinyi unique, which is of course related to the priority expressed by the Chief Ethics Officer that “people must believe that this positioning can breed success”. And all employees express a confidence that they can be heard by top management if they want and need to. The strategy implementation at Sinyi is not a cold mechanic clockwork, but it embodies the values of the owner and CEO at the top and his senior team. This shows how some of the implementation goals can explicitly cut across the entire organization, and the interdependence of the various organization’s parts is further emphasized by the fact that some of the goals are shared. For example, the goals of the initial 6-month training are certainly sales effectiveness (“it taught me how to speak to people,” said one salesperson), but they go further to encompass collaboration and the empathy to look out for other as an end in itself, apart from business goals. Similarly, the encouragement of sales people to engage in their communities serves the mobilization of business opportunities, but it also mobilizes the sales personnel to add value to their communities in its own right, as the “conversion” of community contacts is not measured. These double-purposes of actions across several strategic goals explicitly acknowledge that people do not sit in siloes but are interdependent.

The emphasis on acknowledging horizontal interdependencies is

supported by horizontal interactions: branch-specific goals, or function specific goals, would not work if the organization was not aligned behind a common understanding of the company's mission and common values. Multiple HR practices specify selection as well as training of employees in ways that systematically teach them, in the first year after they arrive, the importance of this balance and how to achieve it. In the words, of the Chief Ethics Officer, "We tell our people that quality, transparency and honesty toward the customer will lead to profitability. The salespeople must believe this, otherwise our company does not work. If we execute the business successfully in this way, we are generating a profit machine, with the employees at the center, with which we can then also increase the benefits to the environment and society."

So far, we discussed goals that arise top-down from the "vision of the business". However, as competitors have for 20 years copied Sinyi's positioning by talking the same language and promising the customer the same integrity (although none of them actually matches the consistency of customer service), it is crucial to evolve the positioning to stay ahead. Sinyi has continued to innovate with new services over the last 20 years.

Such guided innovation triggers projects that address weaknesses (e.g., process improvements that respond to customer feedback) or strategic opportunities (such as a major Management Information System that will increase customer knowledge, sales records and process integration). Such strategic projects are agreed in the TEM and driven by the strategy office (the owner of strategic projects) and the customer service department.

But there are many activities that empower employees to initiate activities and even influence goals, driving strategic innovation and change also from the bottom. Salespeople have a budget to test new ideas in customer service, for example, one salesperson bought a client disposable slippers to visit a house, because this person did not like walking in other people's slippers. This feature then became a formalized option in the SOP.

A symptom of the strong motivation of the frontline employees to make changes is that they can all send direct messages to both the CEO and Chief Ethics Officer, all of which are read and responded to, and a few of which indeed result in commendations or follow-up projects. And the middle managers (store and regional managers) bring innovation opportunities to the TEM for discussion. As a result, Sinyi has managed to steadily improve operating performance (such as significantly reducing the legal process of deed transfer and contract execution) and has introduced roughly one new service every year, such as a "takeback guarantee" in the case of later discovered problems, or an investigative service to find whether someone had died in the house over its history (an important issue in Chinese culture).

Salespeople can also formally initiate process changes---for example, visiting the stock of "houses for sale" used to be done weekly, every Friday, but salespeople found that this was sometimes too slow to respond to competition for hot properties, and now the process allows them to visit a new house at any time when it comes up. They discuss ideas in the daily shop "morning meeting" --- some of these practices are very much in the spirit of continuous improvement in Total Quality Management. As a result, the sales people feel that they "own" the SOP, that the SOP reflect what they know and share as best practice. Of course, not all proposed process changes are accepted: one salesperson experimented by cleaning a house for the buyer (to trigger the final purchase decision), but making this part of the SOP would have added too much cost and was rejected. But the end result of the ability of the front line salespeople to change the processes is a sense of ownership --- they feel they have an influential voice, which in the spirit of "fair process" motivates them to identify with the organization and to go the extra mile.

3. Conclusion

Sinyi Realty is an example of how good management, using a strong ethical vision together with creative ideas from many people, can achieve an ethical company position that creates true value for society. The discipline and sophistication of management that are necessary to indeed implement an ethical vision then also helps the company --- by empowering loyal and motivated employees to share their ideas, which enables the company to develop its position further and to be resilient to external challenges. Maybe this is merely good business, but few achieve it, in the East and in the West.

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