

*Figure 13.1 Jan de Witt*

## 13. Some Speculative Conclusions

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### The Origins of Economics

The progress of knowledge has led to the development of sharp distinctions between closely related subjects. The modern science of economics has a well developed body of theory that has decided similarities to parts of mathematics, engineering, actuarial science, and other subjects.<sup>1</sup> The historical development of economics is identified with the development of ideas that relate to economic content. In conventional histories of economic thought, little attention is given to the role that developments in other subjects may have contributed to these ideas. Numerous examples where advances outside economics led to progress in modern economics can be identified: developments in hypothesis testing and time series analysis in mathematical statistics contributing to econometrics; techniques from actuarial science being adapted to financial economics; and stochastic processes and filtering theory being borrowed from engineering for use in macroeconomics.

The starting point for the history of economic analysis, the beginning of classical economics, is usually identified with Adam Smith because the *Wealth of Nations* is the first book that was recognized at the time for developing a comprehensive and cohesive body of theory that was substantively distinct from other related subjects. Contributors prior to Smith are typically categorized as 'precursors of Adam Smith' or 'pre-Smithian economists' or 'pre-classical economists'. Yet, in key subject areas of concern to financial economics, there was an impressive and substantive body of knowledge that had been developed prior to Smith. Some of this knowledge, such as the early mercantilist writings on foreign exchange markets, was unjustly discredited by Smith. Other areas, such as the pricing of aleatory contracts, are not examined by Smith at all or, as in the various facets of joint stocks, Smith's treatment is only cursory.

Does Adam Smith deserve to be credited as the founder of modern financial economics? In a sense, because modern financial economics is a part of the larger subject of economic science, Smith has a claim to founder status. Following Stigler (1965, p.4), progress in science is measured by the opening of 'eyes to new ideas or to new perspectives on old ideas'. In most cases, recognition of originality requires the

techniques of persuasion (p.5): 'The techniques of persuasion ... repetition, inflated claims, and disproportionate emphases ... have preceded and accompanied the adoption on a large scale of almost every new idea in economic theory'. This requires 'the techniques of the huckster'. In this light, substantive contributions prior to Smith that went unrecognized at the time, such as Cantillon's *Essai*, cannot be considered as the starting point for the history of economic analysis because there was no discernible impact on received opinion. In terms of classical impact, Smith was unrivalled.<sup>2</sup>

Yet, a central theme in this book is that the origins of financial economics lie well outside the conventional boundaries of the history of economic thought. These differences extend to the philosophical foundations underlying the subjects.<sup>3</sup> The roots of financial economics can be traced to the commercial arithmetic taught in the Renaissance reckoning schools. At this time, many essential problems in financial economics posed ethical, as well as analytical difficulties. For example, determining the fair price of a sequence of cash flows involved concepts of interest, that were touched by usury considerations. Other examples involved setting a price for risk or determining fair compensation for a contingent claim, both of which involved the ethics of gambling. All this complicates the task of constructing an early history of financial economics.

In financial economics, the scholarly incentive structure is somewhat different due to the potential for pecuniary and other gains in the financial markets and other arenas. To be sure, there were contributions to the early history of financial economics motivated by the desire to achieve social, if not academic, recognition. The commercial arithmetics, the mercantilist musings, the debates over the legal maximum interest rate all fall into this category. By design, these contributions are recorded in published primary sources. But there were also many important contributions, due to some anonymous merchant or reckoning master, which went unrecorded. In addition to the various arbitrage trading strategies for bills of exchange and derivatives, this category also includes the methods used to set premiums for maritime insurance, the pricing of option contracts, and the somewhat unethical techniques for manipulating commodity and stock markets.

Whatever the reason for the absence of primary sources on certain topics, unravelling the early history of financial economics poses considerable challenges. Due, perhaps, to a relative absence of hucksterism, it is often more difficult to associate turning points in the

evolution of financial ideas with specific individuals than is the case in other subjects such as mathematics, statistics or conventional economics. In addition, many of the requisite contributions were not exclusively concerned with financial content, as reflected in the early commercial arithmetics, or Malynes's *Lex Mercatoria*, or de Moivre's *The Doctrine of Chances* or Price's *Observations*. The subject matter crosses the boundaries of a number of modern academic subjects. As a consequence, the genealogy of financial economics is decidedly different from conventional economics. Well before the writings of the giants of classical political economy, such as Smith, Ricardo and Thornton, financial economics had achieved numerous impressive and substantive results.

### The Origins of Financial Economics

The origins of financial economics lie outside the well defined boundaries of the conventional history of economic thought. Though the roots of financial economics can be traced back to antiquity, using the late fifteenth century as a starting point for the early history is pedagogically useful. By this time, financial economics was being widely disseminated among the merchant classes as the commercial arithmetic that formed the core of the reckoning school curriculum. From this point, until the appearance of the *Wealth of Nations*, the founding work of classical political economy, financial economics underwent a dramatic transformation. By the middle of the 18th century, sophisticated techniques for pricing contingent claims such as life annuities had been developed and applied to the establishment of life insurance and pension funds. In addition, modern techniques for trading fixed income securities, joint stocks, as well as options and forward contracts had emerged.

Relative to other areas of economics, there is an absence of studies on the early history of financial economics. This relative absence is quite general, extending beyond the specific efforts of historians of economic thought. This begs an obvious question: why has the history of financial economics been relatively ignored by historians of economic thought? The search for a resolution of this question in the early history of financial economics leads, almost inevitably, to the observation that financial economics originates in an intellectual tradition that is decidedly incongruent with conventional economic science. The scholarly intellectual foundations of economics, as reflected in the writings of Adam Smith, stand in contrast to the

practical musings of the merchants and applied mathematicians who were the early financial economists. Where Smith was concerned with justice in economic relationships, the early financial economists were concerned with devising rules for pricing securities.

This incongruence in the intellectual foundations permits financial economics to claim scholars such as Petrus Ramus and Rudolf Snellius as intellectual forbearers. During the 16th and 17th centuries, these individuals advanced the notion that the subject matter of university teaching could be seriously questioned as being overly complicated, theoretical and abstract (van Berkel 1988). The time line of financial economics is part of the intellectual rebellion against the humanist dominance of universities, at the expense of studies aimed at practical applications. One implication is that the absence of historical studies on financial economics is, at least partly, due to an inherent historical bias in university instruction and research. Though begrudgingly given a small place in university studies, the breeding ground for education in financial economics was the reckoning school and the later offshoots, such as the 17th and 18th century English writing schools.

Financial economics is 'use' oriented and, as such, has not been an overly interesting or accessible subject to those involved in generating humanist-oriented historical research. The modern era has witnessed the ascendancy of use-oriented subjects in intellectual discourse and study. What would Ramus think about the current state of university studies? He might be struck by how opposite the modern world is compared to his time. Humanist concerns, so important in his time, have now been depreciated to the point where these concerns are being overwhelmed by a tidal wave of use-oriented subjects. Engineering, computer science, applied science, actuarial studies, business studies, even medical studies have assumed a prominent role in the university curriculum. The 'use' in historical analysis is obscured by concerns of immediate practicality.

Though somewhat different from, say, the history of Elizabethan theatre, intellectual history of use-oriented subjects contains much that could be fruitful.<sup>4</sup> In particular, there are numerous interesting but largely unexplored issues in the early history of financial economics. For example, consider the issue of omitting compound interest in the Renaissance commercial arithmetics. This seemingly arcane question disguises an array of related issues. Some of these issues are immediate, such as assessing the impact of usury restrictions on stated market valuation practices. Did the reckoning masters teach one method in the classroom to merchant apprentices and use another

method in actual practice? How widespread was the use of compound interest in merchant valuations? These types of questions lead to less obvious issues, such as those arising in the collection and examination of primary sources.

Unfortunately, there are relatively few studies available that detail the early primary sources in financial economics. In some cases, the primary sources have been examined for some other context, giving only passing commentary to items of interest in financial economics. In many other cases, the primary sources are either unavailable or unexamined. On balance, there is currently a pressing need for detailed examination of the relevant primary sources of interest in financial economics. For example, certain Renaissance merchant manuals apparently had detailed descriptions of various merchant activities, including how arbitrage was conducted in bills of exchange. Another example concerns sources that describe the mechanics of arbitrage trading in stock options. That this trading was done is very likely, yet detailed primary sources have not been identified and examined.

All the uncertainty and paucity of primary sources makes it hard to trace the genealogy of certain contributions. Those involved in financial activities were often more concerned with the use of the ideas rather than with correctly recording the process of production. In some cases, the proprietary character of the ideas dictated against accurate recording. Even though affairs improved substantially from the time of the *Treviso* until the *Wealth of Nations*, certain types of activities are still elusive. While fundamental 17th and 18th century contributions to pricing life annuities are well known, arbitrage trading activities in the derivative security markets are decidedly obscure. While the genesis of methods for pricing life insurance premiums are readily identified, the methods for pricing maritime insurance are not. All this make an accurate assessment of the founders of financial economics a difficult task.

### Who are the Founders of Financial Economics?

The difficulties associated with primary sources pose obvious problems for the task of identifying the founders of financial economics. How is it possible to identify the contributions of an individual if there is no record of what was done? Even when primary sources are readily available, there are a range of analytical issues that make it difficult to recognize even the most seminal early contributions to financial economics. For example, the beginnings of modern contingent claims

analysis can be attributed to the Dutchman Jan de Witt (Figure 13.1), with secondary recognition given to his compatriot Jan Hudde, neither man being either a financial market practitioner or a scholastic. However, de Witt's pricing analysis was done using only theoretical assumptions about life contingencies. In perhaps the most remarkable contribution to financial economics, Edmond Halley provides a more rigorous theoretical solution to the valuation problem, as well as solving for annuity prices using an empirically determined life table. Is de Witt or is Halley to be considered the founder of modern contingent claims valuation?

There is a different situation involved in recognizing the contributions of reckoning masters such as Nicolas Chuquet. In this case, the seminal source for solutions to complicated problems in commercial arithmetic, such as those relating to topics in compound interest, is often obscure. In certain cases, the contributions were not so much seminal as pathbreaking. For example, even though fixed income valuation methods originate in the early commercial arithmetics, the most complete statement of the analytical foundation for modern fixed income analysis can still be credited to Abraham de Moivre. Although he was concerned primarily with the now out-dated problem of pricing life annuities, de Moivre was the first to substantively develop important mathematical techniques, such as series solutions, to the pricing of complicated fixed income securities.

In some areas, such as joint stock valuation, it is difficult to assess the contributions because the modern benchmark is still underdeveloped. Starting with the trade in joint stock in early 17th century Holland, important works have been largely descriptive. Perhaps the most notable is Joseph de la Vega's descriptive insights about the Amsterdam bourse in the 1680s. Only Thomas Mortimer and, possibly, Isaac de Pinto come close to the standard set by de la Vega. These primary sources fairly indicate that none of the authors fully understood the details of certain transactions that were being conducted, such as arbitrage transactions involving derivative securities. However, both Mortimer and de la Vega do demonstrate an active appreciation of the trading process, as well as excellent intuition about the impact of specific fundamentals on value of joint stocks.

Though his contributions were relatively circumspect, Adam Smith is such an important reference point for the conventional history of thought that it is almost essential to detail his writings on financial economics.<sup>5</sup> In particular, Adam Smith did provide an insightful and surprisingly modern summary of agency costs. Even though similar

views about agency costs can be found in studies predating Smith, the presentation of agency costs in the *Wealth of Nations* is noteworthy. The *Wealth of Nations* also contains other useful observations scattered here and there on topics such as bills of exchange and government debt management. However, the implications of insurance were apparently lost on Smith, even though he was present at the beginning of that feature of the financial revolution. On balance, it is unfortunate that Smith did not expend more effort on financial topics.

The early history of financial economics is populated by numerous significant contributions that were made by individuals who are also recognized in the conventional history of economic thought. Among these individuals are Thomas Gresham and Gerard de Malynes. Gresham is almost an enigma. In modern times, Gresham is associated with 'Gresham's Law', 'that bad money drives out good'. Yet, it is quite clear that this notion did not originate with Gresham and was almost certainly common knowledge at his time (Feaveryear 1931, p.73). This unjust recognition is balanced by the numerous unrecognized contributions, such as Gresham's proposal for an exchange stabilization fund or his precise statement of the workings of the specie points. As a royal factor, Gresham can be recognized for his efforts to manipulate the foreign exchange market for the benefit of the English government.

Gerard de Malynes is another figure important in the conventional history of economics. Together with Thomas Mun and Edward Misselden, Malynes contributed to the evolution of the export surplus doctrine, a defining feature of mercantilist thought. In this 'controversy ... the new views which were expounded by Misselden and Mun won a definite victory over the old views as presented by Malynes' (Viner 1937, p.5). Malynes's contributions to financial economics are substantively more positive, but still within this vein of 'old views'. 'Of all the mercantilists, Malynes is perhaps the one who was influenced the most by Scholastic doctrines' (de Roover 1974, p.350). This is reflected in his major work, *Consuetudo vel Lex Mercatoria*. Among the considerable number of merchants manuals of the period, the *Lex Mercatoria* is 'one of the best examples of this genre'. On numerous topics of interest in financial economics, Malynes's discussion of mercantile practices goes well beyond detailed description.

Considerable time separates Malynes from another, more important, individual in conventional history of economic thought, Richard Cantillon. Since Jevon's rehabilitation of the *Essai*, Cantillon's contributions to economic theory have become well known. Some of



these contributions, such as the use of a loanable funds model to determine interest rates, are also of interest in financial economics. Yet, much of Cantillon's contribution to financial economics is somewhat veiled. His stature as a man of financial history, intimately involved in the throes of the Mississippi scheme, private banker to important players in the bubble, is well documented. As such, his opinions of these events, captured in a few selected passages in the *Essai*, carry considerable weight. In this vein, Cantillon attributes the leading role to market manipulation, 'a Bank with the complicity of a Minister', at the expense of the unwitting people who 'get caught for want of understanding these operations, in which there enter infinite refinements or rather trickery'.

Though there are definitely a number of individuals familiar from the conventional pre-Smithian history of economic thought who also played a significant role in the early history of financial economics, such individuals are in a minority and are not typically in the first rank of contributors to the early history of financial economics. Consider the emergence of life insurance. Key individuals involved are **Richard Price**, who built on the early insights of **James Dodson** and the theoretical contributions of de Moivre. Prior to de Moivre, important theoretical contributions were made by **Edmond Halley** and **Jan de Witt**. None of these individuals is referenced in conventional texts on the history of economic thought, yet each of these individuals can be recognized as an important contributor to financial economics.

This incongruity is not limited to the subject of life insurance. Consider the development of compound interest. Significant contributions to this subject are often difficult to identify, even the actual usage of compound interest in merchant practice prior to the mid-16th century is also clouded. Yet, substantive progress in the sophistication of compound interest analysis can be identified around the end of the 16th and start of the 17th century, as reflected in the work of Flemish mathematician **Simon Stevin** and, somewhat later, in *Arithmetical Questions* by **Richard Witt**. By this time, compound interest calculations were sufficiently complex to sustain the presence of specialists, such as **Richard Witt**. These contributions are arguably the precursors of modern actuarial science. Though difficult to trace the individuals involved, by the time of **Richard Witt** compound interest analysis had moved far beyond the elementary presentations of the early commercial arithmetics.

The early history of financial economics is populated by a number of lesser figures, almost complete unknowns but for the contributions that

were made on a specific financial topic. One excellent example is Joseph de la Vega. Though largely descriptive, the *Confusion* is a classic of financial economics. Yet, this contribution is the extent of de la Vega's writings on financial economics. Some other lesser figures, such as Thomas Mortimer, were products of the financial marketplace. In addition to the highly successful and insightful *Everyman his Own Broker*, Mortimer aspired to make a more scholarly contribution. Though containing a number of insights on topics such as the sinking fund and the benefits of joint stock companies, the *Elements* has largely been ignored. One of the oddities of the *Elements* is that, in areas where the subject matter overlaps, the arguments contained in the *Elements* often eclipse the *Wealth of Nations*, at least in practical foresight.

In addition to Mortimer, there are other examples of lesser figures who made contributions to financial economics but who also had much higher aspirations. In the *Essay*, Isaac de Pinto sought to benefit the French by outlining his views on English government debt policy. The *Essay* was considered to be important enough that it was translated into English within a few years of being published in French. The main text of this work is disjointed, rambling and self-congratulatory. In another of the numerous oddities of the early history, the original translator of the *Essay*, the Rev. S. Baggs, considered an Appendix to this text not suitable for translation and omitted this material from the English translation. This Appendix, *Jeu d'Actions en Hollande*, provides perhaps the best available description of 18th century derivatives trading on the Amsterdam bourse. Though there are no issues of substance that did not also appear in *Confusion*, the discussion of derivative trading is more precise and insightful.

Certain figures in the early history are important, not so much for a contribution to the theory of financial economics, but, rather, for a contribution to the history of financial markets. One such figure is John Law. While the conventional history of economic thought recognizes John Law for his contributions to monetary economics, Law has little to offer to the theory of financial economics. Law's importance stems from his prime mover status in the Mississippi scheme. Whatever the misguided theories that underpinned the scheme, this event qualifies as one of the most remarkable in recorded financial history. A Scotsman, a fugitive from British justice, was able to assume control over the financial policies of the French government, perpetrating one of the most fantastic 'schemes' of all time. The

scheme itself produced a number of novel financial innovations, including the use of options to facilitate debt management objects.

In addition to Law, there are a number of lesser individuals who possess a similar stature within the pre-Smithian history of economic thought. Included in this group are: Nicholas Barbon, for his role in developing fire insurance; and Thomas Culpepper and Josiah Child, for contributions to the debate on legal maximum interest rates. The inclusion of Josiah Child in this list raises an important, intimately related problem in intellectual history: what is plagiarism? The early history does present problems of identifying where the contributions originated. From Fra Luca Pacioli, who borrowed liberally from numerous sources, to Etienne de la Roche, who plagiarized Chuquet, to Joshua Child, who commissioned works to which his name was attached, it is not always possible to identify the proper source of ideas. Rather, when such a name is included, the intent is to only provide a reference point, rather than to impute credit.

After all this naming of names, it remains to recognize perhaps the most important contributor of all to the early history of financial economics: **Anonymous**. The essence of financial economics arises in the market practices associated with the trading of financial instruments. Of necessity, the trading process involves pricing, the various financial instruments pose an array of pricing problems. In numerous cases, the solutions were developed by some anonymous merchant. These unrecognizable individuals made insightful contributions on many subjects such as arbitraging bills of exchange, pricing forward contracts on government debt, and doing put-call conversions for options. In addition to practitioners in financial markets, there were many now anonymous reckoning masters involved in merchant education who contributed to the body of knowledge on commercial arithmetic. Also, in the counting houses, now anonymous merchants developed the rudiments of double entry accounting and various applied aspects of fixed income valuation.

### **Some Speculative Conclusions**

What is to be learned from the early history of financial economics? Many features of financial markets have changed since the times of the Renaissance, the Reformation and the Enlightenment. The types of securities being traded, the market institutions, the legal and social environments have all been transformed. Yet, there are certain constants that remain. Included in these constants are the methods of

analysis used in valuation, as de Roover (1974) observes: 'The purpose of the history of economic thought is ... to study the genesis of ideas and the evolution of methods.' Close examination of the methods used in earlier times provides an informed appreciation about current valuation methods. This can yield insights into modern questions of security design and security valuation. For example, it would be possible and interesting to apply de Moivre's series solutions for life annuity valuation to the modern problem of deriving a closed form solution for a mortgage backed agency bond such as a GNMA or FNMA.

Another historical constant is human nature. Severe disturbances in financial markets are important historical events, yet there is only limited agreement as to the key contributing factors. Are these disturbances due to manias, manipulations or institutional failures? If only to aid regulators in designing rules to limit such disturbances, the answer to this question is important. The historical record provides insight into this question. The tulipmania, the South Sea Bubble, and the Mississippi scheme are financial disturbances that can offer some clues as to the state of human nature and institutions that precipitated financial dislocation. Rationality in economic actions is a key assumption of modern economic analysis. The actions of large numbers of individuals speculating amounts far in excess of their personal wealth calls this assumption into question. Insight into such questions can be gained from the historical record.

In addition to the human constants, the historical record also features numerous questions that were posed and examined at the time. Though the reasoning and solutions can leave something to be desired, there are often lessons that can be gleaned from the general discussion. A useful example is the sinking fund debate that offers numerous insights for modern government finance. The losing side in the sinking fund debate possessed two essential observations: the public debt, which is acquired largely during time of war, needs to be paid off during times of peace, if only to provide sufficient borrowing capacity to finance the next war; and debts acquired need to be funded from specific sources. Modern economics is unclear about these issues. In modern guise these issues appear as questions such as: is a balanced budget amendment desirable? and what is the optimal level of public debt?

At the beginning of the English revolution in government finance, there was a serious concern about the need to paydown debt in order to be able to meet future military and other contingencies. This insight has been largely forgotten in modern times. Another useful lesson is

that tying debt-financed government expenditures to specific revenue sources imposes necessary fiscal discipline on governments. The ability of modern national governments to book debt operations under the category of general revenue confers too much discretionary authority on elected representatives. The modern outcome was clearly anticipated: that high and continuing debt levels would provide a pretext for the imposition of high tax levels. With default ruled out by social conviction, high tax levels are needed to meet current expenditures that were achieved with the use of debt-financing.

One of the more arcane lessons that can be gleaned from the past relate to the methods of market manipulation. These activities seemed to pervade early financial markets, such as the market for shares in joint stock companies. The 'tricks' range from simply spreading false rumours, aimed at encouraging uninformed trading, to ingenious trades involving combined trading in both derivatives and cash securities. Some 'tricks' depend on the complicity of brokers. Some of the 'tricks' involved little more than fraud, such as the pre-Bubble Act promotions involving the sale of shares in dubious joint stock companies. In some cases, the manipulation has an objective other than individual profit, such as Gresham's manipulation of the Antwerp market for bills of exchange.

Somewhat incongruently, the early history also provides clues about the ethical foundation of activities in financial markets. Modern trade in stocks, bonds and money market securities is derived from the early contract forms: the *census*, the *societas*, and *cambium*. Scholastic doctrine on these contracts is quite exhaustive and sophisticated. Yet, the modern guidance provided by the Schoolmen is quite limited and only indirectly of consequence. The height of scholastic influence in civil law and social convictions predates important innovations in financial markets, such as the Financial Revolution and the emergence of joint stock companies. What provides modern relevance to the scholastic discussions is the profound issues that were being examined such as the importance of charity toward the poor and the implications of natural law for the proper conduct of business practice.

## Notes

1. Along this line, Ekelund and Hebert (1999) is an interesting study of the historical connection between microeconomic theory and engineering. As the title suggests, Ekelund and Hebert are concerned with exploring the mythology surrounding the origins of microeconomics.

2. Putting aside the obvious question of whether Stigler is, himself, engaged in hucksterism in an attempt to claim originality for his view of progress in economic science, Stigler's hucksterism argument can be used to motivate the David principle. More senior scholars and those at more reputable universities are better situated to engage in persuasion, leading to the propensity to attribute ideas to such individuals, even when the actual originators may have been junior academics or those from less reputable institutions. This is the 'David principle'. The university system, both contemporaneously and historically, has reinforced this process by designing a reward structure dependent on the process of assessing and attributing to individuals their specific contributions to the development of ideas. In most areas of economics, this process of attribution is the central incentive for scholarly research.
3. To quote from Chapter 1: 'The ghost of Ramist philosophy is found to be haunting the *Wealth of Nations*'.
4. The neglect by historians of 'use' oriented subjects is not systemic. In recent years, historians of science have exhibited a growing interest in the history of practice. Two excellent examples of this line of research are Daston (1987, 1988).
5. If for no other reason, Adam Smith must be considered a founder of modern financial economics because of his part of in the development of Economics.