supply liquidity through the bill market, so banks kept a buffer of bills and resisted aggressive creation of illiquid loans. By the 1950s, the Bank of England had been nationalized and shifted the enforcement of these conservative standards to direct supervision.

At the turn of the current century, originate-to-distribute returned to displace originate-to-hold. Competition increased as commercial banks lost segmentation from building societies, Scottish banks, and foreign banks. Excessive competition quickly unraveled the conservative equilibrium. Standards fell as banks sold loans to investors through securitization. Leverage increased as mathematical models replaced restraint. The Bank of England lost its mandate to supervise commercial banks, and the scale of the global money market grew beyond regulators' ability to manage. The catalyst for the global financial crisis may have been the United States, but Michie makes clear that the United Kingdom had made itself vulnerable.

Policy makers interested in the long view will find *British Banking* enlightening. Historians will find a book rich in detail that avoids mathematical modeling. Economists will see the complexity of a story integrating banks, money markets, central banks, and regulations. All will appreciate the frequent efforts to question conventional wisdom.

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The Politics and Perils of Space Exploration: Who Will Compete, Who Will Dominate? By Linda Dawson. Springer Praxis Books. New York: Springer Nature, Springer, 2017. Pp. xx, 199. $29.00, paper. ISBN 978–3–319–38811–3, cloth; 978–3–319–38813–7, e-book.
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Jeff Foust, of *Space Review*, notes that Linda Dawson's above-captioned book "is often little more than restating NASA press releases and various other articles, without offering much insight or demonstrating deep knowledge of the subjects." I am afraid I would have to agree. Economists, in particular, will have little to learn beyond her (competent) recitation of events. Above all, it is impressive how closely she adheres to NASA's well-publicized aversion to risk, especially when in comes to the lives of their astronauts. Dawson says in the preface that despite the well-known list of fatal accidents and other mishaps that did not end with death of astronauts, NASA's mission of "focusing on space science and celestial bodies is essential for the future of humankind and the betterment of Earth." While the benefits of space exploration clearly seem worth it to Dawson, we are not told what the "it" is, if not simply preserving the lives of spacemen and women, in which case they should probably just stay home and let robots take on the task. Neither do we know how and why space science and exploration would be justified in an audit of human well-being. This is a yawning gap in the book. Somehow, readers are supposed to intuit the worth of space exploration and technological spin-offs. Above all, we are not instructed as to how a public-sector entity is supposed to bring together the marginal social cost and marginal social benefit of the efforts in manned exploration, space science including robotic missions, and the monitoring of Earth's environment and resources.

Nor is there much analysis of the political side of the equation. Are all government agencies as risk averse as is NASA? Or does risk aversion just come with the territory, because NASA astronauts are the "best of what we are," and when space vehicles crash we have lost something truly priceless? Zubrin (2012) (an aerospace engineer, not an economist) argues the contrary case quite convincingly, pointing out that even if astronauts' lives were worth ten or one hundred times as much as those of lesser mortals, it makes no sense to confine space missions to low-earth orbit as a hedge against the risks they would take on a mission to Mars. NASA has already spent far more than can be justified by any "value of human life calculation."

Dawson is quick to point out, of course, that space vehicles don't kill astronauts, but people do, in particular through the breakdown of human communication. The book carefully avoids pointing fingers throughout the narrative, identifying only a mismatch of capabilities. Nor is there an historical backdrop to frame the analysis. Linda Ham and her infamous unwillingness to ask the

Air Force for help imaging Columbia on its final mission is not even mentioned in the book, despite the obvious connection to the "politics and perils" of space exploration. There is a fantastically interesting story to tell here, even if not strictly economic, that involves Dwight D. Eisenhower leaving a carefully placed wedge between the military and scientific uses of space, a wedge that has cast a long shadow over US policy ever since. Ike wanted overflight authority of Soviet airspace and the only way that could happen was if the Soviets overflew the United States first, as they ultimately did with Sputnik. This is why Eisenhower blocked Wernher von Braun from beating the Soviets to orbit with Explorer by giving the go-ahead to the Navy's Vanguard rocket. The latter was way behind von Braun's Redstone remake of the A4 rocket (renamed by Hitler the *V2*) and Vanguards blew up with great regularity as the Navy struggled to get it right. This gave the Soviets a launch window, so to speak, to be first to orbit the Earth.

The Soviets had won the first round of the space race, but Eisenhower was quite content with his consolation prize. Eisenhower was also famously afraid of military-industrial domination of the United States and the very establishment of NASA as a scientific, rather than military, agency has irritated Air Force brass ever since. Enmity between the Air Force and NASA has persisted and arguably led to the reentry breakup of Columbia and the death of its crew. Oddly, none of the politics of this particular peril comes up in the book, perhaps because the story has been so ably covered elsewhere (Cabbage and Harwood 2009; NASA 2003). In a book aimed precisely at the politics of space, however, the omission is glaring, since the Columbia Accident Investigation Board made all these connections quite public in what has come to be seen as one of the best and most thorough reports ever produced by a government agency.

That Dawson is bound to public-sector dominance of space policy is also evident in that she simply notes that "the Earth science budget [was] cut by almost 40 percent from previous levels that had been reached by the Obama administration," without pausing to comment that the Donald Trump cuts were motivated by blatantly political and wholly antiscientific aims. The planet may be warming, but if it goes unnoticed because we refuse to monitor it, then there is no point in abating CO_2 emissions. This is clearly a much larger debate, but for a book on the politics of space exploration, the analysis is thin. Klerkx (2004), and many others, have made the case that NASA has become a barrier to progress in space and pointed to the capricious nature of public funding as part of the problem. The ban on cooperation with the Chinese, mentioned but not analyzed, is another example of short-sighted, politically driven thinking about space. Whatever the downsides of an expanded private-sector presence in space, having politics randomly derail scientific goals is not one of them. By the way, the United States cooperated with the Soviet Union, in the Apollo–Soyuz program, at a time in which the fear of nuclear conflict was real and present. Current tension with China is, at least for now, a dustup by comparison.

The economic way of thinking so ably equips us with, but is denied to those who reject or ignore it, the insight that the problems of preference aggregation and preference revelation in the arena of public choice are not only difficult to solve, but in fact are logically *impossible*. Of all the basic principles of economics, the Arrow impossibility theorem is perhaps the most widely ignored, disregarded or disbelieved. In a society dedicated to the principles of democracy, the impossibility theorem is an awful Grinch. The impossibility theorem doesn't prevent space exploration by an agent of public choice; it does call out for other measures if a socially efficient allocation of scarce resources is to be approximated. NASA's Commercial Orbital Transportation Services program has, somehow, even miraculously, embraced this concept. This is admirable and should impart a sense of optimism that economics truly matters in one of the arenas most beloved by a wide swath of the citizenry.

Tracing back the logic of this argument for a moment, it should be clear that it applies only to problems of public choice. Charles Homans noted that the "market has a better idea of what's worth doing in orbit than the government does" (p. 23). While that is only strictly true in a world without public goods, it goes a long way in explaining the current mix of private and public efforts NASA is orchestrating to explore the final frontier. There is no impossibility theorem

for preferences revealed and aggregated in markets and this is what Homans (2010) has in mind when he refers to NASA's newfound "intergalactic Milton Friedmanism." It seems that NASA senses this intuitively and certainly has a better grasp of the problem than does Dawson.

Many of Apollo's children had non-single-peaked preferences, preferring that government spend nothing at all if it were not going to throttle up. Indeed, there are many in the space community who hold preferences so indelible that they would seem to transcend rational-choice theory. They justify their rigidity with the claim that those who would favor other public-spending priorities (health, education, or poverty reduction), simply don't fully understand what NASA, in its infinite wisdom, has chosen to provide. There is a touch of this attitude in Dawson, for whom the preference aggregation problem is simply one of incomplete information. Her goal is to enhance public understanding as a way of fighting "ratty com," astro-speak for static on communication channels. Once the public *understands* what the agency does, they will come to appreciate and support the mission statement and design. The public-choice problem is solved by getting the word out, educating the public.

A wholly appropriate question from the economists' bench is "on what margin?" With the NASA budget no bigger than what the US military spends on video games, one would certainly be justified in asking whether the marginal public dollar would be better spent exploring Mars or taming Afghanistan, to pick two examples with strikingly similar physical geographies. No reasonable economist, or indeed other social scientist, would argue that the *average* benefit of space exploration could rival the average benefit of health or education, but that is not the question. A marginal dollar spent on social programs might well have close to zero return, while the accumulation of scientific knowledge is still well within the range of increasing returns. Many scientists hold that the discovery of life somewhere in the solar system would be the biggest scientific achievement ever managed by the human race. Thinking "at the margin" is not the traditional province of government of course, but in this case, the imbalance between costs and benefits is more wildly out of line than usual. Dawson should help her readers overcome this gap. Sadly, addressing this issue in these terms is not what this book is about, even though it would seem to be necessary to Dawson's project.

Here, this review is taking a definite turn for the positive. While hardened space geeks might feel as short-changed as academics, both political scientists and economists, Dawson makes a good deal of information accessible to her readers. She is, after all, a professor herself and this book seems to be aimed at an undergraduate or general-purpose audience. Those who teach a space-related course that does *not* emphasize economic analysis might want to consider this either as a main text or supplemental reading. There are perhaps better books for every specialized approach, but this book is fairly up-to-date and does cover a wide range of topics. Supplemental readings would be necessary for more depth on any particular topic or subtopic.

The book opens with a chapter on "The New Space Race," which unfortunately cribs a title of the third chapter of Zubrin (1999). Dawson is more up-to-date, of course, but emphasizes the failures of SpaceX and Orbital more than their successes. One gets the feeling that a company line might be in toe here, but (most of) her facts are accurate.[1] Since the "perils of space exploration" are always uppermost on Dawson's mind, it is not surprising that her sharpest criticism here is that the private sector is *insufficiently risk averse* and that "only time will tell" whether budgetary and scheduling pressures will drive them to make the same mistakes NASA has. She doesn't quite get that the role of the private sector is to take risks, and reap the corresponding rewards, rather than rely on taxes, lobbyists, political persuasion, and public opinion to get humans to infinity and beyond. Capitalism is a whole different ball game than a government-led, politically motivated, cost-plus, centrally coordinated command and control national endeavor. The benefits of competition in the fledgling industry have already cut launch costs by a factor of ten through off-the-shelf parts and equipment sourcing, vehicle reusability, and esprit de corps in engineering and operations that is quite self-evident when

[1] See the review by Faust for some rather shocking examples to the contrary.

SpaceX successfully executes a back burn of the first stage onto one of its floating drone ships, "Just read the instructions," or "Of course I still love you." These technical successes are as much about marketing as anything else, a cynic might say high theater, but then, the private sector has always been about marketing while NASA's efforts at the public relations have always been, one might just say, "endearing."

Oddly, the first chapter concludes with a list of other government-sponsored space efforts. Here the trail turns cold for the reader in search of an inspiring vision of the future of space policy, as the narrative becomes one of rekindling public-sector competition. This was the principal driver of space conquest in the Apollo era and its effectiveness is without question. One cannot help but wonder if Dawson sees that as the enduring model, or whether she realizes that private-sector competition will most likely emerge as the main propellant of twenty-first-century space exploration. Economic history of virtually any sector would suggest that a shake-out will occur, with government retreating to the production of public goods, research, and robotic missions devoted to pure science. The profit making will be left to private sector, and appropriately so. In this model, NASA would continue in the essential role of technical advisor, much in the same way as the National Advisory Committee on Aeronautics supported the fledgling aviation industry in the interwar period. NASA is already rehearsing for this role with SpaceX and other new aerospace companies. Elon Musk can be seen earnestly thanking NASA, not only for tendering the factors of production, labor, land, and capital, but also for helping to solve the riddles that each of the failures presents. NASA is very, very good at this, largely because of its long institutional memory, a factor of production that the newcomers do not and cannot possess.

There are also introductory chapters on the dangers of space travel, the politics of the space race, and the post-Apollo period. All consist of lists of well-known points, but are not supported with data and by-and-large have little economic content. Most references are to web pages and many of those are to the agencies' own voluminous postings. In the most promising chapter, "Politics, the ISS and Private Enterprise" as before, her biggest stumbling block is the idea of a public good. For this author, the consumer of a public good is logically "the public." And when the public loses interest, "once again, the initial excitement of humans returning to space started to dwindle in the eyes of the public. . . [and] routine activities conducted in space fell into the background of American daily life" (p. 153). Without public support, there is no rationale for government spending in space. There is no mention of free-riders, any of the public goods provided by the space program, such as GPS, nor of government's role in the provision of goods underproduced by the private sector in order to achieve an efficient allocation of resources. Instead, she points to the public interest in movies, books, and video games as a source of optimism about a publicly funded space program. She remains skeptical about the capacity of the private sector to meet the challenge of "handling the complexity and safety of manned space flight beyond low-Earth orbit." The analogy to the development of the aviation industry is entirely lost in this analysis. So, too, is the role of competition. She doesn't see that what is lacking in publicly funded space efforts is the key driver in all private sector activities. Again, in the aviation industry, when British-built DeHavilland jets broke up over the Atlantic, a California company, Boeing, stepped up, fixed the problem and then dominated the industry for decades.

In chapter 8, Dawson decries the use of Russian Soyuz spacecraft to ferry US astronauts to the International Space Station (ISS) as a "controversial decision" and a "big expense when you are exchanging four astronauts [at 70 million per seat]" (p. 158). She does not mention that 280 million is just slightly more than half the cost of a shuttle launch. If the notion of comparative advantage ever applied to anything, it would apply to Russia's specializing in delivering astronauts to the ISS, while the United States specializes in building and upgrading the ISS, as well as other technology-intensive sectors such as the robotic exploration of the solar system. She also seems blind to the appeal of development from the bottom up, noting with approval Bolden's plan to involve Russia in NASA's plans for a mission to Mars, "in order to avoid duplication" (p. 159).

In the penultimate chapter, Dawson reprises her own personal risk aversion. In economics, and

dare say social science in general, risk is a cost, the magnitude of which is determined subjectively by a premium demanded by those who undertake it. Risk as a cost is minimized through market transactions and not, as Dawson claims, by leaving the dangerous stuff to the big boys. Dawson seems to sense that there is more to the story than simply minimizing risk, and her diffidence is palpable. She lapses into the passive voice: "It is thought that, despite past evidence to the contrary, NASA is the safest organization to oversee space exploration" (p.175). Perhaps smaller, more tightly controlled private organizations can reduce risk even further? No, that doesn't sound right either, so she simply punts: "We shall see. . . ."

Just as not everyone can be an aerospace engineer with a highly successful career helping humans explore space, not everyone can apply the economic way of thinking to social problems, especially in the realm of public policy. In this regard, this review may be asking too much. There is a fertile field to plow here, however, and someone soon will undertake to analyze problems in the domain of science and engineering, the science, technology, engineering, and mathematics fields, using the basic principles of our discipline. Hopefully a complex and subtle literature on these topics will begin to emerge.

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N Economic History

The Invisible Hand? How Market Economies Have Emerged and Declined since AD 500. By Bas van Bavel. Oxford and New York: Oxford University Press, 2016. Pp. ix, 330. $60.00. ISBN 978–0–19–960813–3, cloth.

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If one were to summarize van Bavel's *The Invisible Hand?* in one sentence, one could do worse than write that market economies carry the seeds of their own demise. Defining market economies as those who allocate factors of production (land, labor, and capital) predominantly through market mechanisms, van Bavel argues that their long-run dynamics are cyclical. An initial period of rapid growth is followed by an increasing concentration of wealth. As elites move to protect their position—to the detriment of the productive sectors—market economies enter a phase of stagnation and decline, typically marked by the contrast of a "golden age" of artistic efflorescence with shrinking incomes and living standards for a large majority of the population.

After an introductory chapter, the book plunges into three deep case studies of rise and decline: Iraq between 500 and 1100 AD, Northern Italy between 1000 and 1500, and the Netherlands between 1100 and 1800. Another chapter, somewhat confusingly labeled "Epilogue," discusses England, the United States, and Northern Europe between 1800 and the present, admittedly in less depth and without the benefit of long-run hindsight. Among all these, the analysis of the Dutch experience shines brightest. Van Bavel's deep expertise in the subject matter weaves an intricate web of connections of cultural, economic, and social aspects across time and space, and seamlessly draws the reader into a wonderful account of the economic history of the Netherlands from its inception through its golden age.

Economists, however, should read the book's conclusion first. Indeed, for someone who is not opposed to the idea of stylized facts and would rather skip the intricate detail, it might be useful to think of Van Bavel's contribution as an engaging thirty-seven page concluding chapter, preceded by a 250-page meticulous historical prologue. The conclusion, indeed, is the only