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**The Equity Premium Puzzle:
Australia and the United States in Comparative
Perspective**

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Abstract

The equity risk premium puzzle has received regular attention by economists since it was first invoked by Mehra and Prescott (1985) twenty years ago. In a recent paper, they revisit the question and reject many of the explanations offered but we are left with no clear alternative account. The current paper seeks to do two things. We provide matching historical evidence of the equity premium for Australia and compare the results for the two nations. Resulting from this, we argue that a closer understanding of phases of economic history helps to explain the puzzle.

JEL codes: G12; N2

1. Introduction

Twenty years ago Mehra and Prescott's paper in the *Journal of Monetary Economics* brought to light the existence of the so-called equity premium puzzle. The 'puzzle', or paradox, lay in the wide gap between real returns to equity and to government bonds revealed by a longitudinal study of the United States over the course of nearly a century between 1889 and 1978. Standard competitive equilibrium models suggested that, while an equity premium or gap should exist to reflect the greater risk associated with equity investment, this should converge to the order of one percentage point rather than the mean of six percentage points revealed by their historical research.²

Mehra and Prescott's work, while sceptically received at first, subsequently has received much attention in the economics literature. The focus has been on theory development and refinement in order to reconcile their quantitative empirical findings with economic analysis. Good summaries of the literature at different stages are provided by Kocherlakota (1996) and by Mehra and Prescott (2003). Various strands of theory development can be identified. Of central importance has been discussion of investor preferences, market incompleteness, and anticipated versus actual returns. Investors may be subject to greater risk aversion than traditional modeling assumed, particularly as a result of habit formation. Asset markets suffer from friction particularly as a result of differentials in transactions costs and asymmetries in information. Significant differences may exist between ex ante expected returns and ex post results.

2. The Equity Premium in Australia

It is evident from the above discussion that most of the literature on the equity premium puzzle has addressed conceptual and theoretical issues. There have been only limited attempts to look more closely at the historical data itself, calculations of the equity premium being mostly restricted to the United States or to the post-world War Two experience of several other similar manufacturing nations including France, United Kingdom, Germany, and Japan (Campbell 2003; Siegel 1994). In this briefing note, we calculate the equity premium for Australia across the same long run period as that of Mehra and Prescott for the United States. This provides us with an opportunity to draw comparisons of long term trends and shorter historical periods between two nations with distinctive economic structures. Australia's emphasis upon the primary resource industries and a relatively active role for government contrasts with American laissez-faire industrial capitalism.

The calculation of equity returns uses the same method as Mehra and Prescott, namely the holding return that incorporates dividend yields and changes in share prices. It draws upon Pope's 'all ordinaries' indices for share prices and dividend yields, (which fortuitously covers almost exactly the same period as Mehra and Prescott) and then is price adjusted with Shergold's GDP deflator. The results show a mean equity premium of 4.73 per cent covering the same period as the American data.

3. Comparisons of Australia and the United States

The decadal means are indicated in table one and figure one below, comparing Australia with the United States.

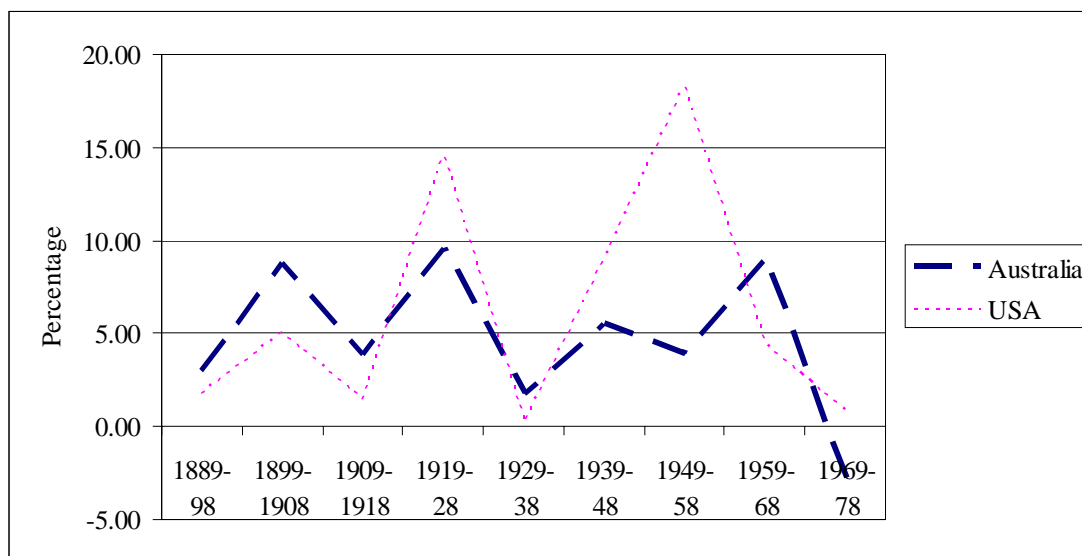
Table 1: The Mean Equity Premium in Australia and the United States, 1889-1978

	Australia	USA
1889-98	3.01	1.78
1899-1908	8.82	5.08
1909-1918	3.90	1.49
1919-28	9.53	14.64
1929-38	1.77	0.18
1939-48	5.49	8.89
1949-58	3.93	18.3
1959-68	9.07	4.5
1969-78	-2.91	0.75
Mean	4.73	6.18
SD	4.04	6.49

Sources: USA: Mehra & Prescott (1985); Australia: Pope (1987); Shergold (1987)

Note: The method of calculating the American equity premium is provided by Mehra and Prescott (1985). The Australian equity premium was calculated by initially summing the annual change in the share index with the dividend yield to produce the holding return. The bond yield was subtracted from this figure to achieve the nominal equity premium, which, in turn, was price adjusted with the Shergold deflator using the same base year (1972) as Mehra and Prescott.

Figure 1: The Mean Equity Premium in Australia and the United States, 1889-1978



Sources: as per Table 1

Several results are immediately apparent. Except for the 1950s, the trend is very similar between the two countries. However, the Australian mean premium over the century is nearly a quarter below that of the United States and the inter-decennial fluctuations are smaller and less volatile, as reflected in a much lower standard deviation. This suggests that cross investments between the two markets were relatively limited and were overlain by the existence of distinctive features for each capital market. Australia's very different historical experience from the United States and the other key industrialized nations was as a small nation specializing in the resource industries. As price takers in notoriously volatile sectors, one might expect investors to be more risk averse in their investment strategies, thereby implying a larger equity premium as fewer moved to take advantage of asset return differentials. This is the logic behind the conceptual literature. It might alternatively be postulated that less demand for equity would constrain the growth of stock market prices and thus possibly the holding return to equity. Another empirical observation is that the Australian character would rarely be regarded as risk averse: gambling and hubris being more noticeable. This might suggest a greater willingness to invest in risky equity ventures. Successive investor booms in the highly speculative mining industries would tend to confirm this trait (Blainey 2003). In addition, official policy fostered risk-taking investment, including the 'no-liability' mining share, whereby an investor was not obliged to meet further unpaid calls.

In fact, there is probably limited value in deducing particular conclusions about means averaged across a century worth of data in light of the much more limited time perspective of the individual investor and the enormous changes in the business environment across the course of time. Instead, we should scrutinize more carefully the data for shorter periods. What is striking for the US data is that in only 3 of the 9 decades is the equity premium above 5 per cent, and there are two clear outliers, 14.6 per cent for the 1920s and 18.3 per cent for the 1950s, which are more than double the mean; and in the latter case is triple the mean and more than double all the remaining decennial means. If we remove the two outliers the mean premium

of the remainder halves to 3.2 per cent. In the Australian case, outliers are less evident. However, if we remove the two highest figures, those above 9 per cent, the mean falls to a very similar 3.4. If, alternatively, we remove the top 2 and bottom 2 decennial means we get respectively 4.35 and 5.03 for USA and Australia. Thus, the American figure still fell noticeably from the original, while the Australian one actually rose marginally. This confirms the distinctive nature of two decades of American economic and business history, the 1920s and the 1950s, to the long term mean of the equity premium, or a range of other economic variables for that matter. Let us look briefly at the history of those two decades.

4. Phases of Economic History and the Equity Premium Paradox

The 1920s were a decade of rapid growth and structural change in the American economy. It is during this period that the origins of the modern consumer economy can be most accurately dated. Household appliances (washing machines, refrigerators, vacuum cleaners) and a wide range of automobile models became available, and whose purchase was facilitated and sustained by the rapid expansion of consumer credit facilities. Companies that were quick to recognize this consumer revolution, such as General Motors, experienced exceptional prosperity. Other corporations, located particularly in chemicals, pharmaceuticals, and electronics, established major research laboratories in the 1920s that generated new consumer products. These included Du Pont, Procter and Gamble, General Electric, and Westinghouse (Chandler 1990). Many of these companies invested overseas in the 1920s and 1930s, providing benefits to local equity holders in other countries, though to a muted degree as demonstrated by the Australian equity premium figures, which peaked in the 1920s.³

The 1950s additionally provided exceptional growth opportunities for the American economy. At the end of World War Two, the United States was well placed to exploit the economic benefits of peace. Its erstwhile competitors in Western Europe and Japan had suffered major economic and political dislocation. The provision of Marshall Aid (European Recovery Programme) provided further opportunities for American exports and overseas investment on top of an already booming domestic economy (Milward 1984). A range of new consumer industries, supported by sophisticated research and persuasive advertising, included television and air travel, while successive governments committed huge investments to economic infrastructure and military defence. By contrast, Australia performed badly in the early 1950s as the Korean War temporarily fuelled demand for wool exports. The collapse of the boom coincided with the adverse effects it had already had upon inflation and the international trade balance leading to a sharp contraction in output and in the stock market (Waterman 1972: 64-98). Some of this loss was made good, however, in the 1960s.

The two decades of the 1920s and 1950s presented American investors with exceptional opportunities in light of the rapid growth of real dividends and stock prices (Grossman and Schiller 1981; Siegel 1994). However, inter-temporal changes in risk aversion, driven by habit formation, and the distinction between ex ante decisions and ex post returns explain why these opportunities were not effectively exploited by investors. The post-World War Two decade had been preceded by a serious and sustained downturn in the American economy in the 1930s followed by the uncertainty, if not dislocation, created by the war. In these circumstances,

investors were likely to have become more risk averse than in other more stable periods of economic development. While the pre-1914 economic environment and that of World War One provided less grounds for risk averse responses, few could have imagined or predicted the remarkable economic expansion of the American economy in the 1920s. In each case, the distinction between ex ante expectations and ex post returns would have been substantial. Frictions created by differences in transaction costs and imperfect information may have delayed an investor response; once it did come from the middle of the decade share prices were driven to unsustainably high levels and with it holding returns on equity and the equity premium (Mehra & Prescott, 2003: 897, 900).

5. What is a reasonable ‘wedge’ and how quickly might it converge?

If the size of the equity premium in the 1920s and 1950s is explained by historical exceptionalism, are there grounds for accepting the residual long term figure of 3 to 4 per cent as a reasonable ‘wedge’? Here we can turn to some further profitability evidence from Australian historical experience. We would expect a gap between the return on equities and bonds both because of their varying risk profiles and because of any frictions in investors switching between different classes of asset. Equally, it would be reasonable to expect a much smaller wedge between investment returns in different equities, across industries or companies, because they belong to the same asset class and constitute similar levels of risk.

Table 2. Comparative profitability by selected ANZSIC, 1920-38 [HERE]

In a second set of Australian historical data, we have compared the returns to shareholders in different industries across the interwar period, organized upon the basis of the Australian and New Zealand Standard Industrial Classification.⁴ This measures net profitability after taxes and depreciation as a percentage of shareholder funds on a price adjusted basis. The data is extracted from the *Australian Investment Digest* and includes approximately 500 companies per year. The results of the two best and worst performing ANZSIC categories are presented in table 2 below. The best performing sectors, manufacturing and utilities (electricity, gas, water), average 8.2 per cent across the period, compared with 5 per cent for the worst two, wholesale trade and culture/ recreation, a gap of 3.2 per cent, or a proportionate difference in returns of more than 60 per cent. Nor is there any evidence of convergence across two decades. Manufacturing was the best performer in the 1920s. Explanations for this include the influx of American multinationals, tariff policy, and cost-reducing innovations (Ville and Merrett). In work currently in progress, further disaggregation of manufacturing into distinct industries reinforces the existence of gaps and non-convergence in rates of return.

6. Conclusion

While the original theorizing on the basis of frictionless Arrow-Debreu type general equilibrium models suggested convergence in rates of return, excepting for a small risk premium across different asset types, the historical evidence paints a quite different picture of larger and more persistent differences. In their most recent

discussion of the topic, Mehra and Prescott (2003) acknowledge the importance of analyzing shorter run historical periods. We build on this approach. The theoretical refinements offered to the original model help us to understand the exceptionalism of the 1920s and 1950s in America (ex ante decisions v ex post outcomes, and intertemporal shifts in risk aversion); they also aid our understanding of larger and more persistent differences than predicted, even within asset classes. Most likely, this can be attributed to incomplete markets and imperfect information. In these circumstances, premiums of 3 or 4 per cent in 'normal' periods may not be uncommon, with much larger gaps in exceptional periods.

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Biographical note

Simon Ville is Professor in the School of Economics, University of Wollongong, specializing in the teaching and research of the economic and business history of Britain, Europe, Australia, and New Zealand. He is President of the Economic History Society of Australia and New Zealand, a Fellow of the Academy of the Social Sciences in Australia, and was editor of *Australian Economic History Review* (1997-2003). Recent publications include: *The Rural Entrepreneurs. A History of the Stock and Station Agent Industry in Australia and New Zealand* (Cambridge University Press, 2000), winner of the Bruce McComish prize for economic history; *The Development of Modern Business* (with G. Boyce) (Palgrave, 2002); *The Big End of Town: Big Business and Corporate Leadership in Twentieth-Century Australia* (with G. Fleming and D. Merrett) (Cambridge University Press, 2004).

Table 2. Comparative profitability by selected ANZSIC, 1920-38

ANZSIC Code	1920	1921	1922	1923	1924	1925	1926	1927	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	Mean
Manufacturing	10.0	8.2	8.3	8.6	9.3	9.0	9.7	9.4	9.6	7.7	5.0	4.5	4.8	5.9	6.5	8.0	9.2	12.1	8.1
Electricity, Gas, Water	8.1	8.6	8.9	9.6	8.9	8.6	9.2	8.9	9.7	9.0	8.7	8.1	8.1	7.8	7.0	7.0	6.8	7.2	8.3
Wholesale Trade	11.7	7.9	5.4	4.0	6.1	6.9	7.4	6.8	7.4	3.2	-0.4	-2.1	0.9	3.4	3.7	5.9	7.1	9.1	5.2
Cultural / Rec Services	3.0	8.1	6	5.4	6.0	8.4	7.9	8.9	5.0	6.7	3.6	0.7	1.4	3.1	2.6	3.6	5.2	3.0	4.9

Source: *Australian Investment Digest*

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² In their most recent paper, Mehra & Prescott (2003) extend the data to 2000 leading to a slightly higher premium. This addition does not affect the arguments proffered in our paper. The Australian series on which we draw has not currently been extended through the 1980s and 1990s. A project to do so would motivate a related research topic – the degree of any equity premium convergence between nations in the light of recent capital market globalisation trends.

³ Many American manufacturers established in Australia in the 1920s. Forster.

⁴ This data is being assembled as part of a project funded by the Australian Research Council (DP 0557412) entitled, 'Business Profitability and Long Term Industrial Change in Twentieth-Century Australia'. Chief investigators are Professor David Merrett and Professor Simon Ville. Initial results for the interwar period have been published in Ville and Merrett (2005).