
William P. Fisher, Jr.

BEAR Center, UC Berkeley
and Living Capital Metrics LLC

BEAR Seminar
1 October 2019
Outline

• Background on measurement, metrology, and economics
• The Basel Committee on Banking Supervision and the Basel Accords: II, III, and IV
  • Some history
  • Basic purpose
  • Three measurement approaches
• Reinvigorating established but neglected econometric principles
  • I. Fisher and Frisch: separation theorem, necessary and sufficient tests
  • Data autonomy, model identifiability
• Rasch construct modeling as a basis for a new risk metrology
• Sketching a way forward
Background on measurement, metrology, and economics

Metrology and the State: Science, Revenue, and Commerce

William J. Ashworth

Science 19 Nov 2004:
Vol. 306, Issue 5700, pp. 1314-1317
DOI: 10.1126/science.1102551
Background on measurement, metrology, and economics

- "...any activity whose performance can be perfectly measured objectively does not belong inside the firm. If its performance can be adequately measured objectively it can be spun out of the firm and contracted for in a market transaction..."

Background on measurement, metrology, and economics

• But objective measurement alone is insufficient:
  • "In the West, by contract, every parcel of land, every building, every piece of equipment, or store of inventories is represented in a property document that is the visible sign of a vast hidden process that connects all these assets to the rest of the economy. Thanks to this representational process, assets can lead an invisible parallel life alongside their material existence. ... By this process the West injects life into assets and makes them generate capital."

Background on measurement, metrology, and economics

• To be effective, objective measurement and legal ownership rights must be combined in practical, socially distributed networks, because:
  • “Markets are not spontaneously generated by the exchange activity of buyers and sellers. Rather, skilled actors produce institutional arrangements, the rules, roles and relationships that make market exchange possible. The institutions define the market, rather than the reverse.”

Background on measurement, metrology, and economics

• To be effective, objective measurement and legal ownership rights must be combined to create the vast hidden networks connecting individual assets to the economy as a whole, because:

  • “...the making of markets as a practical accomplishment [is] achieved through particular types of instruments,” instruments capable of mediating “practices that frame the capital spending decisions of individual firms and agencies, and that help to align them with investments made by other firms and agencies in the same or related industries.”

Mediating instruments help institutions define markets via consensus standards for representing obligatory passage points and boundary objects.

Can metrologically traceable mediating instruments’ roles in making markets be extended from manufactured capital and property to human, social, and natural capital?

- "Practices of translation, replication, and metrology have taken the place of the universality that used to be assumed as an attribute of singular science."

A provisional unmodern resolution of the modern vs postmodern culture wars?

• Deconstruction’s Socratic gadflies accept language as the mediating instrument of communication
  • “When I take liberties, it's always by measuring the distance from the standards I know or that I've been rigorously trained in.” (Derrida, 2003, p. 62)
  • "As soon as you give up philosophy, or the word philosophy, what happens is not something new or beyond philosophy, what happens is that some old hidden philosophy under another name...goes on dominating the research in a dogmatic or implicit way.... That's why I am true to philosophy.“ (Derrida, 1989, p. 218)
A provisional unmodern resolution of the modern vs postmodern culture wars?

• Hermeneutics’ Socratic midwives similarly accept that language conceals as much as it reveals in its function as the mediating instrument of communication
  • “...the part of lived reality that can enter into the concept is always a flattened version--like every projection of a living bodily existence onto a surface. The gain in unambiguous comprehensibility and repeatable certainty is matched by a loss in stimulating multiplicity of meaning” (Gadamer 1991: 7).
  • In other words, "all interpretation makes its object univocal and, by providing access to it, necessarily also obstructs access to it" (Gadamer 1991: 8).
A provisional unmodern resolution of the modern vs postmodern culture wars?


A provisional unmodern resolution of the modern vs postmodern culture wars?

• Actor Network Theory focuses on the role of mediating instruments and metrology in supporting distributed cognition.
  • "Every time you hear about a successful application of a science, look for the progressive extension of a network."
  • "The predictable character of technoscience is entirely dependent on its ability [p. 250] to spread networks further."
  • "In all these mental experiments you will feel the vast difference between principle and practice, and that when everything works according to plan it means that you do not move an inch out of well-kept and carefully sealed networks."
  • "Metrology is the name of this gigantic enterprise to make of the outside a world inside which facts and machines can survive."

IMEKO 2016 Joint Symposium
UC Berkeley Clark Kerr Campus

First ever measurement and metrology conference with nearly equal numbers of psychometricians and engineers in attendance
An Online Platform for Sociocognitive Metrology!

The BEAR Assessment System Software

William P. Fisher, Jr and Mark Wilson

BEAR Center, Graduate School of Education, University of California, Berkeley, California, USA
Leslie Pendrill

- Chair 2009 - 12 for EURAMET ([www.euramet.org](http://www.euramet.org)), the European Association of National Metrology Institutes
- Currently Chair of the ISO TC12 on Quantities & Units
Pendrill’s forthcoming book

Springer Series in Measurement Science and Technology

Quality Assured Measurement
Unification across Social and Physical Sciences
Authors: Pendrill, Leslie
Jeanette Melin

• Coordinator of multiple projects aimed at initiating a **new national metrology institute for categorical quantities**


Research Institute of Sweden (RI.SE)

Claes Winzell

• Vice President, Head of Measurement Science

• Email communication on 30 September 2019 after meeting in Stockholm on 29th:
  • “RISE is going to spend substantial internal resources in building a science and project portfolio on the subject ‘Measure for Transformation.’”
  • “The various industries in Sweden need help with that.”
  • “I am sure I will be back to you.”
Angelica Lips da Cruz, INNORBIS

- [https://www.innorbis.com/](https://www.innorbis.com/)

- Dynamic and forward looking analytical tool for accelerating impact & sustainable development

- A digital solution for decision making that shifts priorities towards social and environmental impact, with a transparent and scientific integration of social, natural, human and financial data, for making the world a better place including growth opportunities for all stakeholders.
Basel Committee on Banking Supervision (BCBS)

• Established as an international authority in 1974 by the central bank governors of the eleven countries providing lending resources to the International Monetary Fund (IMF).

• After several expansions in the intervening years, the BCBS now has 45 members.

• It does not issue binding regulations, and is not based in an international treaty.

• It is rather an informal body that recommends policy solutions, common approaches, and standards, such as those included in the Basel Accords, useful to solving problems of financial capacity and information.

• The overall intention is to minimize the possibility of large scale financial catastrophes.

• The emerging problem, which in many respects still has not been identified or articulated by BCBS or the banking industry, concerns the limits of traditional methods of financial accounting and statistical modeling.
The 1988 Basel Accord, known as Basel I, published recommendations for banks' minimum capital requirements. Basel II, initially published in 2004, was significant for trying to better align capital requirements with risk appetites, and for reducing opportunities for "regulatory arbitrage," which entails mechanisms for profiting from rigidly fixed rules contradicting economic reality. Importantly, credit, operational, and market risk were defined and quantified. Basel II was largely implemented by the time of the 2007-2008 recession. Basel III was formulated in response to the failures causing that crisis.
Basel II

• Three pillars in support of a stable banking industry:
  • Minimum capital requirements determined by quantified risks
    • Credit
    • Operational
    • Market
  • Supervisory regulation focused on nonquantified risks
    • Systemic
    • Pension
    • Concentration
    • Strategic
    • Reputational
    • Liquidity
    • Legal
  • Market discipline facilitated by disclosure requirements
Basel II

• Bespoke measurement systems
  • Idea is to align real world economics of capital with regulations
  • Effect is to allow banks to tailor their risk estimates and minimize capitalization requirements

• Internal Capital Adequacy Assessment Process (ICAAP)
  • All forms of risk are accounted for
  • Expected to be integral part of material business activities
Known problems with credit ratings and risk measures

• Basel III is criticized for expanding Basel II regulations without addressing its basic presuppositions, especially the ever-growing reliance on standardized assessments of "credit risk."

• “The story of the credit rating agencies is a story of colossal failure.”
  • Henry Waxman (D-CA), chairman of the House Oversight and Government Reform Committee between 2007 and 2009.
  • Quoted in:

• Though the issues are complex, having firms pay the credit rating agencies sets up a conflict of interest in which the agencies are motivated to provide higher ratings.
Basel Accords III

• Criticized as negatively affecting the stability of the financial system by increasing incentives of banks to game the regulatory framework to the point of profiting from the predictability of the year-end adjustments to holdings needed to minimize capitalization requirements.

• Robert Reich asserts that Basel III did not go far enough to regulate banks as he believes inadequate regulation was a cause of the 2008 financial crisis.

• In 2013 the global banking sector won a significant easing of Basel III Rules, when the Basel Committee on Banking Supervision extended not only the implementation schedule to 2019, but broadened the definition of liquid assets.

• Implementation has now been delayed until 2022.
Basel Accords

• Basel II specifies three measurement approaches
  • Basic Indicator Approach
  • The Standard Approach
  • The Advanced Measurement Approach (AMA)
• Standardized external auditing and modelling is an issue proposed to be addressed in Basel IV.
The Advanced Measurement Approach

• The AMA requires four data types
  • Internal loss data
  • External data
  • Scenario analysis
  • Business Environment and Internal Control Factors (BEICF)

• The AMA does not, however, require any specific modeling technique.

• The AMA is the specific mechanism used to justify models maximizing profits and minimizing capitalization requirements (Slovik, 2012).

• Accordingly, in 2016, a new Standard Measurement Approach (SMA) was introduced to replace both the AMA and the Standard Approach.

• Under SMA, capitalization requirements will be more difficult to minimize via modeling methods that are flexible towards estimates of operational risks.
Basel Accords

• Actuarial techniques dominate quantitative modeling in finance, using risk and loss event severities and frequencies to analytically define distributions general enough to inform policy and practice.

• “The Loss Distribution Approach (LDA) has evolved as industry standard for operational risk (OR) models despite a number of known weaknesses. In particular, LDA’s traditional focus on historical loss data often neglects expert knowledge that is available for OR types of a more predictable nature.”

• “The implementation of [an alternative quantification technique, so-called exposure-based operational risk (EBOR)] models is a challenging task since new types of data and a higher degree of expert involvement are required.”
Basel AMA criticisms

• Moosa (2008):
  • No consensus on what constitutes this approach
  • Its implementation is difficult
  • It is unlikely to pay off in terms of costs and benefits


• What’s needed:
  • Consensus on what the approach is
  • Easier implementation
  • Return on investment
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• Sketching a way forward
Separation Theorems in Econometrics and Psychometrics: Rasch, Frisch, Two Fishers, and Implications for Measurement

William P. Fisher, Jr.  wfisher@berkeley.edu  5 May 2018

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<th>Scandinavian Economic History Review</th>
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Reading growth curves for 15 cohorts of North Carolina students, 1995-2014.

Each cohort is comprised of one group of the same students.

N = 1,012,118

Figure 4 in Williamson (2018)
Thank you

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