

The Direct Economic Measurement of Innovation: Eight Steps in Commercial Knowledge^{III}

Each **Step** uses otherwise neglected data, or interprets such data, to illustrate increasingly complex commercial activity that puts innovation into Economics. Its direct economic measurement becomes a talisman linking growth to original factors that are arranged with utmost simplicity to provide new possibilities for economic enhancement, including Going Beyond GDP.

Step 1 - Develops an otherwise unknown economic equation that enumerates absolute product advantage by an analogy between creative destruction for money in the economy and species competition for food in nature. It overcomes the limiting anchor of current evolutionary modeling; its focus on the firm has little correspondence in nature. 5-13

Step 2 - Validates the equation's ability to quantify product performance (quality in Economics) in a dozen varied commercial instances, where performance is known or can be reliably judged, making it universal, and providing insight into limitations of the current hedonic method for correcting price indices, which cannot account for human factors in purchase decisions. The method provides a new segue from price to 'value'. 15-34

Step 3 – Enumerates the historical performance of light-bulbs to resolve the 'Price of Light' quandary that has stymied understanding of quality change bias in price indices for decades. 35-37

Step 4 - Develops algebra from the equation that shows that GDP is driven primarily by innovation. 39-40

Step 5 – Provides the economics of entrepreneurship across the Innovation Funnel; a treatment of creative destruction that exactly defines innovation and its measurement. 41-44

Step 6 - Applies this direct economic measurement of innovation to enumerate the consequences for individual firms when creative destruction grows the economy. 45-54

Step 7 - Sums manufacturing innovation to reveal a unique rising shape that provides a congruent match between current commercial R&D spending on creative destruction and future GDP. This not only reveals the long sought temporal link, but also provides a global innovation explanation for the great productivity slowdown from the 1970s. 55-64

Step 8 – Shows that Factor Productivity is insufficiently related to innovation and must be measuring something else. Offers **Smart Growth**, a system laid out in an Innovation Parallelogram across which simple mathematics between new variables controls creative destruction by the Innovation Funnel mechanism. Recommends that the proposed direct economic measurement of innovation be included in National Accounting so that its currently missing mechanistic role for growth is properly tabulated therein. 65-69

Provides evidence on the role Federal R&D has played in stimulating economic growth. 76

Tracks innovation in the 20th Century American Economy by answering all of Commerce's leading questions, Commerce (2007), referencing the above steps. 93-97

^{III} 'Over the longer term I would like to see economics researchers begin to incorporate more from the non-economics community', Griliches (1999).