SIR SIDNEY KIDMAN: AUSTRALIA’S CATLE KING AS PIONEER OF ADAPTATION TO CLIMATIC UNCERTAINTY

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Abstract

There is little direct evidence about the business model used by the legendary cattle king, Sir Sidney Kidman. Kidman’s properties were generally contiguous, forming chains that straddled stock routes and watercourses in the most arid zone of central Australia, were invariably stocked at less than full capacity; providing access to the main capital city markets via railways, as well as a wealth of information on competing cattle movements. This combination of features effectively afforded strategic flexibility in the form of so-called ‘real options’, especially during severe drought events. Alternative explanations such as the vertical integration of Kidman’s operations, and spatial diversification of land holdings, offer only partial insights at best. Faced with a highly variable and unpredictable climate, combined with erosion and the spread of rabbits, Kidman provides a highly pertinent example of successful human adaptation to exogenous shocks such as climate change by avoiding expensive deterministic responses.

Key words: climate change, adaptation, real options, drought, rangelands

Introduction

Sir Sidney Kidman (1857-1935) was a controversial figure. Born in modest circumstances in Adelaide, he eventually came to control, both directly and indirectly, a vast pastoral empire that stretched north-south across the rangelands of central and northern Australia, with further holdings in the Kimberley region of Western Australia.

Feted in England as a fabulously wealthy Cattle King, he also attracted criticism in Australia for trying to recruit London omnibus drivers as stockmen. During World War I, he made a name for himself nationally by donating fighter planes and other equipment to the armed forces. He also undertook an unsuccessful venture to build wooden ships for the Government during World War I. And in 1924, the Federal Treasurer, Earl Page, pursued Kidman in the courts for unpaid taxes.

Although he controlled an enormous pastoral empire, there has been surprisingly little, if any, serious analysis of Kidman’s business model. Of particular interest is his survival commercially in the face of a series of major droughts in some of the most marginal country

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around the ‘Dead Heart’ of Australia\(^2\) and in the ‘corner country’ west of the Darling, when many others were walking off the land. Kidman succeeded in spite of significant climatic variability, but more particularly in the face of the unpredictability of the climate in central Australia.

The most detailed and substantive study of Kidman is by Bowen (1987), who claims to have had access to surviving members of the Kidman family and their records, as well as undertaking research in a range of archives and collections\(^3\). Bowen, a journalist by profession, clearly undertook extensive and detailed research for her book, including interviews with many of those familiar with the Kidman family. Unfortunately, the book does not reference quotations, including newspaper articles and other contemporary source material. It is thus difficult to benefit fully from her work, although checking of a number of available sources indicates that she appears to have used them accurately. The only other study of any significance is by Ion Idriess (1936), who claims to have had personal access to Kidman himself, but it is mildly hagiographic in nature, lacks references, and employs substantial amounts of fictional dialogue and scenarios for effect.

It is not the intention in this paper to traverse the same ground. Bowen (1987) has been used as a point of departure, both as background, and as a source of information on matters such as the names of companies controlled by Kidman interests. To the extent possible, and, where appropriate, key issues or facts have been cross-checked using sources such as newspapers and Royal Commission reports. One reason for constructing a map such as the one in Figure 3, was to gain visual confirmation of some of the central tenets on which this paper relies.

Regrettably, the fire that gutted Eringa, the Kidman residence (which also housed all the Kidman company records) in Kapunda, South Australia, in 1904, apparently destroyed all extant company records. A second fire, in 1924, in Kidman’s Currie Street office in Adelaide, appears to have destroyed the subsequent twenty years of records. Moreover, Bowen (1987, p. 311) notes that it is puzzling that no records appear to exist for the period from 1924 to Kidman’s death in 1935:

‘Any trace of the activities of these companies [Bowen lists various holding companies, partnerships, and incorporated stations] had been obliterated by 1984-85, when research was being done for this book. Members of the Kidman family either could not, or preferred not to, make them available. There is evidence to suggest that some records were still held until the early 1960s (when Walter Kidman and Sid Reid were still alive), but they have since disappeared.’

By necessity, therefore, this paper seeks to explain Kidman’s business model primarily by inference.

Of particular note is the fact that Kidman concentrated his land holdings in some of the most marginal country in Australia, around the Simpson Desert and Lake Eyre, rather than

\(^2\) The ‘Dead Heart’ of Australia is generally taken to be the area around the Simpson Desert, to the north of Lake Eyre. The name appears to have first been used in the title of a book by Gregory (1906).

\(^3\) Bowen made extensive use of the Noel Butlin Archives Centre at the ANU and the South Australian Archives. Although the Butlin Archives contain a wealth of commercial and industrial material, the holdings are primarily of companies like Elders, which dealt with the Kidman companies, rather than Kidman records themselves.
diversifying across climatic zones to reduce risk. Further, Kidman’s central Australian properties were generally contiguous, and located on or across stock routes and rivers. Drawing on a ‘real options’ approach, this paper argues that this concentration of contiguous properties, combined with extensive information networks, allowed Kidman to address climatic and other uncertainties by embedding flexibility in his operational arrangements.

The central Australian climate

A benign, stable climate lowers level of risk (variance in returns) of production. Combined with the local geomorphology, climate determines the quality and durability of feed for cattle, both during drought, and during more felicitous seasons.

Climate can be characterised in many ways, including variables such as temperature, intensity, timing and frequency of rainfall, wind strength and direction, humidity, seasonal variation, length of growing season for vegetation, etc. Classifications of climate can involve some of these variables, combinations of them in various indexes, or even according to the vegetation or crops that predominate in each zone. Gentilli (1972) provides a non-technical comparison of major climate indexes (including the widely used Koeppen index), and their application to Australia.

Figure 1 illustrates the ‘commonly accepted arid zone boundary’ that delineates the rangelands that constitute the bulk of the Australian continent. Within this area, there is a central arid heart where:

‘there is no one period when [property] managers can expect to receive sufficient rainfall for plant growth. Instead, they depend upon the ability of livestock to respond to the periodic and unpredictable pulses which occur, and to survive on the forage which is available during the intervening dry periods.’ (Young, et al 1984, p. 337)

Maps based on several different indexes, and reproduced in Gentilli (1972, ch. 2), reveal a very similar delineation of the arid core of the rangelands to that shown in Figure 1. Rainfall in this arid core is ‘very irregular’ (Gentilli 1972, pp. 4, 8), and is due mainly to convectional thunderstorms after very hot weather.

It is virtually axiomatic that Australia’s arid and semi-arid rangelands experience a high degree of climatic variability ‘at all time scales from intra- and inter-annual through inter-decadal to longer …’ (Stafford Smith and McAllister 2008, p. 15). Climatic variability will generate a probability distribution of:

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4 In evidence to the Report of the [South Australian] Royal Commission on the Pastoral Industry (1927, p. 117), Kidman characterised his South Australian properties as generally being in areas of less than 4 or 5 inches (about 100 to 200 mm) of annual rainfall.

5 Organisms in arid ecosystems can be characterised as ‘pulse and reserve’ systems that have evolved in different ways to take advantage of growth or propagation opportunities due to rainfall, and then generate reserves for the next pulse. Following a growth phase, plant roots, for example, may decay, thus depositing carbon and nutrients in the soil for a future pulse phase.

6 In a detailed comparison of global inter-annual rainfall variability, van Etten (2009, p. 116) found that the ‘dry lands of northern Australia (north of 27°S)’ exhibited some of the greatest variability, but those of southern Australia were no more variable than many other deserts. Kidman’s central Australian properties were distributed almost equally above and below the 27°S parallel of latitude, which cuts across the northern end of Lake Eyre.
‘pulse sizes and periods between pulses and consequent histories of resource storage. … These pulse distributions may be reasonably predictable, as with most Mediterranean-type or monsoonal climates where rain is more-or-less guaranteed in a particular season even though its amount may not be. They may also be highly unpredictable, as is characteristic of central Australia for example, where the size distributions both of soil moisture pulses and of intervening dry periods are very skewed … the fundamental nature of this distribution has long been recognised as explaining the lack of stem succulents in Australia, for example. The stem succulent strategy can cope with very dry conditions but depends on reliable re-charge every year, a condition that is safe in the north and central American deserts but not met in central Australia … That is, succulents can cope with great variability, but not great unpredictability.’ (Stafford Smith and McAllister 2008, pp. 16-17.)

That is, the arid core of Australia is characterised not only by highly variable climatic conditions, but also by climatic unpredictability. A comparison of Figures 1 and 3 reveals a close correspondence between the area in which Kidman’s central Australian properties were concentrated, and the arid core of the Australian continent. It is this key feature of climatic unpredictability overlaying climatic variability that provides a first clue to Kidman’s business model.

Figure 1: Australia’s arid zones

The Kidman properties
The Kidman properties extended across the whole Australian continent, principally from the Gulf of Carpentaria in northern Queensland to Broken Hill in far western New South Wales, and in a second chain from Tennant’s Creek (Northern Territory) to Farina in South Australia. But he also owned several properties in the Kimberley region at the time of his death.

Figure 2 shows properties which Kidman owned, controlled, or in which he held an interest either through family ownership or shares. Because the map shows all the properties from 1890 to 1935, it overemphasises the extent of properties held or controlled at any one time, leaving a false impression of ownership and control of a vast, continental-scale area.

Figure 2: Properties which Kidman owned, controlled or in which he had an interest, 1890-1935

In fact, Kidman was an opportunistic buyer and seller of properties, as well as employing an underlying strategy in his acquisition of linked properties in the more arid regions. A number of examples cited by Bowen (1987, ch. 10) indicate that he sporadically bought properties to provide a quick source of cash flow. For example, Lake Albert in the Menindee area of New South Wales, which he bought in 1903 and sold shortly thereafter as two blocks at a profit of £25,000 (Bowen, 1987, 125). According to Bowen (1987, p. 211-212) Kidman also bought Yambacoona on King Island (Tasmania) in about 1917, but soon sold it to the Tasmanian Government for soldier resettlement.
Figure 3: Properties which Kidman owned, controlled, or in which he had an interest, 1935

Figure 3 shows the holdings (listed in Appendix A) of Kidman, his family, and various associates in 1935. This temporal snapshot has been chosen because it is the year of his

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Property holdings in 1935 were identified using secondary sources such as Bowen (1987) and Kidman’s obituary in The Pastoral Review, 16 Sep 1935, pp. 937-938. Identified properties were cross-checked using The Australian Pastoral Directory (1935 and proximate years) which lists owners of pastoral properties by State, on the basis of a list of Kidman-related companies and partners identified by Bowen (1987, pp. 294, 311-312).

Kidman appears to have owned only a limited number of properties in his own right. In evidence to the Royal Commission on the Pastoral Industry, 1927 (para 3041), Kidman said in relation to Anna Creek: ‘My family has 30,000 shares out of 90,000 in that, and Baratta. People reckon I own it, but I have only 3,000 shares in it myself’.

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death, and can be taken to represent a reasonably ‘mature’ manifestation of the strategic approach underlying Kidman’s business model, give or take a few opportunistic acquisitions and sales.

Even so, Figure 3 probably provides only a minimalist picture – Kidman maintained friendships with other property owners, and so would have had access to other properties too, if required. In evidence to the 1927 Royal Commission on the Pastoral Industry, for instance, Kidman recounts how he allowed a neighbour’s sheep access to his water to prevent their death (para 3053) because the neighbour was a ‘good hard-working chap’, and how he sold at a reduced price his Pandi Pandi property and cattle to a returned soldier who used to work for him (para 3024). Similar informal networks exist today with respect to agistment (McAllister, 2010).

Though only a snapshot in time, the map in Figure 3 suffices to reveal two key characteristics of Kidman’s strategic approach. First, a number of breeding properties are scattered across the north. Those in what might be classified as a ‘tropical climate with a short rainy season’ include Newcastle Waters in the Northern Territory and Augustus Downs and Fiery Downs in Queensland. Rutland Plains, Westmoreland, Van Rook and Miranda, further north in the Gulf country where summer rainfall seasons are more prolonged, were also controlled by Kidman and used to source cattle for southern markets.

Grasses on the properties in the north of Australia are mainly of the C4 photosynthesis pathway type, like Mitchell grass. While sufficient for breeding purposes, such grasses were not considered suitable for fattening cattle for market because their higher fibre content reduces their nutrient value. More temperate grasses, such as those in the Channel country of south-western Queensland were used for finishing cattle for market. Peck (1972, p. 90), a stockman who claims to have known Kidman well, records that he often heard Kidman express a preference for the ‘sweet and lasting’ herbage in western Queensland, on which a bullock could be fattened in three months, rather than the ‘abundant and perhaps heavier carrying, coarse and rank’ grass of the Gulf country.

The more remarkable feature evident from Figure 3 is the strong concentration of contiguous land holdings west of the Darling to the South Australian border region, along the three rivers (Diamantina, Georgina and Cooper’s Creek) in the Channel country, and along the stock route to the west of Lake Eyre via Charlotte Waters to Marree (previously known as Hergott Springs) and Farina.

In effect, Kidman created two major chains of properties, one for cattle coming down from the Gulf country to Adelaide or the rail head at Cockburn (near Broken Hill), and one for cattle sourced from Newcastle Waters station and other properties in the Northern Territory and South Australia. Because the holdings were on, or in close proximity to major stock routes (and associated watercourses), they afforded easy access to railheads connected to southern markets.

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8 Based on Hettner, who classified climates primarily on the basis of ‘prevailing zonal winds and their effect on climate’: Gentilli (1972, p. 48 and map 14).

9 ‘in general, C4 plants live in environments where water is relatively unavailable at certain times. To prevent excessive water loss, the leaves keep their stomata closed much of the time. This leads to a depletion, by photosynthesis, of CO2 within the leaf.’ (Purves, et al, 1992, p. 179). The plants compensate for the depletion by using the phosphoenolpyruvate carboxylase enzyme.
At one stage, Kidman also owned a string of properties on the Paroo which crosses the Queensland border into New South Wales, west of the Darling. It is not clear why these properties (e.g. Currawinya, Tinapagee, and Momba) were sold. Presumably, they were not considered essential to droving cattle from western Queensland to Broken Hill, given the availability of alternative routes through Kidman properties closer to the South Australian border.

Water and feed can appear unexpectedly on floodplains, even if there is no rain in the immediate area. So-called ‘dry floods’ make their way down watercourses and spill over in flat country far downstream, generating growth in vegetation. It was apparently this feature that attracted Kidman to the Channel Country of south-west Queensland, where the ‘three rivers’, the Barcoo, Diamantina and Georgina fed into a multitude of channels, as well as Cooper Creek.

Despite periodic droughts, Kidman was generally able to use his chain of properties in the Channel Country to fatten store cattle taken from his Gulf properties, on their way down to holding properties near Broken Hill. Because stock arrived in relatively good condition, they could be sent quickly by rail to markets in Sydney, Melbourne or Adelaide. Alternatively, Queensland cattle could travel along the route pioneered by Harry Redford in 1870 to Adelaide down the Cooper and the via the Birdsville track (Bowen 1987, pp. 72-76). By sinking artesian bores ‘from his Innamincka station into Queensland in the 1920s’, Kidman ‘opened up a further stock route which became known as the Bore Track’ (Bowen 1987, p. 364).

Finally, Kidman also owned holding and fattening properties located near railheads and markets. The key properties were Mundowdna near Farina, Dry Creek near Adelaide, and Forders near Cockburn (Bowen, 1987, pp. 138, 393, 242).

There appears to be no direct evidence or recorded explicit statement by Kidman explaining or justifying his strategy of buying properties in a pattern that would form chains. Referring to the purchase by Sidney Kidman and his brother Sackville of properties from 1895, when rabbit plagues and drought had seriously depressed prices, Bowen (1987, p. 90) notes that ‘there is no record of their outlining their three rivers [the Georgina, Diamantina and Cooper Creek], chain-of-supply scheme to anyone.’ Herself a reporter, Bowen also notes that newspaper reporters who interviewed Kidman’s drovers were more interested in the grass and water conditions of the country over which a mob had travelled, or ‘adventurous dealings with the blacks’, so that ‘there is not a single piece of press publicity with even a mention of the Kidmans’ plan to link backblocks’.

Examination of a range of contemporary newspaper interviews and articles with, and about Kidman confirms Bowen’s observations. It is possible that Kidman’s approach to purchasing land was so commonplace, or so obvious to all, that it was not a priority in terms of scarce newspaper space. Nevertheless, the issue remains puzzling, necessitating analysis of Kidman’s business strategy through inference rather than direct evidence.

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10 Kidman’s innovativeness in this regard was recognised by the 1945 Royal Commission on Abattoirs and Meatworks (Queensland), pp. 27-28.
11 Harry Redford and four accomplices stole 1,000 head of cattle from Bowen Downs station in Queensland, drove them down the Cooper and Strzelecki Creek to the Flinders Ranges, selling the cattle at Blanchewater station. Despite strong evidence against him and the judge’s direction to the jury, it is said that he was acquitted at trial due to the jury being composed mainly of stockmen who admired his feat.
Alternative perspectives on the Kidman business model

Kidman’s central Australian properties had four key characteristics:

- They were concentrated in some of the most arid, marginal country in Australia where rainfall was both highly variable and uncertain (seasonally unpredictable).
- Although Kidman bought and sold properties opportunistically (often selling any livestock to reap immediate cash flow), his acquisitions usually adjoined his other properties, or were at least part of a ‘chain’ of proximate properties.
- The properties straddled stock routes or rivers, or were close to them.
- The ends of his two ‘chains’ of central Australian properties were on or close to railways.

Three broad, alternative perspectives are examined below to see which best fits these four characteristics and other known facts about Kidman’s operations.

One model, the so-called ‘chain of supply theory’ appears to have ascribed Kidman’s success to the fact that his operations were vertically integrated, from properties that bred cattle, to fattening properties and final sale in capital city markets.

An alternative explanation is based on the fact that Kidman’s properties were spatially diversified. Lack of rain or feed on one property could be compensated by moving cattle to a property with sufficient feed. The underlying paradigm treats individual properties as separate assets in a diversified portfolio. Diversification would have reduced the risk (variance of returns on the assets) of the overall property portfolio, but not its average return.

A third interpretation of the known facts is provided by identifying a set of ‘real options’ that are embedded in Kidman’s operations. Because this approach seems to best fit the facts, it is preferred to the diversification and vertical integration models as an explanation of Kidman’s success.

Kidman also raised horses on many of his properties. A source of additional income, it was an activity that initially supplied horses to a coaching business run in partnership with his brother Sackville, and later provided horse plants\(^\text{12}\) for drovers employed by him. Surplus horses were auctioned at Kidman’s annual Kapunda sales, a useful pressure valve during periods of prolonged or severe drought. He also used his South Australian properties to breed Angora goats, mules and camels\(^\text{13}\). While these sidelines would have generated useful additional income, they are unlikely to have been responsible for Kidman’s success.

Other explanations are also likely to be feasible, but have not been explored here for want of sufficiently detailed information and data. For example, it may be that Kidman relied on knowledge obtained from aboriginals in central Australia that allowed him to make at least

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\(^\text{12}\) A drover’s ‘horse plant’ typically includes work-horses, ‘night-horses’ with good night-vision for watching over a mob of cattle at night, and packhorses. The boss drover’s plant would typically also include dogs and cooking gear.

\(^\text{13}\) *The Advertiser*, 6 September 1906, p. 9. In a number of areas, Kidman properties used camel teams to bring in supplies and hardware (Bowen 1987, p. 309).
short-term predictions of drought based on the behaviour of local flora and fauna. Bowen (1987, pp.24-25) records that Kidman formed a close working relationship in the 1870s with an aboriginal named Billy, picking up so much bushcraft that he was ‘put on loan’ to new settlers by his employer.

James Tyson, Sid Kidman and the ‘chain of supply theory’

Cattle stations in the latter half of the nineteenth century were typically situated at a considerable distance from capital city livestock markets and their associated abattoirs. These properties generally produced ‘store’ cattle: those that could be filled out and fattened within a year. Until the proliferation of railway lines into the hinterland, and ‘beef roads’ for motorised transport in the 1960s, it was necessary to ‘drove’ store cattle overland from breeding properties to dealers, or for commercial agistment on fattening properties close to capital city markets. After fattening, cattle could be drove by easy stages, or trucked by rail to market.

Droving cattle meant using a designated stock route, generally in competition with other cattle owners. To ensure sufficient feed and water for travelling stock, it was the rule that sheep were expected to travel at 6 miles a day, and cattle 10 miles a day. Landowners adjoining a stock route were theoretically protected by the further rule that mobs were permitted to stray no further than a half mile either side of the route. At times of heavy usage of a stock route, or in a bad season, however, feed and water were likely to be scarce or even non-existent. Droving along established stock routes during droughts inevitably meant that cattle lost condition or died en route to market or agistment.

14 Stock route rules were generally observed in the breach. J. Murray Allison’s poem, The Grass Stealers, suggests that it is in fact a drover’s duty to steal a squatter’s grass. Banjo Patterson’s more entertaining portrayal of Saltbush Bill’s ploy against a new chum English jackeroo (Stewart & Keesing 1971, p. 160) opens with a contextual stanza:

Now this is the law of the Overland that all in the West obey –
A man must cover with travelling sheep a six-mile stage in a day;
But this is the law which the drovers make, right easily understood,
They travel their stage where the grass is bad, but they camp where the grass is good;
They camp, and they ravage the squatter’s grass till never a blade remains,
Then they drift away as the white clouds drift on the edge of the saltbush plains;
From camp to camp and from run to run they battle it hand to hand
For a blade of grass and the right to pass on the track of the Overland.
For this is the law of the Great Stock Routes, ‘tis written in white and black –
The man that goes with a travelling mob must keep to a half-mile track;
And the drovers keep to a half-mile track on the runs where the grass is dead,
But they spread their sheep on a well-grassed run till they go with a two-mile spread …

15 Part of Judith Wright’s iconic poem South of my Days’ Circle (Maxwell & Phillips 1962, p. 10) expresses well the harshness of droving in a severe drought; in this case the Federation drought:

Droving that year, Charleville to the Hunter,
nineteen-one it was, and the drought beginning;
sixty head left at the McIntyre, the mud round them
hardened like iron; and the yellow boy died
in the sulky ahead with the gear, but the horse went on,
stopped at Sandy Camp and waited in the evening.
It was the flies we seen first, swarming like bees.
Came to the Hunter, three hundred head of a thousand - cruel to keep them alive - and the river was dust.
The legendary James Tyson became a wealthy cattle dealer in the middle of the nineteenth century. Beginning with extensive breeding and fattening properties in the Riverina (and later in Queensland) he drove store cattle to Wodonga for trucking by rail to his fattening property at Heyfield in Gippsland, from where he supplied the Melbourne market. He also drove cattle to the Bendigo goldfields where his brother operated a family abattoir and butcher shop. At an early stage of their operations, Sidney Kidman and his brother Sackville also supplied meat to miners through their butcher shops in Broken Hill.

This approach to selling cattle has been referred to as the ‘chain of supply theory of property management’. Bowen (1987, p. 443) records that, in researching her book, she encountered a ‘terse suggestion’ by a ‘distant member of the Tyson family’ that James Tyson, rather than Kidman, should be credited with devising the ‘chain of supply’ strategy, as well as being accorded the title of ‘Cattle King’.

Like Tyson, Kidman focused on cattle. As he acquired large sheep stations west of the Darling River in New South Wales, he converted them to cattle runs, retaining only the few that were particularly suited to sheep, such as Bootra, Corona and Yancannia. While the conversions fitted well with Kidman’s overall strategy of developing a chain of contiguous properties, cattle had also become financially more profitable than sheep, partly because of the spread of dingoes, providing a further reason to switch. It was also reported at the time that a cattle property in the area required only 2 or 3 men to run it, compared to 20 for a sheep station.

Denholm (1967, p. 130) rightly questions the popular attribution of the ‘chain of supply’ strategy to Australian cattle interests (including both Tyson and Kidman), except perhaps in its application on a large scale. In any case, the so-called ‘chain of supply’ strategy is simply a vertically-integrated business model of producing and transporting cattle to market. Whatever its commercial merits, it can be practised without acquiring contiguous properties, as was the case with Tyson, so that it is not inherently relevant to Kidman’s own approach.

In the 1890s, the Kidman brothers had pioneered the shipment of cattle, sheep and pigs from Adelaide to the goldfields of Western Australia (Bowen 1987, pp. 62-63; Barrier Miner (Broken Hill), 8 March 1895, p. 3). It is therefore puzzling that Kidman does not appear to have transported cattle from his Gulf (of Carpentaria) properties like Rutland Plains, Westmoreland or Van Rook directly by ship to southern markets.

Cost may have been a factor, especially if aboriginal stockmen could be employed cheaply on droves from north to south. Another possibility is that quarantine rules would have hampered such shipments. Cattle ticks, endemic to the tropical north, could not survive the drier climate of the inland, a key factor in the development of the 2,000 kilometre Canning stock route from the Kimberley region of Western Australia to Perth and the goldfields (National Museum of Australia, 2010). It may simply have been easier for Kidman to take cattle

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16 In an interview given to The Advertiser, 6 February 1925, Kidman claimed that he purchased Berrawynnia, Tinapagee and Wanaaring stations after ‘the previous owners had not been able to make a success of the properties as sheep runs’, ran sheep for a while, but ‘they were found to be unprofitable … [so] were utilised … mainly for cattle’. This trend appears to have started in the 1890s: Coghlan (1899, p. 593) notes that, while sheep ‘are more profitable to the individual owner’, the slow increase in cattle numbers in New South Wales ‘may be taken as evidence of the disposition of the pastoralists in some parts of the colony to revert to cattle-breeding in place of sheep’.

17 The Argus, 14 January 1920, p. 16.
southwards along the many stock routes in Queensland at the time, than to pay for shipping and quarantine.

The diversification paradigm

The variability of returns on tradable financial instruments such as shares can be reduced through diversification\(^ {18} \). By including in their portfolio shares whose returns are likely to move in opposite directions (that is, shares whose returns are negatively correlated), investors will not make large windfall gains in the long run, but neither are they likely to suffer catastrophic losses. Although average returns are not affected by diversification, it provides a hedge against extremes.

Diversification within a portfolio of agriculture-related shares might involve reducing the variability in returns caused by both variation and intensity of rainfall, and by variations in prices of different agricultural products. Coleman (2007, table 2, p. 20) generates a portfolio of agricultural shares that is composed of 25 per cent weighting in livestock, but with no investment in companies operating in the arid centre of Australia.

A conventional diversification strategy might have seen Kidman hedge the risk on his central Australian properties by acquiring others in higher or more consistent rainfall areas, perhaps on the coast. According to Bowen (1987, p. 111, p. 211), however, Kidman was averse to paying ‘high’ prices for higher quality properties. In any case, Coleman’s (2007, p. 19) analysis found no areas of Australia with negatively correlated rainfall patterns.

Although famously parsimonious, it may be that Kidman’s true rationale was that he knew central Australia extremely well, and preferred to concentrate his holdings there because of the advantage that his knowledge gave him in acquiring properties cheaply and hence increasing average returns. In an interview with The Advertiser (Adelaide, 30 June 1934, p. 27), Kidman revealed that he had ‘foolishly bought several [Northern Territory] properties on a report’ and was getting rid of them. He similarly abandoned some of his properties in the Kimberley area of Western Australia after finding them unsatisfactory (Sydney Morning Herald, 28 August 1935).

Local rainfall was the key factor determining the survival of stock, even when bores were sunk. It not only provided drinking water, but was essential to generating pulses of growth in vegetation. Localised thunderstorms produce feed within a week or so of rain falling (Bowen 1987, p. 41), so that native animals and cattle watch and ‘follow the thunderstorms’ (Idriess 1936, p. 187). Dry floods (caused by heavy rainfall in distant catchments), particularly in the Channel country, also provided highly nutritious feed when watercourses spilled over onto flood plains (Royal Commission on Abattoirs and Meatworks (Queensland) 1945, pp. 27-28).

Drawing on an extensive network of drovers, camel drivers, aborigines, dingo-trappers and telegraph operators, Kidman and his station managers were able to identify grazing opportunities and bring in cattle from properties that had insufficient feed. Areas without

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\(^ {18} \) The management literature addresses ‘diversification’ primarily from a product market perspective: see for example Goold and Luchs (1993). The approach here is that of Portfolio Theory as used in financial economics (e.g. Brealey and Myers, 1991) and initially developed by Harry Markowitz (1952).
rain were left unstocked\textsuperscript{19}, thus fortuitously reducing damage to the soil and vegetation. Although some stock were inevitably lost, this nomadic pattern of running cattle reduced overall losses\textsuperscript{20}. Recovery of over-grazed saltbush, for example, would have required spelling a property for several good seasons without cattle.

Graziers on a single large property would also have been able to benefit from localised thunderstorms, but they would not easily have been able to take advantage of rain that fell outside their own property. Kidman, by contrast, was able to move stock over large distances, especially during localised droughts:

‘I think Kidman was probably the man who handled the Australian bush better than anyone else. He was nomadic. For instance if there was a drought on Glengyle he’d shift cattle to Durrie. If there was no feed at Durrie he’d move down to Innamincka, and further on, and he’d finish up at Broken Hill. And if the country there was bare the cattle would go on to Adelaide or a market somewhere else. Kidman’s drovers were shifting, shifting, shifting all the time. There was no such thing as starving or dying stock on Kidman’s stations. They just shifted them.’ (Wyllie 1982, p. 76, quoting R.M. (Reg) Williams, who was initially a stockman, and later the manufacturer of saddlery for the Kidman empire.)

On the other hand, Bowen (1987, p. 214) states that 75,000 head of cattle died in the 1914-16 drought on seven Kidman properties alone. And Kidman is quoted in the *Sydney Morning Herald*, 8 June 1921, p. 12, as saying that he lost 140,000 sheep and 50,000 cattle in the 1918-20 drought. Williams’ statement is probably more representative of ‘normal’ seasons than of major, region-wide drought events.

From one perspective, Kidman’s holdings of properties across a wide area of Australia can be viewed as spatial diversification. There is also an element of temporal diversification in that additional space enabled him to take advantage of rainfall in different places at different times. Treating cattle as ‘tradable’ across a large number of properties, Portfolio Theory suggests that diversification would have reduced Kidman’s risks. Indeed, McAllister et al (2009, p. 344) posit this as an explanation for property acquisition and consolidation in the arid and semi-arid zones of Australia in more recent times.

The risk associated with returns for all of the properties in the portfolio taken together depends on both the sum of the individual property variances (weighted by relative contribution of the individual properties to the portfolio, perhaps by size or carrying capacity per square mile) in returns, as well as the weighted covariances between them. Variances in the current context can be taken to refer to temporal dispersion of either rainfall or the availability of feed and water.

\[
\sigma_p^2 = \sum x_i^2 \sigma_i^2 + \sum \sum x_i x_j \sigma_i \sigma_j \rho_{ij}
\]

\textsuperscript{19} Carcoory station homestead, for example, was closed down by Kidman in 1902 during the ‘Federation drought’ (Bowen 1987, p. 115). F.J.A Pockley (1933, p. 31) reports a conversation with cattle men and the local policeman near Charlotte Waters: ‘they said that Kidman leases a lot of the gibber plain at 4 shillings a square mile and only brings in stock when it rains.’

\textsuperscript{20} Ironically, Kidman’s ‘sustainable’ approach resulted in accusations that he was not fully utilising his properties by understocking, while excluding other potential landholders who would have more fully stocked their properties (e.g. ‘Mr Kidman’s leases. Alleged understocking’, *Barrier Miner* (Broken Hill), 29 July 1916, p. 6).
where
\( \sigma_p^2 = \) variance of returns on the portfolio of \( n \) properties
\( x_i = \) proportion of total property portfolio represented by property \( i \)
\( \sigma_i^2 = \) variance of returns to property \( i \), where \( i = j \)
\( \sigma_{ij} = \) covariance of returns to properties \( i \) and \( j \) = \( \sigma_i \sigma_j \rho_{ij} \) where \( i \neq j \)
\( \rho_{ij} = \) correlation coefficient between properties \( i \) and \( j \).
\( i, j = 1 \ldots n \)

Assuming that properties were probably roughly similar in terms of size and carrying capacity per square mile, we can assume that \( x_i \approx x_j \approx \frac{1}{n} \).

As the number of properties grows large, portfolio risk effectively becomes dependent on the covariance term alone, because
\( \sigma_p^2 = n x_i^2 \sigma_i^2 + (n^2 - n) x_i x_j \sigma_i \sigma_j \rho_{ij} \).

A conventional approach to diversification would therefore seek to maximise the number of properties whose returns are negatively correlated, or whose correlation coefficients are as low as possible.

Lack of data precludes analysis of Kidman’s properties, but the fact that his central Australian properties were all located in the same extreme climatic zone suggests that risk levels (variance of returns to investment in property and cattle) were similar, if not identical.

In the terminology of Portfolio Theory, the regional climate represents market or undiversifiable risk. Taking into account the fact that rainfall from thunderstorms is distributed reasonably randomly (e.g. ignoring topographical effects such as from the Macdonnell Ranges) across the arid core of central Australia, there is no reason to presuppose that returns made by any individual property will be more or less variable than any other in the long run. That is, it is at least arguable that \( \sigma_i \approx \sigma_j \).

In the short term, localised rainfall, falling randomly only on some properties but not others during ‘normal’ seasons, would have meant that the correlation of risks between different properties \( \rho_{ij} \), was less than perfect. Thunderstorms determine unique or diversifiable risk. Given the mobility of cattle, spatial diversification would have reduced total risk for the whole portfolio of properties between major regional droughts because \( \rho_{ij} < 1 \).

In the longer term, however, severe droughts on a regional scale, not an uncommon event in central Australia, would imply a very high degree of correlation of risk between individual properties. Analogous to market risk in a Portfolio Theory context, regional-scale droughts represent non-diversifiable risk for properties and stock routes located within the region. Because our interest is in Kidman’s demonstrated commercial ability to survive major droughts when others did not, and given that Kidman’s career spanned several major regional droughts, with all his properties badly affected, it is justifiable to assume that \( \rho_{ij} \approx 1 \) as a long run condition.

In the longer term, and especially for lengthy regional droughts, it is thus more likely that total portfolio risk is at its maximum possible value, the average variance.

\( \sigma_p^2 = n x^2 \sigma_i^2 + (n^2 - n) x^2 \sigma_i^2 = n^2 x^2 \sigma_i^2 \) where \( i = j \)

\( \sigma_p^2 = \sigma_i^2 \) given that \( x \approx \frac{1}{n} \).
Finally, if properties were sufficiently diversified spatially in order to take advantage of differences in rainfall, there would be no need, from a Portfolio Theory perspective, to stock properties at less than full capacity. In the event of a major drought, cattle would simply be sold off immediately, and possibly at a loss, but unaffected properties would be relied on to ensure overall positive returns. Thus, while spatial diversification has some attraction as an explanation for ability to reduce risk during ‘normal’ central Australian seasons, a more encompassing paradigm for Kidman’s operations is required.

**The three ‘real options’ embedded in the Kidman business model**

When faced with uncertainty about future events, a reasonable and intuitive response is to retain a degree of flexibility until better, more definitive information becomes available. New information allows decisions to be made as to whether a project should be continued, expanded, or abandoned.

In financial markets, investors can purchase an option on a share, rather than committing immediately to the full cost of a share whose future price is unpredictable. An option (in this case a ‘call’ option) offers the right, but no obligation, to purchase the share at a pre-agreed price at some specified later date if the share price rises sufficiently to make its purchase profitable. Insurance is an example of a ‘put’ option that allows its purchaser to exercise a right, but no obligation, to claim a pre-specified sum during a specific period if an adverse event occurs. A premium is paid for acquiring the right that is conferred by an option.

Options can also be acquired over physical (so-called ‘real’) assets. Sinking a bore, for example, provides the right or opportunity, but no obligation, to water stock during a drought. The option of a bore is an alternative to sending cattle for agistment, or purchasing a more expensive property in a higher rainfall area. The cost of the bore is the premium paid for the ‘real option’, or right to water stock in a drought. Where the expected value of the benefits of cattle surviving future droughs exceeds the cost of the bore, or the alternative of agistment costs, drilling may be worthwhile. Dixit & Pindyck (1994), Copeland & Antikarov (2001), Reuer & Tong (2007), and Dobes (2008) provide a range of examples in other areas.

### 1. a ‘normal season’

Kidman effectively exercised ‘call’ options on real assets when he moved cattle from a drought-stricken property to others where there was feed and water. This is illustrated in Figure 4 which shows, as a hypothetical example, a four-year drought affecting one of two properties. Complications such as drought striking one property but not an adjoining one, or whether a second property is able to carry additional stock from the drought-affected one, are ignored here. Kidman’s chains of properties would have overcome such complications.

Panel A represents an investment line involving the purchase of two properties that are separated sufficiently to make the transfer of stock between them in times of localised drought unviable, even if a stock route exists. Taking a nevertheless optimistic perspective, the grazier is able to sell all of his cattle just as the drought strikes one of his properties after three years of operation. But any residual cattle die during the four-year drought and restocking is necessary in the seventh year to enable annual sales of cattle to re-commence.
The case of two adjoining properties is shown in panel B. If drought strikes one, but the other is relatively unaffected, cattle can be transferred from the drought affected property to the adjoining one for the duration of the drought, and then sold, or moved back again after the drought breaks.

Because a grazier needs to understock each of the adjoining properties to create the option of moving stock there from the other property, a premium is paid in terms of the opportunity cost of lower production. It is also possible that the purchase of a second property will require a premium if the seller realises that adjoining properties carry an embedded option value and seeks to extract some of the rent. Bowen (1987, pp. 367-368) relates Kidman’s vain attempts over many years to purchase Tindara station in western New South Wales because it would have connected his Corona and Quinyambie properties, but no direct evidence seems to be available of higher purchase prices by Kidman for contiguous properties.

Figure 4: Moving cattle to feed and water: exercise of a ‘real (call) option’.

Diversification in an area subject to the same climate, but randomly different rain events, would have been effective only if stock could be moved between properties. Because Kidman had adjoining properties, he was able to exercise an option of moving his stock. Diversification in itself was not a sufficient condition to exercise the option; the necessary condition of contiguity of properties was also required.

An area that would merit further investigation should more information on Kidman’s operations become available is the extent of the trade-off that he made between loss of production (returns on assets) by stocking at less than full capacity, and the reduction in risk.
(variability) in returns due to the option generated. The theory on the relationship between portfolio diversification and real options is also not well developed. However, simulations by van Bekkum et. al. (2009) suggest that a portfolio of positively correlated assets that embed real options entails a lower overall risk than a similar portfolio of assets which do not include options. This admittedly limited result appears to be intuitively correct, and confirms the wisdom of Kidman’s own approach in maintaining options on properties with highly correlated risk.

2. **Peacocking**\(^{21}\) the stock routes

The consequences of the unpredictability of rainfall in central Australia are reflected well in the report of the NSW Royal Commission into the condition of the Crown tenants, (1901, Part I, p. vii) on conditions in the Western Division, which, at the time, was mainly devoted to sheep rather than cattle:

> ‘It is, perhaps, only just to point out that in districts far removed from railway communication, as is most of the Western Division, the evils of “overstocking” are in many instances brought about by circumstances for which, unless he be omniscient, the pastoralist can hardly be held responsible. On a given date he is carrying on his run a certain number of stock. The weather becomes dry; but according to precedent, based on limited experience, rain may be expected to fall soon. The rain holds off. To send his stock away means loss of profit—perhaps an increased overdraft. He decides to wait a little longer. The expected rain fails to come. The run is then overstocked; and, owing to the condition of the stock routes rendering it impossible to get the sheep away, it remains “overstocked” until the sheep die or the weather breaks.’

Kidman’s central Australian landholdings were also characterised by a feature other than the fact that they were extensive in area and generally contiguous. They adjoined, straddled, or were close to stock routes that offered transport to markets. Relying solely on a ‘spatial diversification’ paradigm to explain Kidman’s success does not make use of this fact, so that it is essentially incomplete.

In a protracted region-wide drought, feed would have eventually been depleted on all of Kidman’s properties, even though he apparently took care to stock them at less than full carrying capacity. At the same time, feed along stock routes would have become unavailable as various stations sent their cattle along them to market to avoid their total loss. Owning property on or near a stock route would have permitted cattle to be driven along it to market while making use of remnant feed on the property, but competing cattle interests would have been unable to do so.

For instance, *The Cairns Post* 26 October 1928, p. 5, carried a short item about a complaint by Mr E. Horsington in the NSW Legislative Assembly that:

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\(^{21}\) The Land Acts of the Australian colonies from the 1860s were intended to open up lands occupied by squatters in earlier times. In areas of limited water, however, squatters were able to retain their runs by ‘selecting’ land around waterholes and watercourses, effectively denying new arrivals the ability to obtain useful land. The practice was known as ‘peacocking’ because the squatters were said to pick the eyes out of the country. Kidman’s strategy of purchasing land along stock routes and watercourses was conceptually similar.
‘… Sir Sidney Kidman controlled all the stock routes from Queensland to the South Australian border, and from the Queensland border to Broken Hill. Drovers, unless in his good graces, were not able to use them. … Sir Sidney allowed stock to loiter at watering places and reserves, the privilege being denied to other drovers. He asked if the Minister [for Agriculture] would see that Sir Sidney Kidman was made to comply with the regulations.’

Kidman thus effectively peacocked the stock routes. Peacocking the stock routes generated a ‘real option’ in times of severe drought, because it afforded the opportunity, but not the obligation to use strategically located properties to get cattle to market. Akin to insurance (a ‘put’ option), acquisition of the option required payment of a premium in terms of opportunity cost of stocking properties at less than full capacity, to ensure sufficient feed for travelling stock. It may also have entailed payment of higher than otherwise prices for the acquisition of adjoining properties.

3. A ‘call’ option on market prices: information combined with transport flexibility

Uncertainty in market prices was also addressed though the creation of a separate real option.

Kidman’s chains of properties ended at ‘depots’ close to railheads such as at Mundowdna near Marree, and Forders near Cockburn. When cattle arrived at railheads, Kidman was able to take advantage of the right or opportunity, but no obligation, to ship them to different capital city markets. At this point, however, he would have faced uncertainty about prices that might be obtained in the different markets by the time that the cattle actually arrived at their destination. Prices depended not only on local demand, but also on supplies arriving from competitor stations from across Australia.

The key means of overcoming price uncertainty was to combine the availability of properties near railheads such as Cockburn with a network of drovers, camel drivers, aborigines, dingo-trappers and friendly telegraph operators, who provided information about the movement of competing herds being driven to various markets. According to Bowen (1987, p. 119) Kidman required his drovers to communicate by telegraph, and also instructed ‘his drovers to pay the telegraph operators a little something extra for any information they could give about other mobs on the road …’. Peck (1972), a stockman who claims to have known Kidman ‘intimately ever since he began to amass stations’ (p. 87), recollects that, in about 1917, Kidman:

‘… was selling bullocks regularly in all four markets – Adelaide, Melbourne, Sydney and Brisbane – and had many thousands on the tracks and wires were pouring in every day from managers and drovers for instructions. Though it is difficult to say how many mobs they represented, Kidman, without a note, could say just where every mob was at the time, where from, who was in charge, and when they were likely to reach the market.’ (p. 89)

Cockburn provided direct rail access to the three major capital city markets of Sydney, Melbourne and Adelaide. Cattle were also shipped to Melbourne from Farina (near Marree) via Adelaide (Barrier Miner, 1 April 1908). If it became clear that a competitor’s cattle were about to come onto a particular market and would depress prices, Kidman was able to
exercise flexibility by switching delivery of his own cattle to an alternative market where prices were likely to be higher.

**Kidman as a pioneer of adaptation to climate change**

Options, both ‘real’ (i.e. based on physical assets) and financial, are the most appropriate means of investing (acquiring assets) in the face of uncertainty about any future benefits that they may yield.

Uncertainty is the hallmark of climate change; particularly with regard to timing, intensity, local effects, probability and frequency of extreme events, etc. Deterministic responses are likely to be inappropriate and wasteful of scarce social resources. For example the construction today of a 10 metre high sea wall around the entire coast of Australia would represent an inappropriately expensive precaution. Dobes (2008) suggests a ‘real option’ alternatives, such as the initial construction of a solid foundation in major coastal population centres that can be used for placing sandbags, or for future construction of walls of varying height, depending on the actual outcomes associated with climate change. A range of similar ‘real option’ responses is available for adapting to other features of expected climate change.

From this perspective, the Kidman business model provides a highly pertinent lesson for adaptation to climate change.

Kidman coped with an inherently harsh, unpredictable climate. But he also came on the scene in the 1890s, just as a series of exogenous shocks reduced the viability of existing pastoral properties in central Australia. In particular, the spread of the rabbit, coupled with severe droughts that had not been anticipated by experienced pastoralists, resulted in severe degradation of productive capacity.

The following excerpts from evidence given to the NSW Royal Commission into the condition of the Crown tenants, (1901, Part I, Summary of Evidence) highlight the issues on the sheep runs west of the Darling, but similar problems were also encountered in South Australia:

‘In the years 1880 and 1881, before this district was stocked … the country was covered with a heavy growth of natural grasses – kangaroo grass, star grass, blue grass, mulga, and other grasses. The western half of the district abounded in salt and cotton bush … The ground was soft, spongy and very absorbent. One inch of rain then, in spring or autumn, produced a luxurious growth of fresh green grass. … With the exception of a few droughty years, when some heavy losses were experienced, pastoral matters progressed fairly satisfactorily until the years 1890-91 when the rabbit pest increased and spread over the whole district, destroying all the good natural grasses, the salt and cotton bushes ... There has also been a gradual deterioration of the country caused by stock, which has transformed the land from its original soft, spongy absorbent nature to a hard, clayey, smooth surface … which, instead of absorbing the rain, runs it off in a sheet as fast as it falls, carrying with it the surface mould, seeds of all kinds of plants …’ (James Cotton, Stock Inspector for the Cobar Sheep District)
‘The productive power of the country was in the first instance over-estimated. … The result of each successive drought has been to leave the country in a much worse condition than it was before. Perhaps the rabbits were the greatest cause of the depression in the Western Division … They have destroyed the country and reduced the carrying capacity to nothing.’ (E. Hayes, Pastoral Inspector of the Australian Mortgage Land and Finance Company)

‘In South Australia, the non-success of pastoral occupation is attributed to rabbits and overstocking.’ (L. O’Loughlin, Commissioner for Crown Lands, South Australia)

If they are to be relevant, case studies of adaptation to climate change need to involve situations where climatic or other factors have changed in unexpected ways. Lessons cannot validly be drawn by examining only adaptation to a constant set of conditions, no matter how harsh or uncertain they may be.

Kidman’s relevance therefore lies not merely in overcoming the vicissitudes of a harsh, unpredictable climate and rabbit infestations. Where many others, previously successful, could no longer cope, Kidman succeeded. He is an example of human adaptation that goes beyond a purely deterministic, technical response. Bassino & Van der Eng (2010, pp. 1-2) put it well:

‘ … the debate on the possible consequences of climate change has hardly assessed the economic responses that may abate these consequences. The 2007 report of the Intergovernmental Panel on Climate Change (IPCC) does not discuss abating economic responses. It warns that increasing temperature will decrease crop productivity [in] countries at low latitudes, increase the frequency of drought that lowers crop yields, and increase crop damage and failure. And it expects these effects to affect crop production negatively and increase the risk of hunger. These dire predictions are grounded in the analysis of available evidence on climate change and its impact on crop production, but they fail to account for ways in which economic systems may respond and work to offset these expected outcomes.’

It is at least conceivable that Kidman, or various Australian governments, might have responded to the uncertainties of central Australian livestock production by diverting the rivers of northern Australia to irrigate the arid interior, or diverting the entire Australian population to exterminating the rabbits there. Such deterministic solutions would have obviously been expensive, and possibly ineffectual.

Kidman’s contribution lies in his use of creativity and local knowledge in developing a flexible strategy for coping with the inherent unpredictability. But he could not have done so had he been constrained by government regulations. In 1916, for example, a Queensland Government export embargo prevented Kidman from bringing about 18,000 cows across the border into South Australia (Barrier Miner, 29 July 1916, p. 6), resulting in a claimed loss of £40,000 (The Queenslander, 13 April 1918, p. 13).

Governments have a propensity for applying deterministic, expensive solutions to perceived problems such as climate change. The Kidman story reminds us that adaptation to climate change is principally a question of addressing the uncertainty inherent in the future climate.
In such circumstances, flexibility and individual creativity and freedom of action, rather than centralised planning, are more likely to be effective. On a broader scale, a program of rigorous micro-economic reform to reduce structural rigidities would undoubtedly help individuals, businesses and communities to adapt more successfully.

**Conclusion**

Despite the lack of explicit or extensive information about Sir Sidney Kidman’s commercial operations, it is possible to discern the main features inferentially.

- Kidman’s central Australian properties were generally contiguous, forming chains that straddled key stock routes and watercourse. By stocking his runs at less than full capacity, Kidman incurred an opportunity cost of lost production in a good season. However, akin to insurance, this cost can also be regarded as the premium on a ‘real’ option to move cattle to adjoining properties at times of localised drought.

- During more extensive, region-wide droughts, he was able to exercise the further option of moving livestock to markets along stock routes when competitors could not do so because of the lack of water and grass en route.

- By drawing on an extensive bush network drovers, aboriginals and telegraph operators for information about the movement of competing mobs of cattle, Kidman was able to exercise a third option. Because his chains of properties ended at railheads that provided access to the major capital city markets, he could redirect his stock to the market where prices would likely be highest.

The strategic flexibility afforded to Kidman by these three options allowed him to remain commercially successful when many others failed in the face of a highly variable and unpredictable climate that was compounded by the depredations of the rabbit.

Kidman coincidentally provides a valuable object lesson in terms of adaptation to climate change. In particular, a creative individual who applies local knowledge in a way that allows scope for flexible responses can adapt successfully to change on a transformational scale. Although not explored in this paper, it is intuitively obvious that the scope for successful adaptation will be maximised when government regulations and economic interventions that reduce the scope for flexibility are minimised.
Appendix A: Properties probably owned or controlled by Kidman, or in which he had an interest, 1935

The following properties are included in the map in Figure 3 in the text.

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