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Banking Records, Business and Networks in Colonial Sydney, 1817-1824

Banking Records, Business and Networks…

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Abstract

This paper contributes to knowledge of early Australian colonial businesspeople and their business activities through an examination of accounting transactions between depositors in the first accounts ledger of the Bank of New South Wales. A social network analysis framework is applied to the transactions to disclose business networks and prominent individuals in the networks. The analysis seeks to ascertain the importance of these people to commerce and the significance of their networks in terms of facilitating commercial relationships in a business environment that was fraught with uncertainty. The results illustrate the importance of networks to colonial trade and mercantile activity, especially for smaller-scale businesspeople.

Keywords: networks, business networks, colonial business, uncertainty, Bank of New South Wales, accounting, banking records, Australia

JEL Categories: B25, M40, N0, N01, N90

Introduction

Sydney's early colonial business and economic history is a story of remarkable achievement in the face of many obstacles for would-be businesspeople. The early colonial economy was formed from the need to feed, clothe and house the inhabitants and was financed initially by the British government.[1] Commerce was, thus, the sole means by which private wealth could be accumulated. However, an unfamiliar environment together with myriad sources of uncertainty — long distances from international markets and lines of communication and credit, little 'free' labour, a small domestic market, a shortage of currency and a government that did not initially encourage private enterprise — meant that early businesspeople had to evolve new and adaptive business practices.[2] How was this managed in a foreign land that was fraught with hazards, and where most of the population was composed of convicts? Ville has described strategies used by several pioneer firms to address these challenges, such as diversification and a focus on capital minimising industries.[3] However, a response was also needed that went beyond the boundaries of the firm, particularly for smaller enterprises with few internal options. In this context, inter-firm cooperation through networks would have helped firms mitigate uncertainty. Networks are especially important in situations where it might be costly to reverse potential risk effects of transactions. In contrast, a past successful transaction exchange is likely to prompt repeat exchanges.[4] This would have been important in the colony. Thus, networks that improved sharing of information and

[1] Phillips, Development under Macquarie, p. 32; N.G. Butlin, *Forming a colonial economy*, pp. 89-92.
[2] White, *Mastering risk*, pp. 72-7; Ville, Business development, pp. 21-4. 'Free' labour means colonists who were not convicts or ex-convicts ('emancipists').
[3] Ville, Business development.
[4] Rangan, The problem of search, pp. 824, 826.

alleviated uncertainty would have assumed great consequence in the face of risky business dealings.[5]

Regrettably, historians have neglected early nineteenth century enterprises, despite their importance in initial Australian economic development. This neglect is due partly to the paucity of extant business records.[6] While several case studies have been written, we know little of the way business was transacted between firms.[7]

Therefore, the aims of the study are first, to ascertain the extent of business networks and their role in mitigating business uncertainty and facilitating commerce and commercial relationships in the uncertain business environment. The second aim is to broaden our knowledge of the businessmen and women in these networks whose contribution to the early economic and business development of the colony of NSW may have remained unrecognized.

Recorded accounting data from the first ledger and two minute books of the Bank of New South Wales (hereafter, BNSW), Australia's first formal bank, established in 1817, is used to identify possible colonial businesspeople.[8] A social network analysis framework is applied to the data to disclose networks and the prominent people in these networks. Supplementary archival evidence, such as government correspondence,

[5] Kadushin, The motivational foundation, p. 81.
[6] Ville, Business development, p. 38; Steven, The changing pattern, p. 177.
[7] For example, Hainsworth: The NSW shipping interest, *Simeon Lord, Builders and adventurers*, Trade within, *The Sydney traders*; Steven: *Merchant Campbell*, Enterprise, The changing pattern, Public credit, Eastern trade.
[8] Held by Westpac Banking Corporation as BNSW First Ledger and Directors' Minute Books 1 and 2. The merger of the Bank of New South Wales and the Commercial Bank of Australia in 1982 created Westpac Banking Corporation (Fleming, Merrett, and Ville, *Big End*, p. 120). S. J. Butlin (*Foundations*, pp. 138-9) contended that although initially the operations of the BNSW were only on a small scale, the bank's real significance lay in the fact that the colony had developed economically to the point where it could support a banking institution. It also symbolised the acceptance of economic development (p. 7).

colonial newspapers, census reports and family letters and memoranda, provide detail on the individuals identified and their backgrounds and occupations**.**

The specific time frame for the study, 1817-1824, is chosen because it was the period covered by the ledger and minute books. The BNSW did not preserve its second ledger, so there are no sources covering accounts data for ensuing years. The records provide a complete set of transactions (deposits and withdrawals) for depositors of the bank for the period of the first deposits accounts ledger, 8 April 1817 to 30 June 1820, and transcripts of all shareholders' and board of directors' meetings from the bank's inception to 21 September 1824.[9] The deposit accounts in the bank ledger represent quantitative information regarding actual transactions—detailed, tangible data and observable information not easy to find from this period. Network analysis techniques in the form of network matrices can be applied to the BNSW data to analyse the extent of relationships between depositors and to allow identification of possible business networks.

The entries in the BNSW account books were not the only means of completing business transactions in the colony. There were also a variety of coinage, discounted British Treasury bills, and store receipts. We cannot say with certainty what proportion of transactions were completed through the BNSW ledgers but reputable contemporary observers point to their importance. Commissioner Bigge, in his report on agriculture and trade in the colony in 1823 considered that "the notes of the Bank of New South

[9] The first official record of the BNSW is a meeting held on 22 November 1816 regarding the establishment of the bank (Directors' Minute Book 1). Minute Book 1 covers the period 22 November 1816 to 21 July 1819; Minute Book 2 covers the period 27 July 1819 to 21 September 1824.

Wales have constituted the largest portion of the circulating medium of the colony", a view reaffirmed by William Charles Wentworth.[10]

Thus, the BNSW records provide a unique opportunity to study networks that might have existed at the time, and enable the development of a clear financial profile of the people who used the bank. The bank records are invaluable for this particular type of analysis because the free and freed population was small and the BNSW was the only formal bank.

The bank data, in particular the bank ledger, have not been used for this specific purpose. However, the value of these early financial records has been recognised by some historians. The bank records have been examined for evidence of female participation in commerce, and for whether networks existed among emancipists.[11] Dense and cohesive networks were found among emancipists; this would have been expected given that all shared the same constraints and the convict 'taint'. Trust, shared bonds and social networks would have been expected and these networks were likely to promote sharing and maintaining of information and resources. The present study provides a wider perspective on colonial business and focuses on transactions between depositors across all facets of colonial commercial society – emancipists, professional and India merchants, farmers and public servants who also engaged in commerce, and traders, who were regarded as less respectable than merchants. The results here are thus representative of all colonial businesspeople and could suggest findings of more open networks where searching and obtaining resources and accessing and extending bridges in a network (thus

[10] (Bigge, Report, pp. 65-66) (Statistical, Historical, p. 9); Wentworth, *Statistical Historical*, p. 9.
[11] Johns, The first female shareholders, Craig and Johns, Women in colonial commerce, Johns and van der Eng, Networks and business development: convict businesspeople.

increasing access to information) might be more useful.[12] There would be less likelihood of finding natural bonds and trust.

The next section describes the nature of commerce in early nineteenth-century Sydney. This is followed by a description of the research methodology. Results and discussion follow. Limitations of the study and areas for further research are addressed in the final section.

The Colonial Business Environment

The British government wanted the colony to be self-supporting yet remain a gaol. Moreover, its choice of governors provided little support for private enterprise until Macquarie arrived (1809-21). He recognized the necessity for strong commercial groups and the importance of emancipist entrepreneurial efforts, which caused friction with some free merchants and officials and free immigrants, who regarded themselves as a social and economic elite. However, economic difficulties plagued Macquarie's administration. There were two depressions in rapid succession, in 1812-13 and 1814, a prolonged drought in 1815, and the flow-on effect of the 1810-1812 financial collapse in Britain. There had also been a glut in shipments from India in 1811 and 1812 making cargoes impossible to sell. India merchants, under pressure from their British interests to pay outstanding debts, in turn called on colonial debtors to settle their accounts, and refused to underwrite additional transactions.[13] Many Sydney merchants were thus ruined for a period and part-time merchants and traders withdrew from commerce to concentrate on

[12] Lin, *Social capital*, p. 27.
[13] Steven, The changing pattern, pp. 178-80; Linge, *Industrial Awakening*, p. 27.

farming and pastoral interests.[14] By 1815 Sydney's commerce had almost totally collapsed, and although trade improved between 1816 and 1821, the large profits made in earlier years would not be repeated. Competition was acute and profit margins were lower.

Therefore, a major issue for successful trading in the colony was the ability to command capital and to be credit-worthy. This was difficult when markets and contacts were so far away, and for ex-convicts, when reputation and good character were essential. The India merchants who arrived after 1800 had sources of capital and connections overseas and showed that the right contacts and the networks that sustained them were crucial for enterprising businessmen. With the advent of these professional merchants, and under Macquarie's governorship, trade became a specialized, acceptable occupation and emancipist traders began to emerge.[15]

Lack of currency, particularly coin, added to the problems. The colony lived on credit. Colonial 'money' consisted of Commissariat (store) receipts, Treasury bills, bills of exchange and promissory notes.[16] Successive governors had difficulty controlling currency because there were so many different forms and such a complexity of private arrangements carried out through mercantile firms.[17] There was no standard exchange rate. Sources of coins included dollars, copper coins and 'dumps' that were cut from larger coins. This disorganised currency system was Macquarie's main reason for

[14] Farmers and townspeople joined in mercantile pursuits, while merchants also owned farms. Mercantile trading could avoid some of the problems associated with uncertainty because it could be conducted on a smaller scale and was less dependent on capital and skilled labour (Ville, Business development, pp. 18, 38).
[15] Steven, The changing pattern, pp. 176-77.
[16] Booker & Craig, Balancing debt, p. 2.
[17] S.J. Butlin, *Foundations*, pp. 5, 97-8; Steven, Public credit, p. 55.

wanting to establish the BNSW; he believed it would help solve the problem of trying to regulate private note issues.[18]

Sydney merchants had to plan ahead and monitor the local market closely, so that they could fill predicted gaps in supply. The distance from suppliers meant that merchants had to accurately predict future shipments, especially given that the small Sydney market was exposed to the full force of natural fluctuations in supply.[19] Information transfer was also very slow because it occurred at a rate dictated by the physical movement of people or commodities.[20] In addition, uncertainty regarding the nature of the relationship between emancipists and settlers added to the economic uncertainty they all faced.

Thus, imperfect information was a major impediment for successful business, and diversification (which helped ease the problems of a small market), networking, and vertical integration (which helped solve the low-trust problem) were used to combat risk and an environment of distrust.[21] For small and part-time entrepreneurs, networking was a particularly attractive option to mitigate uncertainty.

In summary, problems caused by the lack of currency, distance from main markets, labour shortages, communication problems, a small domestic market, the lack of capital and credit backing, and for some, the added disadvantage of being an emancipist, resulted in a volatile nature of business, so that only determined and courageous businesspeople survived. Most of their decisions had to be made with imperfect information; they had to be 'judgemental decision-makers' about the coordination of

[18] Commissioner Bigge considered that the BNSW had 'greatly added to the facility of commercial transactions within the colony'. (Bigge, Report, pp. 65-66).
[19] White, *Mastering risk*, p. 47.
[20] White, *Mastering risk*, p. 74.
[21] Ville, Business development, pp. 18, 38.

scarce resources.[22] Business networks helped to address many of these sources of uncertainty. By facilitating high trust rich transactions they lowered the costs of trading and facilitated the sharing of information on distant and volatile markets, and the extension of credit and acceptance of various forms of payment.

Research Method

Social Network Analysis and Social Capital

Sociologists use network analysis as a methodological framework or strategy to analyse social structure and give a perspective on social behaviour.[23] The emphasis is on relationships.[24] Network analysis is used in other disciplines, for example, to study electrical circuits in physics, networks of roads and canals in geography, and interlocking directorates.[25] Clearly relations that form a network can be very diverse and they can also include strictly business transactions.[26]

Lee claims that network analysis has several benefits. Social structure can be revealed without requiring subjective insights to individual beliefs, values and normative commitments. Ties or contacts are channels for communication or resource transmission, so the greater the number of ties associated with an individual, the greater is that person's potential to communicate, influence or transfer resources to others in a network. And specific features of network relationships can be investigated and the causal actions that

[22] Casson, *The entrepreneur*, p. 22-5.
[23] Marsden and Lin, *Social Structure*.
[24] Morgan, Researching the transfer.
[25] These include Fennema and Schijf, Analysing interlocking; Burt, Firms, directors and time; Berkowitz and Fitzgerald, Corporate control; and Benediktsson, The deviant.
[26] Flap, *Conflict, loyalty*, p. 2.

have produced 'the actual unique histories' can be identified.[27] This last aspect of network analysis is most useful in this study.

Network analysis techniques offer an ideal framework to ascertain the pattern of business relationships among depositors in the BNSW's first deposit accounts ledger. The network model used here is based on a transactions network, rather than a social network. The BNSW deposit accounts identify by name those to whom payments were made from the deposit accounts, and are therefore *relational* data because the relational aspects of the data can be investigated. Transactions (payments) between BNSW depositors can be analysed and the extent of possible business relationships established. Individuals with the greatest number of contacts (transactions) can be identified as the potentially most influential or powerful people in the network.[28] The fact that a transaction has occurred implies that there was a relationship between two people that initiated it – and thus, the transaction can be viewed as a potential source of communication. Social network analysis thus renders the depositor data more useful.

Data Selection

There were 158 deposit accounts in the BNSW ledger; four partnership accounts, four charity or philanthropic fund accounts, one 'police fund' account that functioned as a type of consolidated revenue fund, and 149 individual accounts. Balancing of the ledger was undertaken every six months, and balance sheets and lists of depositors and shareholders and their balances were produced from this process. From these it was possible to identify whether depositors were also shareholders.

[27] Lee, A social network, p. 8; Emirbayer and Goodwin, Network analysis, p. 1419.
[28] Lee, A social network; Wasserman and Faust, *Social network analysis*.

The first objective was to separate depositors who had large, frequent transactions from those who had smaller, less frequent transactions, in order to isolate possible smaller-scale from larger-scale businesspeople. A detailed analysis of transactions in each depositor's account was made. The purpose was to ascertain how often the account was used, how long it had been held, and how large the transactions were. From this analysis, it was possible to calculate, for each depositor, the average number of transactions per week, and the percentage of transactions over £50.[29] Depositors were segregated into first, second or third tiers, according to the following criteria.

For inclusion in the first tier:

- accounts averaged one or more transactions per week; and
- more than 20 per cent of total individual transactions were over £50.

For inclusion in the second tier:

- accounts averaged one transaction a month; and
- more than five per cent of total individual transactions were over £50.

The frequency of contact criterion was important to establish the strength of a link: above-average frequency characterises strong links and below-average frequency characterises weak ones.[30]

Additionally, for both tiers, depositors must have used their account for more than 26 weeks (six months), during the period of the first ledger. This was to distinguish longer-term depositors from those who spent only a brief period in the colony (for example, ship's captains) or part-time businesspeople who opened and closed accounts in

[29] £50 has been used as the minimum criterion for large transactions because it was a considerable sum of money. For example, the first accountant appointed by the BNSW (Robert Campbell Junior) was paid an annual salary of £150 (Directors' Minute Book 1), and the annual salary of a clerk employed in the East India company in 1815 was £66 (Boot, Real incomes, p. 643).

[30] Degenne and Forsé, *Introducing social networks*, p. 123.

a short space of time. Many depositors kept their accounts for only short periods: for example, T. Dunn for three weeks and S. Davis for sixteen weeks.

The record of depositors at 30 December 1821 from the Bigge Appendix,[31] was used to justify inclusion of depositors who did not open their account until the last weeks of the first ledger. If they continued to use their accounts into the second ledger, they could have had more influence on the development of the colonial economy than depositors in the early period of the first ledger.

Depositors who did not meet either the first or the second tier criteria were classified as third tier. These were very small-scale businesspeople or depositors who used their accounts infrequently or only processed small payments (for example, less than £1).[32] Most depositors (90) fell into this category. These accounts were eliminated from the network analysis because their small infrequent transactions negated meaningful assessment of network activity.[33] In addition, the four charity funds and police fund were eliminated from the analysis as irrelevant to the networks. Also eliminated were eight depositors with the same surname, because of the difficulty in ascertaining payments to each other, given that the data were directed data. An exception was Robert Campbell Junior and bank president John Thomas Campbell; the latter's name was generally entered as 'his honour' or 'the president' so could be differentiated. Mary Reibey and her son George were also included because they made no payments to each other. Therefore, of the 158 depositors, 36 were in the first tier of large-scale depositors, nineteen in the second tier of smaller-scale depositors and 103 (including the charity and association

[31] Bonwick Transcripts, Box 27, pp. 6294-98, Mitchell Library (ML).
[32] After May 1818 the bank decided that no cheques for less than £5 would be written unless they were for balances of accounts (Holder, *Bank of New South Wales*).
[33] Knoke, Organisational networks, p. 22. Note that this could have meant these depositors did not use their deposit accounts to process business transactions.

accounts and the police fund and the eight accounts above) in the third tier. Table 1 lists first and second tier depositors and, as far as can be determined, their occupations.

INSERT TABLE 1 HERE

The Network Matrices

For social network analysis collected data is usually stored in a data matrix similar to a table. In this study, MS-Excel was used to record and store the data. Five matrices were derived from the depositor analysis. The first matrix was the depositors' 'affiliation-by-affiliation' matrix, showing whether particular pairs of affiliations were linked through common agents, for example, whether being a free person was linked to also being a bank shareholder, or whether being an emancipist was linked to not being a shareholder. Understanding the social structure of the networks analysed helps in interpreting results.

The outcome from the affiliation matrix was that free settlers were by far most dominant in the BNSW; for example, more than twice the number of free depositors, (70 per cent), than emancipists (30 per cent), were also bank shareholders.[34] Given this finding, it was expected that the network results would be dominated by free persons, rather than emancipists, regardless of which tier they were in.

The remaining four matrices were 'case-by-case' matrices of depositors. The first two square matrices analysed ties among first tier depositors and among second tier depositors. The third and fourth rectangular matrices analysed ties between first and second tier depositors.

[34] Given that the BNSW was founded after a meeting of "magistrates, principal merchants and gentlemen of Sydney" held on 22 November 1816, this is not surprising; only one of these men was an emancipist (Simeon Lord), who was a well-established successful merchant by this time (Holder, *Bank of New South Wales*, p. 11).

Data in all four matrices were both directed and valued, showing the direction and number of payments between pairs of depositors. Directed data allow identification of the most important person in the network, who is the person to whom most transactions are directed.[35] Valued data (here describing the number of transactions between pairs of depositors), give an indication of the strength and potential influence of a relationship.[36]

With the square matrices the aim was to find whether there was a relationship among depositors in the same tier and how strong it was (that is, how many transactions passed between tier members). For the rectangular matrices, the aim was to ascertain how many transactions were directed to those in the first tier from second tier depositors, and *vice versa*.

Centrality measures, which reveal the most important person in the network, were also calculated for each network from the matrices.[37] Centralisation varies according to the definition adopted to measure individual centrality. Here it was used as a measure of transaction activity. Centrality was measured as each depositor's proportion of total transactions in the network and the person who received the most payments was central to the network. This is what is known as 'in-degree' (choices received) centrality; directed data also allow 'out-degree' (choices made) centrality, so that identification of the individual both receiving and sending the most payments could be made.[38] There is not necessarily a positive correlation between people who direct the most transactions (out-degree centrality) and those who receive the most transactions (in-degree centrality).

[35] Undirected and unvalued data merely show that there is a relationship between two people or subjects; such networks use binary data: 1 there is a relationship, 0 there is not, and give no indication of the strength of the relationship.
[36] Scott, *Social network analysis*, p. 49; Degenne and Forsé, *Introducing social networks*.
[37] Degenne and Forsé, *Introducing social networks*, pp. 132-3.
[38] Zemljič and Hlebec, Reliability of measures, p. 75.

The former might be the member controlling the network or the member with the most information in the network.

Thus, centrality was a relative measure, and allowed for comparisons of centrality between networks.[39]

Supplementary archival sources, noted earlier, were used to trace the background and business activity, where possible, of the individuals identified as likely businesspeople.

Results and Discussion

First Tier

Network analysis results for the first tier matrix are shown in Table 2. Centrality measures are presented in order of importance to the network:

TABLE 2 HERE

Table 2 shows that the most important depositor in the first tier was Williams, followed by Campbell Junior and the merchant firm of Jones & Riley. These depositors received the largest number of payments: Williams (174, centrality 12.7 per cent), Campbell Junior (126, centrality 9.2 per cent) and Jones & Riley (90, centrality 6.6 per cent). The centrality results for these depositors were well above the mean centrality of 2.8 per cent.

[39] Local centrality measures were considered sufficient for the small data set. Several software packages enable large amounts of data to be analysed (for example *UCInet* and *statnet*) and allow calculation of more refined global measures of centrality like closeness and betweenness; however, these measures are based on binary data using samples from larger populations, unlike this study. Lee (A social network analysis) found betweenness and closeness were identical to the centrality measure he calculated. Zemljiĉ and Hlebec (Reliability of measures, p. 82) also claim that in-and-out-degree are the most stable centrality measures.

The total number of transactions in this network was 1,366. The mean number of transactions per depositor was 37.9, with median and mode being 32 and 13.5 respectively. Those depositors who received more than 37.9 (or 38) transactions were the first thirteen depositors in Table 2 – from Williams down to Levey. This means that 36 per cent of depositors in Tier 1 had more active accounts than the rest of Tier 1, which could indicate they were involved in business activity.

The fact that Williams dominates the network analysis over Campbell Junior is initially surprising in that Campbell Junior is well documented as a leading colonial businessman, whereas Williams is relatively unknown.[40] Almost 71 per cent of first tier depositors made payments to Campbell Junior, as opposed to 63 per cent for Williams. The total *number* of payments caused Williams' superiority – 174 for Williams, 126 for Campbell Junior. Nevertheless, Campbell Junior was connected to 71 per cent of the first tier depositors, as opposed to Williams who was connected to only 63 per cent of that group.

The highest number of common ties or links was between Campbell Junior and Jenkins (80). In fact Campbell Junior's centrality would not have been so high had it not been for the 52 payments he received from Jenkins. There were also strong mutual ties between Williams and Campbell Junior (77); Williams' centrality would have been much lower without the 65 payments he received from Campbell Junior. So, when the network is examined closely, Campbell Junior dominated, even though his centrality measure was

[40] Robert Campbell Junior was the nephew of Robert Campbell, 'the father of Australian commerce' (Steven, *Merchant Campbell*). Williams is much less well known and receives scant attention in the extant literature. He came free in 1811, described as a 'merchant'. In 1815 he established a retail shop with the financial support of William Broughton (commissary and magistrate) and the governor's secretary, J. T. Campbell, who was his patron (Colonial Secretary's Papers, Reel 6045, 4/1733, pp. 149-50, 24 June 1815, National Library of Australia, NLA). Williams did not exchange payments with Broughton or Campbell, despite their patronage.

much lower than Williams'. This is one of the benefits of directed ties in network analysis, in that the detail of transaction behaviour, and thus the strength of the relationship, is visible. Centrality of itself does not necessarily signify prestige or importance in this network analysis; it is clear that Campbell Junior is responsible for Williams' high centrality. On the other hand, Jenkins' 52 payments significantly increase Campbell Junior's centrality.

There was also considerable transaction activity in both directions between Williams and Eagar (merchant and lawyer) (32 transactions) and between Jones and Riley and Campbell Junior (33 transactions). Figure 1 expresses these relationships graphically; it shows a five node network where the ten dyads or pairs are all connected to each other. Nodes represent actors – in this case, depositors – while a set of lines represent a direct tie between a pair (dyad).[41]

FIGURE 1 HERE

Williams, Campbell Junior, Eagar, Jones & Riley and Jenkins (all businessmen) have a cohesive, high-density network, with no structural holes.[42] This means that information would more likely be shared among them, in which case Williams would have less power (less control over information), but the network could benefit overall because it could promote mutual trust and willingness to cooperate, and may engender a sense of community among network members.[43] Williams could have used his

[41] Yang and Knoke, Optimal connections, p. 286.
[42] Structural holes (the absence of ties within networks) potentially increase one's social capital because they increase non-redundant contacts. Burt (*Structural holes*) claims that individuals in the same network who have no ties to each other have an advantage in that they might be bridges to other networks, and are thus likely to link several small groups (Granovetter, The strength of weak ties) and add to information in a network.
[43] Flap and Völker, Goal specific, pp. 300-1; Kadushin, The motivational foundation, p. 77.

relationship to one partner in the network to contact another partner in the network, thereby forfeiting control of the content and timing of delivery of his information to everyone else.[44] Social capital would be a possible outcome of this network. However, some authors claim that in competitive situations (such as in the NSW colony) cohesion is a disadvantage because network members all have the same information and each is constrained by the other, but at the same time, one cannot be played off against the other.[45] Thus, no one can gain advantage. On the other hand, structural holes in a network can mean that individuals gain information from diverse clusters that do not have direct access to one another, and one person can be played off against the other.

Nevertheless, lack of choice of business partners was a problem in the colony and knowing who to trust assumed great importance. Rangan argues that in this situation, economic actors turn to their networks, which assume real significance in influencing the efficiency of economic actions and outcomes.[46] Kadushin suggests that perhaps the most interesting form of trust occurs when it is placed not in the partner to a dyadic transaction, but in the system as a whole and when there is a significant time delay.[47] Partners in a network might have to exercise this form of trust when entering into exchanges where the outcome is uncertain (as was likely or common in the colony).

Note that Eagar was the only emancipist, so the expected finding that free depositors would dominate results has eventuated in this network analysis, although Eagar's centrality measure is among the top thirteen.

[44] Degenne and Forsé, *Introducing social networks*, p. 117.
[45] Kadushin, The motivational foundation, p. 83; Burt, *Structural holes*.
[46] Rangan, The problem of search, p. 814.
[47] Kadushin, The motivational foundation, p. 83.

What seems clear from their low centrality measures is that not all first tier depositors were regularly involved in business activity. Some were government employees, for example, UK government commissioner Bigge, Governor Macquarie's secretary J.T. Campbell, crown solicitor Garling, and explorer Oxley, and used their personal accounts to process government transactions. There might have been a professional network, as Laidlaw's study into colonial governance found, among public servants.[48]

For other depositors who had very low centrality measures, indicating little network activity, a case might be made that they were part of other networks, for example a third tier network of small-scale shopkeepers and artisans. They might also have been paying servants or other employees.

Second Tier Network

Centrality measures for the second tier matrix are shown in Table 3, in descending order of importance:

TABLE 3 HERE

The second tier matrix is smaller than the first tier with a total of only 73 transactions (as opposed to 1,366 transactions for the first tier). The spread of payments was thus much lighter in this network. The first nine depositors (47 per cent) in Table 3 all received more than the mean payments per depositor of 3.8 and the mean centrality of 5.26 per cent. Robinson and Smith, Barnard and Wood, and Black and Willmot were the most central depositors.

[48] Laidlaw, *Networks, patronage*.

Robinson, who was a public servant and poet, and Smith, who was a builder, are highly connected to each other. Their high centrality only arises because of their mutual transaction activity. It is possible that Robinson was making payments from his personal account to Smith for government work.

Little is known of Barnard and Wood other than that they were a shipowner and farmer, respectively. Black was the stepson of Simeon Lord, one of the colony's first networking entrepreneurs, and was employed by Lord in his hat manufacturing business. Willmot was a publican.

The interesting feature of the second tier network analysis is that nearly half the depositors show very little transaction activity, despite many of them being involved in business activity. Bostock & McQueen was a merchant firm; Chippendall was a publican; and Kitchen was a builder who worked on many government buildings. George Reibey was the son of Mary Reibey, Australia's first female entrepreneur, and looked after her business interests while she was in England in 1820-21.[49] This illustrates one of the limitations of the study, in that not all depositors used the BNSW for their business transactions. The importance of Amos in the network is perhaps misleading and an indication of how careful one has to be in interpreting network results. Amos was a practising lawyer and was possibly receiving payments for legal services performed. There is no archival evidence to suggest that he was involved in commerce. Some depositors, such as George Barnard and John Wood, received payments but made none,

[49] Irvine, *Mary Reibey*.

indicating that they had something some other depositors wanted, and which perhaps only they could supply.[50]

First Tier/Second Tier Network Analyses

Centrality measures for first tier/second tier network analyses are presented in Table 4, in order of importance to the network. The purpose is to show how important relationships between those depositors in the two tiers were to each other, that is, between (possible) small-scale and large-scale businesspeople. Results from both matrices are shown in one table because the results highlight the importance of direction of data.

TABLE 4 HERE

Second to first tier:

The mean centrality measure in payments directed from second to first tier depositors was 2.8 per cent. Ten first tier depositors had centrality measures above 2.8 per cent. Seven second tier depositors made no payments to those in the first tier.

There were 279 transactions in this network analysis. The mean number of transactions per depositor was 7.8. The top ten depositors in this analysis all received more than 7.8 payments.

At first glance, Campbell Junior dominates this analysis because he received 38 per cent of all payments. Second and third, Williams and Oxley, had much lower centrality measures of 7.9 per cent and 6.4 per cent respectively. However, in examining the number of *depositors* who made payments (as opposed to total number of *payments* made), Campbell only received payments from 37 per cent of depositors in this network,

[50] Unfortunately no BNSW transaction detail has survived so it is impossible to ascertain what the payments were for.

as opposed to Williams who received payments from 53 per cent of depositors. So, while Williams received much smaller numbers of individual payments, he had links to more depositors than Campbell. In addition, the payments Campbell received included 89 from Robinson, which might indicate a contractual or on-going relationship between them.

Williams, thus, might have had access to more information than Campbell, particularly if his contacts were influential. Not all contacts have the same value: a small number of transactions with an important contact might lead to access to better resources than a large volume of transactions with others.[51] Williams' contacts included a judge of the Supreme Court (Field), a 46th Regiment Army captain (Gill) and a superintendent of police (Minchin). Therefore it can be misleading to rely on the centrality measure alone in a transaction network analysis.

First to second tier

The mean centrality measure in transactions directed from first to second tier depositors was 5.26 per cent. Six depositors had centrality measures higher than 5.26 per cent. There were 217 transactions in this network analysis. The mean number of transactions per depositor was 11.4; the top six depositors all had total transactions greater than 11.4.

Wood dominates with centrality of 20 per cent. However, as in the previous analysis, when examining the number of depositors who made payments (as opposed to the total number of payments made to him), Wood received payments from only 22 per cent of depositors, compared with Smith (31 per cent), Robinson and Sindrey (28 per cent) and Black (25 per cent). Barnard also received payments from 22 per cent of depositors. Wood received 20 of his 43 payments from Wentworth (superintendent of police), indicating some sort of on-going relationship.

[51] Degenne and Forsé, *Introducing social networks*, p. 117.

Campbell Junior made the most payments (39, or 18 per cent) to those in the second tier. He also made the most payments in the first tier network analysis (245 or almost 18 per cent), although he was only second most central. These results, coupled with his centrality in the second to first tier network analysis, demonstrate the wide nature of his business connections.[52]

The results in Table 4 show that more payments (279) were made by second tier depositors to the first tier than the reverse (217), so that first tier depositors were more important to the second tier than second tier depositors were to the first tier. For example, more than a third (37 per cent) of second tier depositors made payments to Campbell Junior, and more than half (53 per cent) second tier depositors directed payments to Williams.

It did not necessarily follow that, because the first tier network was the largest network, the first-to-second tier network would also be larger than the second-to-first-tier network. The result depended entirely on how many first tier members made payments to the second tier. First tier depositors would have less reliance on second tier or lower-scale businesspeople given that they were more successful and operated on a larger-scale. The findings in Table 4 indicate that this assumption may have been correct.

Some second tier depositors in the second-to-first tier network analysis ended up with higher centrality measures in the first-to-second tier analysis than in the second tier analysis (Table 2). This can in part be explained by the higher number of transactions in the first-to-second tier analysis than in Table 2. However, even the fact that it was a larger network indicates that there were stronger relationships between first and second

[52] Pike, *Australian Dictionary*, Vol. 1. Campbell Junior had the largest total number of transactions (1461) in the BNSW ledger.

tier depositors than among second tier depositors. Some second tier members would have been able to use their ties with first tier members to access resources.

The Most Important Depositors

Using the centrality measures from Tables 2, 3 and 4, the five most important depositors in each network are ranked in Table 5, in descending order of importance. Note that some depositors have equal standing.

TABLE 5 HERE

The final column, overall ranking, shows the six most central depositors arising from the network analysis. Campbell Junior tops the list. He is the most prominent individual in the network analysis, spreading his payments equally between first and second tier members. Hence the results here reinforce the far-reaching nature of his business network, and thus, his importance as a colonial businessman.[53]

Robinson, emancipist, poet and public servant, was transported twice and is well documented, although not as a businessman.[54] He was one of the original shareholders in the BNSW and had a balance in his deposit account of £356.10.9 as at December 1821. This suggests he continued his business activities after the first ledger closed.

Williams had the second largest number of transactions (915) in the ledger. Given his position in business, it is curious that he has received little attention in the historical literature.

Comparisons between the sixteen most important depositors are shown in Table 6:

[53] Interestingly, Holder (*Bank of New South Wales*, p. 126) notes that Campbell Junior was a successful but not spectacular businessman.
[54] Pike, *Australian Dictionary*, Vol. 2.

TABLE 6 HERE

Of the sixteen depositors, eight (Wood, Smith, Williams, Barnard, Black, Sindrey, Amos and Laycock) we know very little about. The bank balances at 31 December 1821 show that while some depositors continued their operations into the second ledger, others either stalled (such as Wood) or discontinued their bank accounts. Barnard, Black, Willmot, Sindrey and Laycock were not bank shareholders up to 31 December 1821.

Surprisingly, given the results of the network analyses, Campbell Junior and Williams did not have active bank accounts at 30 December 1821. This might be due, in part, to the deficiency of £12,100 discovered in the BNSW's books at the end of 1820; cashier Francis Williams had made irregular loans to a number of people who could not meet their bills of exchange when due, including Campbell Junior and Williams.[55] Perhaps the latter struggled to repay the loans and no savings were possible. Nevertheless, Campbell Junior survived and became a director and later president of the BNSW (director, 1830-51; president, 1843-1851).[56] Archival information indicates Williams continued to be a successful merchant and a publican, was one of the founders of the Lachlan and Waterloo Mill Company in 1821[57] and a shareholder in the BNSW in 1826.[58] The results perhaps reflect the volatile and uncertain nature of colonial business.

[55] Colonial Secretary's Papers, Reel 6023, X820 p. 45, 25 February-27 March 1822; Reel 6017, 4/5782 p. 249, 18 January 1825, NLA.
[56] Holder (*Bank of New South Wales*, pp. 126, 131) notes that even when Campbell Junior was elected bank president in 1843 his business affairs were not in the best order and he owed money to the bank. Notwithstanding, in 1844 Campbell Junior held 50 shares in the BNSW.
[57] Williams became a colonial merchant, publican and landholder (Bigge Appendix, Bonwick Transcripts Box 12, p. 266, ML; Colonial Secretary's Papers, Reel 6062, No. 56, p. 120, 1 November 1825, NLA; Wentworth Papers, A765, pp. 135, 143; A758, p. 35, ML).
[58] *Sydney Gazette*, 1 March 1826.

Limitations and Further Research

The main limitation of this study is that sterling money was not the only medium of exchange in the colony during this period, and not all colonial businesspeople used the bank facilities, preferring to use merchants' credit facilities or barter. Therefore the transactions of the BNSW provide an incomplete picture. However, this limitation would apply to most, if not all, studies of colonial business during this period.

Network analysis techniques have a number of limitations, chiefly their inability to explain whether the same ties will exist over time. Most network results are 'snapshots'; whereas networks change, as do populations chosen for network analysis, and relationships among members of networks.[59] Nevertheless, the network analysis provides information that has not previously been available on actual business transactions among colonial businesspeople, and it deals with a specific and neglected phase of history.

Further research on business networks covering later time periods, such as the mid nineteenth century, would be valuable to see how far and in what ways they changed. In particular, it would be useful to analyse whether they remained an important mechanism for mitigating uncertainty, given institutional changes such as the growth of export markets and public corporations made trade more regular and less risky.

Conclusion

The early colonial business community of Sydney faced many forms of uncertainty, which threatened the continued existence of the small firms that proliferated. We have

[59] Galaskiewicz, The 'new network analysis', p. 31.

described the principal sources of uncertainty, particularly limited sources of credit, small markets, and inadequate and belated commercial information. All of these challenges occurred in a new and little understood environment of a recently established penal colony, distant from the main international centres of economic and business activity. Prior research has reported the internal strategies and structures designed to mitigate uncertainty, such as vertical integration and diversification by product or function. However, most firms remained small with few internal strategy options. What mattered most for them was the strength of their relationships with other traders. As such, business networks based upon regular transacting helped to build trust between firms. Trust addressed uncertainty in that it reduced the transaction costs of doing business, encouraged the sharing of information and knowledge, and facilitated the offering of trade credit. Prior research has also shown the existence of networks within particular societal groups, for example emancipists.

The current study shows that networks were also established more broadly across the business community, between emancipists and free settlers, for example, and between large and small traders, thus overcoming some of the constraints imposed by social groupings. As Granovetter (1973) classically observed, a web of weak ties spread across a community of different groupings can yield strong networking benefits. The BNSW was one of the key institutions of the contemporary financial system whose earliest records confirm this extensive web of transactions across the business community. Such transactions, which generally require a degree of trust in the first place, are indicative of the social capital already established among these businesses. The ongoing nature of such transactions is suggestive that they in turn further strengthened such links.

The study also adds to our knowledge of many of the key players in the embryonic business community, some previously identified but others unknown prior to this paper, and the nature of their business activities. In particular, some smaller-scale businesspeople have been shown to have played an important role in colonial business. The study thus enables a better understanding of the nature of commerce in early NSW. It adds to our understanding more broadly of Australia's social history. Holder comments in the preface to his book on the history of the BNSW, that the colony's commercial community were people 'in relation to each other and to the society in which they were part', and that this human aspect of commerce should not be forgotten.[60]

Finally, the study extends the use of social network analysis as a valuable methodology in accounting, economic and business history research. The bank records, reflecting commercial business practices of the time, also add a new dimension. Accounting data present well for network analysis because of the ability to use directed, valued ties and the generally readily available data in many company and financial databases. While this research has only involved a small amount of data, it demonstrates what can be achieved using network analysis techniques. The fact that so much detail can be disclosed from simple transaction data illustrates the usefulness of social network analysis as a research tool.

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[60] Holder, *Bank of New South Wales*.

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Table 1

First and Second Tier Depositors (listed alphabetically)

First Tier	*Occupation*	*Second Tier*	*Occupation*
Antill, H. C.	Governor's aide	Amos, T.S.	Solicitor
Berry & Wollstonecraft	Merchants	Barnard, G.W.	Ship-owner
Bigge, J.	UK Govt. Commissioner	Black, J.H.	Dealer, Accountant, BNSW
Brooks, R.	Mariner & merchant	Bostock & McQ	Merchant partnership
Broughton, W.	Commissary	Chipendall, W.	Publican, free settler
Browne, W.	Merchant, farmer	Emmett, W.	Merchant, ship-owner
Campbell, J. T.	Governor's secretary		
Campbell, R. Junior	Merchant	Field, B.	Judge of Supreme Court
Chisholm, J.	Merchant, ex 102 Regt.	Gill, J.	Capt., 46th Regt.
Clark, J.	Ship's captain	Howard, J.	Ship's captain
Cox, W.	Ex Paymaster NSW Corps, builder & surveyor	Kitchen, H.	Builder
		Laycock, S.	Farmer
De Mestre, P.	Farmer, merchant	Minchin, W.	Ex-NSW Corps, Supt. Police
Eagar, E.	Lawyer, merchant		
Garling, F.	Crown solicitor	Reibey, G.	Merchant
Hall, E. S.	Banker, landholder	Robinson, M.	Public servant
Hankinson, J.	Auctioneer, dealer	Sindrey, E.	Merchant, ship's captain
Jenkins, R.	Merchant	Smith, J.	Builder
Jones & Riley	Merchant partnership	Watts, J.	Unknown
Leverton, W.	Merchant	Willmot, J.	Publican
Levey, S.	Merchant	Wood, J.	Farmer/trader
McQueen, J.	Merchant		
McVitie, T.	Merchant, banker		
Moore, J.J.	Clerk to Judge-Advocate		
Oxley, J.	Surveyor-general, explorer		
Piper, J.	Naval Officer		
Redfern, W.	Doctor		
Reibey, M.	Merchant		
Riley, E.	Merchant		
Terry, S.	Merchant		
Underwood, J.	Shipbuilder, merchant		
Walker, W.	Merchant		
Wentworth, D'A.	Superintendent of Police		
Williams, G.	Merchant		
Wilshire, J.	Merchant, landholder		
Winder, T.	Merchant, ship-owner		
Wyatt, J.	Shopkeeper & trader		

Note: Sources, mostly archival documents from the Mitchell Library, State Library of New South Wales, are included in the reference list because the list is too long to include here.

Table 2: Centrality Measure Results for First Tier

Depositor	*Total Directed Ties*	*Centrality %*	*Depositor*	*Total Directed Ties*	*Centrality %*
Williams	174	12.7	Oxley	29	2.1
Campbell Junior	126	9.2	Hall	24	1.8
Jones & Riley	90	6.6	Brooks	19	1.4
Piper	76	5.6	Hankinson	17	1.2
Jenkins	72	5.3	Wentworth	16	1.2
Terry	66	4.8	Antill	13	1.0
McVitie	56	4.1	Broughton	14	1.0
McQueen	55	4.0	Campbell, J.T.	14	1.0
Browne	51	3.7	Chisholm	14	1.0
Eagar	51	3.7	Cox	13	1.0
Riley	51	3.7	Leverton	13	1.0
Underwood	50	3.7	Berry & Wollstonecraft	12	0.9
Levey	40	2.9	Garling	12	0.9
Wilshire	36	2.6	Redfern	8	0.6
De Mestre	34	2.5	Wyatt	8	0.6
Moore	34	2.5	Reibey, M.	7	0.5
Walker	31	2.3	Bigge	4	0.3
Winder	32	2.3	Clark	4	0.3
Total Ties				1,366	100.0

Source: First tier network analysis matrix.

Table 3: Centrality Measure Results for Second Tier

Depositor	*Total Directed Ties*	*Centrality %*
Robinson	10	13.7
Smith	10	13.7
Barnard	8	11
Wood	8	11
Black	6	8.2
Willmot	6	8.2
Amos	5	6.8
Laycock	5	6.8
Sindrey	4	5.5
Bostock & McQueen	3	4.1
Howard	3	4.1
Chippendall	2	2.7
Emmett	1	1.4
Gill	1	1.4
Reibey, G.	1	1.4
Field	0	0
Kitchen	0	0
Minchin	0	0
Watts	0	0
Total Ties	73	100.0

Source: Second tier network analysis matrix.

Table 4: Centrality Measure Results for Transactions from Second Tier to First Tier and First Tier to Second Tier

Direction: Second Tier to First Tier			**Direction: First Tier to Second Tier**		
Depositor	*Total Directed Ties*	*Centrality %*	*Depositor*	*Total Directed Ties*	*Centrality %*
Campbell Jnr.	106	38.0	Wood	43	20.0
Williams	22	7.9	Smith	27	12.4
Oxley	18	6.4	Robinson	26	12.0
Jones & Riley	13	4.6	Black	20	9.2
Underwood	11	3.9	Sindrey	16	7.4
Piper	10	3.6	Bostock & McQueen	13	6.0
Browne	9	3.2	Amos	11	5.1
De Mestre	8	2.9	Barnard	10	4.6
Riley, E.	8	2.9	Minchin	10	4.6
Walker	8	2.9	Emmett	9	4.1
Eagar	7	2.5	Reibey, G.	9	4.1
Jenkins	7	2.5	Howard	5	2.3
Moore	7	2.5	Chippendall	4	1.8
Brooks	6	2.1	Field	4	1.8
Chisholm	6	2.1	Laycock	4	1.8
Levey	6	2.1	Watts	3	1.4
Hankinson	4	1.4	Kitchen	2	0.9
McQueen	4	1.4	Gill	1	0.5
Hall	3	1.1	Willmot	0	0.0
McVitie	3	1.1			
Wentworth	3	1.1			
Clark	2	0.7			
Garling	2	0.7			
Antill	1	0.4			
Berry & Wollstonecraft	1	0.4			
Cox	1	0.4			
Terry	1	0.4			
Wilshire	1	0.4			
Winder	1	0.4			
Bigge	0	0.0			
Broughton	0	0.0			
Campbell, J.T.	0	0.0			
Leverton	0	0.0			
Redfern	0	0.0			
Reibey, M.	0	0.0			
Wyatt	0	0.0			
Total Ties	279	100.0	Total Ties	217	100.0

Source: First-to-second and second-to-first tier network analysis matrices.

Table 5: Most Important Depositors

First Tier	*Centrality %*	*Second Tier*	*Centrality %*	*Second to First Tier*	*Centrality %*	*First to Second Tier*	*Centrality %*	*Overall Ranking all Tables*	*Centrality %*
Williams	12.7	Robinson	13.7	Campbell Junior	38.0	Wood	20.0	Campbell Junior	38.0
Campbell Junior	9.2	Smith	13.7	Williams	7.9	Smith	12.4	Wood	20.0
Jones & Riley	6.6	Barnard	11	Oxley	6.4	Robinson	12.0	Robinson	13.7
Piper	5.6	Wood	11	Jones & Riley	4.6	Black	9.2	Smith	13.7
Jenkins	5.3	Black	8.2	Underwood	3.9	Sindrey	7.4	Williams	12.7
		Willmot	8.2					Barnard	11.0
		Amos	6.8						
		Laycock	6.8						
		Sindrey	5.5						

Source: Tables, 2, 3 and 4.

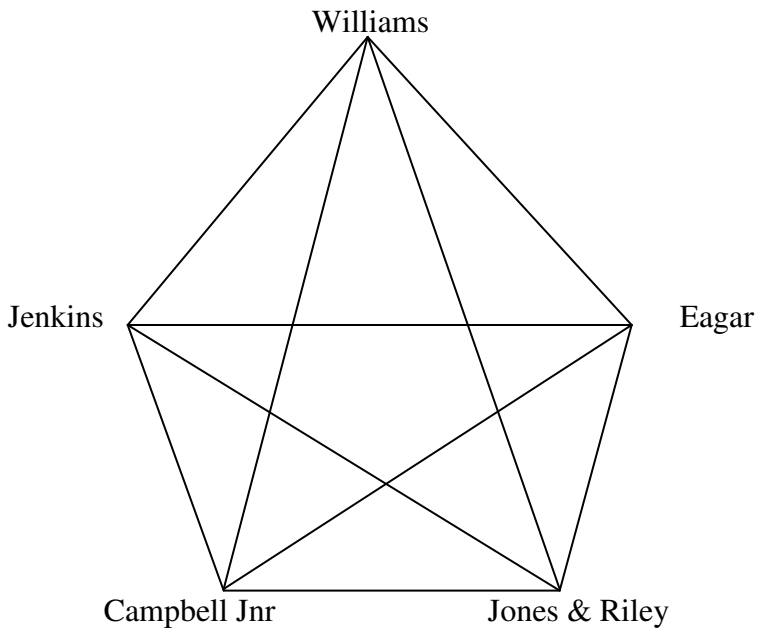
Table 6: Comparisons: Most Important Depositors

Depositor	*Public Record (Australian Dictionary of Biography)*	*Account Balance 30.6.1820 £.s.d.*	*Account Balance 30.12.1821 £.s.d.*	*Shareholder*
Campbell Junior	Yes	4.4.9	Nil	Yes, 1st & 2nd ledgers
Wood	No	0.15.3	0.15.3	No
Robinson	Yes	335.15.6	356.10.9	Yes, 1st & 2nd ledgers
Smith	No	Nil	Nil	Yes, 1st ledger
Williams	No	8.8.3	Nil	Yes, 1st ledger
Barnard	No	254.12.0	191.15.6	No
Black	No	2.2.7	4.8.4	No
Willmot	Yes	202.14.8	1.10.8	No
Sindrey	No	1,138.3.10	985.3.8	No
Amos	No	Nil	Nil	No
Laycock	No	67.11.8	50.1.7	No
Piper	Yes	805.10.7	178.1.9	Yes, 1st & 2nd ledgers
Jenkins	Yes	307.12.5	858.13.8	Yes, 1st & 2nd ledgers
Oxley	Yes	8.7.4	146.9.4	Yes, 1st and 2nd ledgers
Underwood	Yes	772.12.2	220.15.2	Yes, 1st and 2nd ledgers

*Note that Jones & Riley have been excluded because the firm had become a new partnership (Jones, Riley and Walker) by 1820 and they had ceased to use a BNSW deposit account.

Sources: Pike, *Australian Dictionary of Biography*, Vols. 1 and 2; BNSW ledger, 31 December 1817, Folios 101-3, 30 June 1818, Folios 105-8, 31 December 1818, Folios 301-4, 30 June 1819, Folios 401-5, 31 December 1819, Folios 407-11, 30 June 1820, Folios 413-8, Westpac Banking Corporation; Bonwick Transcripts, Box 27, pp. 6292-8, 30 December 1821, ML.

Figure 1: First tier cohesive network showing five-node graph where 10 dyads are directly connected.



Sources: Table 2 and first tier network analysis matrix.