The Fall of Fertility in Tasmania in the Late 19th and Early 20th Centuries

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Declaration

This thesis is the original work of the author undertaken as a scholar from 2011 to 2015 at the Australian Demographic and Social Research Institute, the Australian National University.

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Abstract

The aim of this thesis is to examine the fall of marital fertility in Tasmania, the second settled Australian colony, in the late 19th and early 20th centuries. In this thesis I use quantitative and qualitative data to investigate when marital fertility fell, how it fell—that is, was the fall due to starting, stopping or spacing behaviours— and why it fell at this time. In looking at why fertility fell, I examine how my findings support theories of why fertility fell during the fertility transition.

This study used digitised 19th century Tasmanian birth registration data plus many other sources to reconstitute birth histories of couples marrying in Tasmania in 1860, 1870, 1880 and 1890. This provides an individual-level data base which allows the use of both bivariate and multivariate methods of analysis.

The qualitative analysis looks at the historical context of Australia, and of Tasmania specifically, and at historical sources such as witness statements from the 1903 NSW Royal Commission into the Decline in the Birth Rate, articles and items from the late 19th and early 20th century Tasmanian newspapers, stories about couples in the marriage cohorts and two diaries of upper class Tasmanian women.

The thesis concludes that fertility started to decline in the late 1880s and the fertility decline became well established during the 1890s. The fall in fertility in late 19th century Tasmania was primarily due to the practice of stopping behaviour in the 1880 and 1890 cohorts, although birth spacing was also used as a strategy to limit fertility by the 1890 cohort. Since the thesis provides evidence to support most of the prominent theories of fertility transition, I conclude that the fertility transition was an integral part of the broader social and economic change that occurred in this period of history.

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Chapter 1

Introduction:

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The historical fertility transition

In the 19th and early 20th centuries, most European countries and English-speaking countries outside Europe experienced a demographic transition. 'Demographic transition refers to the process whereby populations shift from regimes of high mortality and high fertility in approximate long-run equilibrium (zero population growth) to a new equilibrium at low levels of mortality and fertility' (McDonald 2001:1). Since the 1950s, many scholars have put forward theories to explain why and how the fertility transition occurred and considerable research has been undertaken to find evidence for these theories. The European Fertility Project (EFP), for instance, which took place at the Office of Population Research in Princeton University during the 1960s and 1970s undertook a vast amount of research into the 19th century European fertility decline (Alter 1992; Coale and Watkins 1986).

The EFP considered that the fertility transition occurred in most European countries between 1880 and 1930, although the decline began earlier in France, from the late 18th century (Cleland 2001, Coale 1986). They adopted a fairly conservative estimate of the timing of the decline, defining the start as the date from which marital fertility fell 10 percent below the previous plateau and never returned to that plateau (Coale and Treadway 1986). Using this measure, fertility declined in some countries in Europe from the 1880s (Belgium and Switzerland), in England and Wales in the early 1890s and in the majority of European countries around 1900. Many demographers, however, disagree with the EFP criterion and consider that the fertility decline started several years earlier. For instance, according to the EFP measure, the fertility decline began in Sweden in 1902 (Coale and Treadway 1986) whereas nowadays it is generally agreed that it began about 20 years earlier, around 1880 (Bengtsson and Dribe 2014; Dribe and Scalone 2014).

Most scholars consider that the fertility decline began in England in the 1870s and that it fell from around the same period in other English-speaking countries (Caldwell 1999; Woods 1987). Marital fertility started to fall from about the late 1860s in the USA, from the 1870s in English-speaking

Canada and New Zealand, and from the 1880s in Australia (Caldwell 1999; Coghlan 1903; Gauvreau and Gossage 2001; Hacker 2003; Jones 1971; Ruzicka and Caldwell 1977). The Australian data suggest that the timing of the fertility decline varied somewhat between the colonies, falling first in Victoria from around the mid-1870s and from the 1880s in all other colonies except Western Australia (Jones 1971; Quiggin 1988).

The fall of marital fertility in Tasmania

The aim of this thesis is to examine the fall of marital fertility in Tasmania, the second settled Australian colony, in the late 19th and early 20th centuries. In this thesis I use quantitative and qualitative data to examine when marital fertility fell, how it fell—that is, was the fall due to starting, stopping or spacing behaviours—and why it fell at this time. In looking at why fertility fell, I examine how my findings support theories of why fertility fell during the fertility transition.

Total fertility consists of marital fertility and ex-nuptial fertility. In examining the historical fall in fertility, most demographers have concentrated on marital fertility. This is because ex-nuptial fertility was generally unplanned and unintended, whereas when married couples decided to limit their fertility they made conscious decisions about their childbearing. In Australia in the late 19th and early 20th centuries, births within marriage accounted for the vast majority of births. In New South Wales in 1891, for instance, 5.9 per cent of all births were ex-nuptial births (NSW Bureau of Statistics and Economics 1912).

In the last decades of the 20th century, some analyses were undertaken of the fertility decline in various parts of colonial Australia as discussed in Chapter 2. However, about 20 years ago, a digitised database of 19th century Tasmanian births, deaths and marriage registration data (see Chapter 4) became available for research purposes enabling much larger and more complex studies of historical demographic events to be conducted (e.g. Kippen 2002a). This is the first analysis of the historical fertility decline in Tasmania, using this data base.

I used the Tasmanian registration data plus many other sources to reconstitute birth histories of couples marrying in Tasmania in the second half of the 19th century, specifically, in 1860, 1870, 1880 and 1890 (See Chapter 4). This provided me with an individual-level database (Van Bavel 2004a) which has enabled me to use both bivariate and multivariate methods in my analysis of the fertility decline.

While some qualitative analyses have been undertaken of the historical fertility decline in Australia (Bongiorno 2012; Hicks 1978; Quiggin 1988), the findings have not been placed in any theoretical context. In this thesis, I examine how the historical context of Australia, and of Tasmania specifically, and historical sources such as witness statements from the 1903 NSW Royal Commission into the Decline in the Birth Rate, articles and items from the late 19th and early 20th century Tasmanian newspapers and diaries of upper-class Tasmanian women, provide support for theories of fertility decline.

In the past five to ten years digitised sources, such as vital registration indexes and 19th and 20th century Australian digitised newspapers, have become available on the internet and this has facilitated the task of reconstituting families and studying the social and economic conditions of the period. This is the largest study of reconstituted birth histories ever undertaken in Australia. Uniquely for Australia, this is the first study to examine the impacts of child mortality on fertility and to apply multivariate analysis.

Theories of the historical fertility decline

Theories as to why marital fertility declined in Western Europe and English speaking countries in the late 19th and early 20th centuries have been reviewed by several authors (e.g. Abbasi-Shavazi et al. 2009; Alter 1992; Bengtsson and Dribe 2014; Cleland and Wilson 1987; Hirschman 1994, McDonald 2001; Mason 1997; van de Kaa 1996). These theories are often difficult to test and the evidence is sometimes contradictory. This chapter examines theories of the historical fertility decline and available evidence for these theories according to the following categories: demographic transition theory; diffusion theory; economic theories; secularisation; trends in infant and child mortality; increased accessibility of artificial methods of birth control; and changes in women's roles and status in society and in the family. The chapter also examines theories about how fertility declined, that is, was it through changes in age at marriage, in birth spacing, or in stopping having children before the end of the reproductive life span.

Demographic Transition Theory

According to demographic transition theory, mortality declined in the 19th century in Western Europe and English speaking countries, because of 'modernisation' (Notestein 1945:39, 1983). The decline in mortality was followed by a decline in fertility, which was a 'response to drastic changes in the social and economic setting that radically altered the motives and aims of people with respect to family size' (Notestein 1945:40). Industrialisation and urbanisation changed the roles of

the family, there was growing individualism, more opportunities for individual social and economic advancement, large families became more costly and parents began to concentrate more on the wellbeing of the individual child. While fairly effective means of contraception had been known for many years, they were not widely used until families had the incentive to limit their fertility.

Findings from the Princeton European Fertility Project (EFP), however, called into question demographic transition theory, since the EFP found that the fertility decline occurred at the same time in late 19th and early 20th century Western and Eastern European societies that were at very different stages of economic and social development (Cleland and Wilson 1987; Knodel and van de Walle 1979, 1986). Economic and social development was measured by the following indicators: percentage of the male labour force in agriculture; the percentage of the population in rural areas; the percent in cities with over 20,000 people; and the percentage illiterate (Knodel and van de Walle 1979).

Demographic transition theory also states that a decline in infant and child mortality in a society is a necessary condition for marital fertility to decline (Freedman 1962; Preston 1978). The EFP findings, however, did not support this sequence, as they showed that the relationship between infant mortality and fertility was not consistent (Knodel and van de Walle 1979; Matthiessen and McCann 1978; van de Walle 1986). In some countries infant mortality declined before marital fertility, in others the decline in marital fertility preceded the decline in infant mortality, while in others the two declines occurred at around the same time (van de Walle 1986).

However, while rejected by the European Fertility Project, demographic transition theory received renewed support from subsequent research (Dribe et al. 2014; Schellekens and van Poppel 2012). Studies on the fertility decline in two large German states, Bavaria and Prussia, using different statistical techniques from the EFP project on less highly aggregated geographic areas, concluded that economic and social factors played an important role in the fertility decline (Brown and Guinnane 2002; Galloway et al. 1994; Lee et al. 1994). More recent studies of the fertility transition in parts of Europe, Iceland, Canada and the USA also found that social and economic change was likely to have played a role in the fertility decline (Dribe et al 2014; Schellekens and van Poppel 2012).

A re-examination of the findings of European historical studies on the relationship between infant mortality and fertility in the fertility transition and a new analysis of the fertility decline in Prussia also indicated that there was a positive relationship between changes in infant mortality and

change in marital fertility (Galloway et al. 1998). A recent study of the fertility decline in Aranjuez, Spain, concluded that in this locality the improvement in 'child survival' was 'the key variable leading to fertility control' (Reher and Sanz-Gimeno 2007: 717).

Diffusion theories of the fertility decline.

The European Fertility Project (EFP) concluded that the fertility decline began and spread within and across areas that shared similar cultural characteristics, such as values and languages, because knowledge and ideas about fertility control began to spread throughout these communities (Cleland and Wilson 1987; Knodel and van de Walle 1979). This occurred independently of changes in economic and social conditions. Thus, the diffusion of ideas and values about fertility control was the reason for the decline in fertility at this time.

Linguistic and cultural boundaries were very important in explaining the fertility decline (Cleland and Wilson 1987). An analysis of the decline in Belgian fertility in the late 19th century, for instance, showed that fertility declined earlier and more quickly in French-speaking rather than Dutch-speaking communities, despite similarities in their socio-economic characteristics (Lesthaeghe 1977). Even where Dutch- and French-speaking communities were located adjacent to one another and were socially and economically very similar, the two communities were 'two obviously non-interacting demographic regimes' (Lesthaeghe 1977: 112).

The EFP found that various elite groups were the 'forerunners' of the fertility decline in Europe, with fertility control being practised in some areas in Europe in the 18th century (Livi-Bacci 1986: 183). Diffusion theorists argue that in general the highest socio-economic status families are the first to take up any innovative behaviour and are progressively followed by groups of lower socio-economic status, with those of the lowest status being the last (Rogers 1983). Thus in 19th century Western Europe, ideas and values about fertility control progressively spread from elites to the upper and middle classes and then to the working classes (Livi-Bacci 1986).

More recent studies of the fertility transition in parts of Western Europe, Canada and the USA have all shown that the upper and middle classes were the first to limit their fertility followed by the other classes (Bengtsson and Dribe 2014; Breschi et al. 2014; Dribe et al. 2014; Schellekens and van Poppel 2012; Vézina et al. 2014). Woods (1987), however, argued that although there were differences in fertility between the occupational classes in 19th century England and Wales, the fertility decline occurred at the same time for all classes. This finding was disputed by Haines (1989) who using the same dataset (the 1911 England and Wales fertility survey) argues that the

upper and middle classes led the fertility decline and that their fertility fell more rapidly than the other classes.

The EFP found that couples living in urban areas in Western Europe had lower fertility than those in rural areas well before the fertility decline (Livi-Bacci 1986). According to diffusion theory, new ideas generally originate in urban settings and ideas about fertility control and information about methods of control are likely to spread more quickly within a densely populated community (Galloway et al 1994). In Western Europe, fertility was lower in urban areas than in rural areas at the start of the fertility decline and declined more rapidly once the decline was underway (Sharlin 1986). In Canada, also, during the fertility transition couples living in urban areas were more likely to limit their fertility than those living in rural areas (Gauvreau and Gossage 2001; Vézina et al 2014). In Utah, on the other hand, fertility declined at the same time in rural areas as in urban areas (Bean et al. 1990). No consistent relationship has been found between urban/rural location and the decline of marital fertility in England and Wales (Woods 1987; Szreter 1996).

A study of the fertility transition in Belgium shows that the diffusion of information and ideas about fertility control from one socioeconomic group to another was facilitated by geographic propinquity. An analysis of the 19th century fertility decline in the town of Leuven found the working class people who lived in districts alongside upper-class people were significantly more likely to control their fertility than those who lived in predominantly working-class districts (Van Bavel 2004b).

Some authors have suggested that the relationship between fertility decline and socioeconomic status is more complex than the EFP argued and stress the importance of examining the spatial context when investigating the relationship between socioeconomic status and the fertility decline (Dribe and Scalone 2014; Garrett et al. 2001; Szreter 1996). Szreter (1996) concluded from his analysis of the 1911 England and Wales Fertility Survey that there were important regional differences within social classes in regard to the timing of the fertility decline. This led him to the view that participation in a 'communication community' was more important than social class in explaining the fertility decline (Szreter 1996: 581). A re-analysis of these data, however, challenged his findings on the importance of social class, concluding that social class accounted for around two-thirds of the differences in fertility (Barnes and Guinnane 2012). A recent study of the historical fertility decline in Canada, Iceland, Sweden, Norway and the USA using micro-level data found that 'SES was a very important factor in the fertility transition' even after controlling for spatial heterogeneity (Dribe et al. 2014: 146).

The relationship between education and fertility has been explained using diffusion theory. This relationship is well documented in developing societies in the 1970s and 1980s, with parents with high education much more likely to use birth control and have lower marital fertility (Caldwell and McDonald 1982). Education encourages people to be receptive to new ideas and behaviour and gives them the skills to access new information (Cleland 2001). Studies of the fertility decline in Spain and Italy using survey data have found a relationship between literacy and fertility, with illiterate women having higher fertility than those who were able to read and write (Baizán and Camps 2007; Breschi et al. 2014). A study of the historical decline of fertility in Verviers, Belgium, however, using the husband's and wife's signatures on birth and marriage registers as the indicator of literacy, found no evidence of a relationship between literacy and fertility (Alter 1988). In contrast, studies of the fertility decline in Quebec, Canada have found a positive relationship between parents' literacy and their fertility, but the authors attribute this relationship to the effect of the French-Catholic schooling system on parents' value systems (Gauvreau and Gossage 2001; Vézina et al. 2014).

Theories as to how ideas and values about birth control and knowledge of methods were diffused are not well developed (Casterline 2001). In looking at how information about birth control spread throughout 19th century populations, many authors argue that written material in the form of books, pamphlets and articles in newspapers and magazines were an important source of information about ideas and methods of birth control (Caldwell 1999; Seccombe 1993). During the 19th century, rising education levels made published information on birth control more accessible to a wider range of the population. In England and Western Europe, from about 1890 onwards, working-class people had access to contraceptive information through the 'penny press' and through birth-control pamphlets that had wide circulations (Seccombe 1993).

Some authors consider that in the late 19th century, the publicity surrounding the trials of people distributing birth control information may have been a catalyst for the spread of birth control practices (Caldwell 1999; Finch and Green 1963; Hacker and Kippen 2007). In the last decades of the 19th century, a number of prominent people were tried for obscenity in the English courts because they were publishing and/ or distributing information about birth control. In England, for instance, Annie Besant and Charles Bradlaugh were tried in the High Court in 1877 and found guilty of obscenity for publishing and distributing Charles Knowles' pamphlet "The Fruits of Philosophy", which contained information about methods of birth control. Caldwell (1999) argues that prior to the 1870s, Victorian couples did not discuss sexual matters or contraception because

it would have threatened spousal respect and the 'sanctity of marriage'. He considers that the public discussion around the Bradlaugh-Besant trial had a major role in legitimising the discussion and practice of fertility control, allowing men and women to raise the subject within their own homes.

Doctors did not appear to be a major source of information about fertility control for their patients (Seccombe 1993). In Western Europe and Britain, letters and surveys about women's childbearing experiences in the late 19th and early 20th centuries indicate that doctors were unwilling to provide their working-class patients with information on how to stop further pregnancies. Contraception was not taught in medical schools and doctors were generally antagonistic to birth control devices, since they viewed them as injurious to health.

Seccombe (1993) argues that in 19th century Britain and Western Europe informal sources were more important than formal sources in spreading information about fertility control. However, documented information on informal sources is rare for Western Europe and English-speaking countries.

In Seccombe's view, informal social networks were an important source of information about fertility control for lower class families in Britain and Western Europe. 'Word of mouth was probably the principal means by which working-class people learned of contraceptives' (Seccombe 1993: 166). One working class woman, writing to the Women's Guild in England in 1913–14 about her experiences of childbirth, explained that her friend had given her advice about contraception which had enabled her to limit the number of children she had (Llewellyn Davies 1978). Elderton (1914) discussing the use of birth control by skilled artisans, clerks and small shopkeepers in early 20th century England, relates a story told by a 'married woman with wide experience, namely that if you hear a knot of young married women of this class talking together, the chances are that the topic will be the means of prevention' (Elderton 1914: 135).

Economic theories of fertility decline

In contrast to the 'diffusion' theory of the historical fertility decline, which explains the processes by which fertility fell, economic theories try to explain why fertility fell, that is, what were couples' motivations for controlling their fertility.

Economic demand theory asserts that the demand for children will fall when the cost of having another child is greater than the benefit of having that child (Becker 1981; Becker et al. 1990;

Easterlin 1975). Fertility falls in conditions where the costs of children increase and exceed the social and psychological benefits of having another child (Abbasi-Shavazi et al. 2009). Becker (1981) argues that with economic development, the returns on investment in human capital (that is, education and training) increase and that this shifts family expenditure 'towards quality and away from quantity' as each child becomes more expensive to rear (Becker 1981: 111). Additionally, in a society where levels of human capital are high, the demand for children will be low because the 'opportunity costs' of having children are high, that is, married women experience higher returns from participating in the labour market than in childrearing (Becker et al. 1990).

The demand theory framework has also been applied by Caldwell, who argues that the introduction of mass education played a major role in the fertility decline in the late 19th century, because children became a cost rather than an economic benefit (Caldwell 1999; Caldwell and Ruzicka 1978; Ruzicka and Caldwell 1977). Once school attendance became compulsory, children became dependants and a burden on their parents rather than workers. Additionally, parents incurred expenditure in sending their children to school. Caldwell argues that the decline in fertility was a response by parents to the change in the direction of "net wealth flows" between parents and children, that is, wealth flows in terms of money, goods and services began to flow from parents to children, rather than from children to parents as previously (Caldwell 1976; Caldwell and Ruzicka 1978). A study of fertility decline in Ontario and Quebec found some support for Caldwell's theory in that families in Ontario whose children attended school all year had significantly lower fertility than other families (Gauvreau and Gossage 2001).

In support of economic demand theory, the timing of the fertility decline in working-class Britain and Western Europe has been linked to changes in the way children were treated in working-class families, that is, from being a 'net benefit' to being a 'net cost' (Seccombe 1993). Before the fertility transition, large families were viewed as 'economically beneficial across the life-cycle', because older children could go out to work while younger children were dependent, and younger children became economically productive when parents were older and thus able to support their parents as they aged (Alter 1988: 164). In Victorian Britain even towards the end of the 19th century, working class families could avoid sending their children to school and children were sent out to work at a relatively young age, sometimes as young as 10 or 11 years. However, in the Edwardian era, they were attending school regularly and were unable to go out to work to supplement the family income until they were considerably older. In Britain and Western Europe,

respondents to surveys about childbearing experiences in the first decades of the 20th century, said that the main reason they wanted to stop childbearing was that 'they could not afford any more children' (Seccombe 1993: 174).

A theoretical framework containing elements of both demand for and supply of children was developed by Easterlin (1975) for the analysis of marital fertility. This framework contains a number of determinants: the demand for children, which is determined by income and the cost of children relative to commodities; the 'subjective preference for children' compared with goods; the costs of fertility control, which includes attitudes towards fertility limitation, the availability of information about fertility limitation, the range of methods and their cost; and the 'potential output of children', that is, the number of children a couple can potentially have, which depends on their natural fertility and whether or not their infants survive to adulthood (Easterlin 1975: 53-55). According to this model couples are motivated to control their fertility when the 'supply' of children is greater than their 'demand' for children, but whether they change their behaviour by adopting fertility control methods depends on the 'costs' of fertility control (Easterlin and Crimmins 1985).

While demand theory focusses on a cross-sectional comparison of the costs and benefits of having children, another economic theory focusses on families' longer term views of their economic future (Abbasi-Shavazi et al. 2009). According to this theory parents began to limit their fertility because of their social and material aspirations for themselves and their children (Banks 1954; Lesthaeghe and Wilson 1986). As early as 1826, Thomas Perronet Thompson was writing about an Englishman's need to limit the number of children that he had so that he could support his family in the way that public opinion deemed socially acceptable (Thompson 1826). In the second half of the 19th century, in English speaking countries and many parts of Europe, there was increasing prosperity and more opportunities for social mobility, because of industrialisation and a burgeoning of new occupations, particularly white-collar occupations (McDonald 1974; Lesthaeghe and Wilson 1986). Education was seen as an important factor in facilitating children's social mobility. In these circumstances, the rate at which families took up the practice of fertility control depended on their economic and social aspirations for their children.

The theory of parents' aspirations for their children explains why upper- and middle-class families were the first to limit their fertility and were progressively followed by those of lower socio-economic status, as discussed above (Banks 1954; Lesthaeghe and Wilson 1986; Seccombe 1993). Among the upper classes and the 'bourgeoisie', children were always viewed as a 'cost' and

education was important for financial independence. In the 19th century, with industrialisation, workers of lower socio-economic status began to develop aspirations for their children and saw education as the means by which these desires could be realised. In Britain, the upper strata of the working-classes, the skilled workers, were the first of the working-classes to limit their fertility, because of their desire for improved living standards for themselves and their children (Seccombe 1993). However, for parents in occupations such as farming, where children were important as workers and an economic benefit to their families, education, beyond a basic level, was not seen as an advantage. Consequently, these parents were less likely to take up fertility control.

Research into the relationship between fertility control and intergenerational social mobility has been very limited, because of the availability of suitable data sources. However, Van Bavel et al. (2011) found that in Antwerp, Belgium during the fertility transition limiting family size was most effective as a 'defensive' strategy, for instance, where it was used by middle class families to maintain the socio-economic position of their children, rather than as an 'offensive' strategy. 'The effects all run in the direction of a large number of siblings increasing the odds of going down the social ladder' (Van Bavel et al. 2011: 338).

Secularisation

Some authors have argued that the spread of secularisation throughout Europe in the 19th century affected families' views on and practice of fertility limitation and was a necessary condition for the adoption of fertility control (Lesthaeghe and Wilson 1986). The basic tenet of secularisation was 'individual responsibility', and according to this ethos, fertility, like many other aspects of life, was viewed as being under the individual's control rather than being subject to 'God's will'.

The EFP found a relationship between the speed of the fertility decline and the level of secularisation in late 19th and early 20th century Western Europe (Lesthaeghe and Wilson 1986). The fertility transition was relatively homogeneous in Protestant communities, which tended to adapt to secularisation, while in Catholic communities, there was far more variation in the start and speed of the transition. Catholic communities that experienced secularisation early were among the first of any communities to adopt fertility control, while those where secularisation occurred much later were the last. A recent paper looking at the impact of secularisation on the fertility decline in the Veneto, North Eastern Italy, however, found that secularisation was not

important at the start of the historical fertility decline but that its impact grew in importance as the decline progressed (Caltabiano and Dalla Zuanna 2015).

Many other studies have found that in most Western European countries and in Canada during the fertility decline, religious groups such as orthodox Protestants and Catholics who were 'traditional' in outlook had higher fertility than the rest of the population who were more 'liberal' or 'modern' (Gauvreau and Gossage 2001; Van Bavel and Kok 2005; van Poppel and Derosas 2006). Jews had the lowest fertility of all religious groups and were among the 'forerunners' of the fertility decline (Livi-Bacci 1986).

Some authors have argued that the specific practices of some religious groups may have facilitated the adoption of fertility control. Van Poppel et al. (2012) suggest that in Europe, Calvinism, with its emphasis on the importance of reading the scriptures, led to high levels of literacy among its followers. Education gave them access to ideas and information about fertility control and encouraged them to take control over this aspect of their lives.

Infant and child mortality

As discussed above, demographic transition theory posits a relationship between infant and child mortality and fertility at the societal level. Four main theories have also been put forward to explain the relationship between infant and child mortality and fertility at the individual level (Preston 1978; van de Walle 1986): 'physiological'; 'insurance'; 'replacement'; and 'societal'.

The 'physiological' relationship between infant mortality and fertility refers to the relationship between breastfeeding and fecundity. There is considerable evidence to show that when a child dies in infancy, a woman no longer avoids conception through breastfeeding and the space between the birth of the child who died and the subsequent child is reduced, leading to higher fertility (Knodel 1978, 1982; Wrigley et al. 1997). Knodel (1982), for instance, has shown that in a number of areas in pre-industrial Europe, birth intervals were shorter when the previous child had died than when the child survived, except in areas where breastfeeding was not common practice. However, he estimated that a substantial fall in infant mortality would only result in a small decline in fertility solely through the physiological mechanism, even in areas where breastfeeding was common and prolonged.

The 'insurance' relationship applies in a context of high infant mortality, in which people have as many children as possible because of their perception of the risk of their children dying. In the

'replacement' relationship, on the other hand, parents have a child to replace an infant or child who dies. Both these theories imply that parents make a conscious choice to have a certain number of children, or to have another child, that is, they imply a notion that parents are conscious of the ability to control their births (Preston 1978; van de Walle 1986; Knodel 1978).

Evidence for the 'replacement' effect of infant mortality on fertility was found by Knodel (1978) in his analysis of child mortality and fertility among couples who married during the 18th and 19th centuries in 14 German villages. Comparing cohorts with natural fertility and those who practised fertility control, Knodel concluded that it was clearly evident that families were making efforts to replace children who died in periods when family limitation had become established. Several other studies of countries in Western Europe have also found evidence for the 'replacement' effect (Alter 1988; Alter et al. 2010; Breschi et al. 2014, Schellekens and van Poppel 2010; Vézina et al. 2014). Only a 'relatively modest' 'replacement' effect, however, was found for the United States at the turn of the 20th century (Haines 1998: 244).

Knodel's study (1978) also found evidence for the 'insurance' effect in that the experience of infant and child mortality within an individual family had an impact on that family's efforts to reduce their fertility. Even in a period when the general level of infant mortality remained relatively high, couples whose children survived were the most likely to adopt fertility control, while experiencing child mortality seemed to deter couples from efforts to limit their fertility. Haines (1998) also found a relatively strong 'insurance' effect for the United States at the end of the 19th century. Another study of the fertility transition in the Netherlands, however, found that the 'replacement' effect declined as the number of infant and child deaths increased (Schellekens and van Poppel 2010). Schellekens and van Poppel's analysis shows that the more deaths a family had, the less likely they were to have another birth, casting doubt on the 'insurance' effect of infant mortality on fertility.

Recent research on the fertility transition in Spain and the Netherlands has found that 'replacement/insurance' effects can vary by socioeconomic status and, in the Netherlands, by religious affiliation (Reher and Sanz-Gimeno 2007; van Poppel et al. 2012). In the Netherlands, for instance, the number of surviving children more strongly affected parity progression ratios for the elite, middle classes and skilled workers than for other occupational groups, and for Liberal Protestants than for other religious groups (van Poppel et al. 2012). In both the Netherlands and Spain, the number of surviving children also affected birth spacing, with birth intervals being longer at any given parity, the higher the number of surviving children.

Preston (1978) suggests that the replacement strategy may be related to the sex of the child who dies, that is, if the parents desire a certain number of sons, and the child who dies is female, they may not make efforts to 'replace' this child. Studies of the fertility in Utah (Bohnert et al. 2012) and in Germany (Sandström and Vikström 2013) in the late 19th and early 20th centuries have shown that families were more likely to progress to the next birth if they had only or mostly daughters. Alter et al. (2010) on the other hand found no such relationship between sex composition and fertility in Sart in Belgium in the 19th century.

The 'societal' strategy in relation to infant mortality and fertility refers to situations in which social norms around or breastfeeding ensure that fertility is kept in equilibrium with mortality (Knodel 1978). For example, consistent with the theories of the demographic transition, scholars have argued that fertility declines because of the pressure of an increasing population due to the decline in mortality (Matthiessen and McCann 1978). In these circumstances, couples are pressured into marrying later, so as to limit the number of children they will have to rear. Alternatively, in societies with high infant mortality, men and women were encouraged to marry at young ages so that they could start their child bearing early (Wrigley 1978). The EFP's analysis of the patterns of nuptiality and child mortality, however, found no relationship between nuptiality and infant mortality (van de Walle 1986).

Infant mortality does not simply affect fertility—fertility can also affect infant mortality. Scholars generally agree that the relationship between infant mortality and fertility is two-way, with higher fertility leading to higher infant mortality (Bean et al. 1992; Haines 1998; van de Walle 1986). A Swiss report published in 1878, for instance, reported that medical doctors concluded that repeated pregnancies were the primary reason for high infant mortality, because mothers of high parity were weak and gave birth to unhealthy babies (Switzerland 1878 in van de Walle 1986). A study of high fertility and high infant mortality in Utah also argued that children born at high parities were at risk because of competition for resources from their siblings and from infectious disease (Bean et al. 1992). Other scholars argue that prior to the fertility decline some babies at high parities were unwanted and their parents let them die through neglect (Scrimshaw 1978). Knodel and van de Walle (1979) cite the contemporary literature of the time which shows that 'concealed infanticide' or 'infanticide by neglect' were common in most of Europe before the fertility decline (Knodel and van de Walle 1979: 230). Infant mortality thus may have declined when married couples began to limit the size of their families, because they were less likely to have babies at higher parities who were at greater risk of dying during their first year of life.

Increased accessibility of artificial methods of contraception

The greater availability of artificial methods of contraception has been put forward as a reason for the decline in fertility during the late 19th century (Caldwell 1999). However, there is little written evidence from the period of the extent to which these birth control methods were used in Western Europe and in English-speaking countries other than Australia.

Histories of contraception indicate that the practice of contraception and the methods used can be traced back thousands of years (Finch and Green 1963; Himes 1963). References to one of the oldest methods of contraception, 'coitus interruptus' (withdrawal), can be found in the Book of Genesis in the Old Testament and home-made pessaries made of mud were used by the Egyptians thousands of years ago (Finch and Green 1963). Some authors argue that prior to the Western European fertility decline, fertility was restricted by forms of behavior such as prolonged breastfeeding and/or periodic separation of spouses for economic reasons (Coale 1986; Cleland and Wilson 1987; Knodel and van de Walle 1979). Many people did not know about 'coitus interruptus' and its use was not widespread (Knodel and van de Walle 1979). Artificial forms of contraception were associated with immorality and were not sanctioned within marriage (Cleland 2001). Birth control measures were not used extensively at this time, since there was no effect on the general level of fertility, but some small populations, such as the Italian elite, adopted birth control measures early on (Livi-Bacci 1986). Santow (1995), however, argues that there is strong evidence that 'coitus interruptus' was used by the general population in pre-transitional societies to increase the spacing between births.

From the late 19th century onwards artificial contraceptive devices began to be made more cheaply (Finch and Green 1963; Himes 1963). In 1880 in England, for instance, pessaries, which could formerly be accessed only by the wealthy, were manufactured and distributed to meet the needs of families in poor London neighbourhoods (Finch and Green 1963). Other devices such as condoms, caps and diaphragms became more reliable from the 1840s onwards, with the development of a technique for vulcanising rubber (Himes 1963)**.** The spread and acceptance of ideas about birth control resulted in a greater demand for contraceptives which led to them becoming available in more 'respectable outlets', such as chemist shops (pharmacies) (Caldwell 1999).

Working-class couples in England and Western Europe were unlikely to use artificial methods of birth control before the 1920s, according to letters and surveys about women's childbearing

experiences in the late 19th and early 20th centuries (Seccombe 1993). Although these devices were available, they were too expensive for families living on a working-class man's wage. 'Coitus interruptus' was the most common form of birth control used by these couples in the first stages of the fertility decline. Abortions conducted in hospitals in England and Germany also increased from the turn of the century and an increasing proportion of these were for married women (Seccombe 1993). Prior to this period, abortion was a dangerous procedure and would have only been resorted to in extreme circumstances (Knodel and van de Walle 1979). Szreter (1996) argues that in England and Wales prior to the First World War abstinence— 'reduction in the frequency of intercourse'— was the main method of reducing marital fertility (Szreter 1996: 393).

Changes in women's roles and status in society and within the family

Historical demographers have often ignored women's roles and their changing status in the public and the private spheres as an explanation for the 19th century fertility decline (McDonald 2000). However, a few scholars have argued that particular attention should be paid to 'those cultural features that determine the status of women and their ability to assert their own wishes regarding childbearing' (Knodel and van de Walle 1979: 240). Seccombe (1993) argues that 'women were the driving force behind family limitation', because they bore most of the burden of pregnancy, childbirth and child care (Seccombe 1993: 168). In Britain and Western Europe, surveys and letters from working-class women who underwent childbearing in the late 19th century and the first two decades of the 20th century show that many women were motivated to adopt fertility control because of health concerns (Llewellyn Davies 1978; Seccombe 1993). They recounted difficult pregnancies and horrific experiences in confinement which made them dread having more children.

Some authors argue that it should be impossible to study fertility transition without considering the part played by changing power relations between husband and wife (McDonald 2000; Folbre 1983). McDonald (2000) has characterised power relations in the family as a component of 'gender equity', which is itself a characteristic of a society's gender system. The gender system is 'the socially constructed expectations for male and female behaviour that are found (in variable form) in every known human society' and applies to both the public and the private spheres (Mason 1997: 158). In societies with high fertility, for example, women experience 'gender inequity' in the private sphere (the family) when they are dissatisfied with the 'constant round of childbearing and childrearing imposed by spousal, familial, and societal expectations' (McDonald

2000: 428). In societies undergoing fertility transition it is possible to have gender equity in the private sphere (the family), but not the public sphere (wider society), and vice-versa.

Gender equity within the family is a necessary condition for fertility to decline and is facilitated through women's education (McDonald 2000). Not only do educated women become receptive to new ideas, but education improves their autonomy and power within the family (Breschi et al. 2014). As noted above, studies of the fertility decline in Europe have found that more educated women were more likely to control their fertility.

Some authors have noted the importance of gender equity in the family as an explanation of the fertility decline in late 19th century Western Europe and Britain. Szreter (1996), for instance, regards the difference in power relations between husbands and wives as one explanation for the low fertility of textile workers compared with the very high fertility of mining families in late 19th century England. He argues that among the textile workers, relations between husbands and wives were relatively equal because of the wife's income and employment outside the home. In contrast, men had the power within mining families, because miners had high wages and their wives did not work outside the home. The importance of 'coitus interruptus' as a method of birth control among working class couples in Britain and Western Europe in the late 19th and early 20th centuries, also indicates a level of gender equity in the family, in that men were cooperating with their wives in fertility limitation (Seccombe 1993).

The power relations between husband and wife may be affected by the difference in their ages and this may impact on their fertility preferences and use of contraceptive methods (Casterline et al. 1986). The association between a couple's fertility and the difference in age of the husband and wife is difficult to disentangle. Wives or husbands who are older than their spouse may have more influence on the couple's fertility behaviour (Tsuya et al. 2010), but their fecundity may be lower because of their age (Casterline et al. 1986; McDonald 1984). Studies of fertility in some areas of 19th century Western Europe have found that couples where husbands were six or more years older than their wives had significantly lower fertility than couples where the wife was up to five years younger, but that there were no significant differences where a wife was older than her husband (Feng et al. 2010). A recent study of the fertility transition in Alghero, Sardinia, however, found no significant differences in fertility according to the age difference between husband and wife (Breschi et al 2014).

The feminist movement in Britain was seen as important in influencing women to adopt birth control methods. Although feminism was primarily a middle-class movement in 19th century Britain, feminist ideas had spread to working-class women by the early 20th century and strengthened these women in their decision to limit their families (Seccombe 1993). Letters from working-class women about their childbearing experiences, sent to the Women's Cooperative Guild just before the 1st World War, showed that many women had adopted a feminist position on several issues (Llewellyn Davies 1978).

Models of Fertility Decline—'Adjustment' or 'Innovation' or Both

Since the middle of the 20th century, there has been an ongoing debate in historical demography as to whether the fertility decline was primarily caused by 'adjustment' to new social and economic conditions or to 'innovation', that is the diffusion and acceptance of innovative ideas and behaviours (Carlsson 1966; Cleland and Wilson 1987). It is generally agreed nowadays, however, that the 'two sets of explanations are complementary, not competing' (Casterline 2001: 3) As McDonald concludes 'both adaptation and innovation are necessarily involved because people cannot change their behaviour without the necessary knowledge (innovation) nor do they do so without reason (adaptation)' (McDonald 2001: 1). This reflects Coale's three major preconditions for a decline in marital fertility: 'Fertility must be within the calculus of conscious choice….perceived social and economic circumstances must make reduced fertility seems advantageous to individual couples… (and) …effective techniques of fertility reduction must be available' (Coale 1973: 65). Cleland (2001) has proposed a 'blended' version of innovation–diffusion theory. 'Under the blended theory, the engine of demographic change is the structural transformation of societies, and diffusion is the lubricant' (Cleland 2001: 45).

How did fertility decline—starting, stopping or spacing

There has been a major debate among demographers as to the extent to which fertility declined in the late 19th century through changes in 'starting', 'spacing' or 'stopping' behaviours (Okun 1995). Most of the debate has concerned the relative importance of 'stopping' and 'spacing' behaviour, which relates to the debate about the importance of the 'innovation' theory versus the 'adjustment' theory (van Poppel et al. 2012). 'Stopping' behaviour is viewed as an innovative form of behaviour, which incorporates ideas that were unthinkable in pre-transition societies (Cleland and Wilson 1987; Coale 1986; Knodel and van de Walle 1979). 'Spacing' behaviour, on the other hand, is viewed as an extension of behaviour that was practised before the fertility decline, but

became a way that couples adjusted to new economic and social conditions during the decline (Anderton and Bean 1985; Santow 1995; Szreter 1996; Van Bavel 2004c; Van Bavel and Kok 2004).

The younger a woman is at marriage, the longer are her potential childbearing years (Wrigley et al. 1997). Scholars have argued that the timing of marriage, either delaying marriage or encouraging couples to marry earlier, was a fertility strategy for many centuries in Western Europe and English-speaking societies (McDonald 1981). In the early 19th century, Malthus viewed late marriage as a preventative check on population growth and suggested that people exercise 'moral restraint' and delay their marriage to curb fertility (Malthus 1798). Although theories about the relationship between marriage and fertility are primarily applied to pre-transition societies (Freedman 1963), some authors have claimed that it also applied to some societies during the 19th century fertility decline (*S*pengler 1938 cited in McDonald 1981; Matras 1965; Ruzicka and Caldwell 1977). McDonald (1981, 1984), however, argues that in both pre-transitional and transitional societies the timing of marriage relates to economic, social and psychological factors, not to fertility preferences. In both pre-transition and transition societies, people married late so that they could be in a better economic position to marry, rather than with the intention of curtailing their fertility. In recent years, comparatively little attention has been paid to 'starting' behaviour in analyses of 19th century fertility decline in Western Europe and English-speaking countries.

In the mid-20th century, an influential group of demographers argued that in late 19th century Western Europe, couples began to deliberately limit their fertility through 'stopping' behaviour (Henry 1961; Coale 1986). This was an entirely new behaviour which was taken up to such an extent that it initiated the fertility decline (Knodel and van de Walle 1979). According to this theory, first put forward by Henry (1961), couples use contraceptive methods, such as withdrawal, artificial methods, or abortion to avoid having more births after they have had a certain number of children and have decided that they do not want any more. Henry contrasted this with behaviours such as prolonged breastfeeding, which increase birth intervals but are not parity related. Birth spacing strategies can be used after any parity, including the first, and couples do not change their behaviour once they have reached a specific family size. Henry termed fertility which is deliberately controlled through 'stopping' at a specific parity as 'controlled fertility' and fertility where people practise non-parity limiting behaviours as 'natural fertility'.

Coale (1986) argued that fertility fell in Western Europe because of a change from 'spacing' behaviour to 'stopping' behaviour, with couples changing from non-parity specific fertility limiting behaviours to parity-specific limiting behaviours (Coale 1986: 9). Some authors have interpreted

the theory of 'stopping' behaviour to mean that parents have in mind a preferred family size, that is, 'they become conscious of a desirable size of the family and set for themselves a target number of children, which they do not want to exceed' (van de Walle 1986: 205). Neither Henry, nor Coale, however, specifically introduced the concept of a 'desired family size' into their theory, arguing instead that parents proceeded to have children until they decided that they had as many as they wanted. While this may not seem an important distinction, as shown in Chapter 7, it has implications for identifying stopping and spacing behaviours in birth patterns.

Other demographers have argued that deliberate birth spacing, that is, intentionally lengthening the time between births early on in marriage, played an important role in the fertility decline (Anderton and Bean 1985; Bean at el. 1990; Hionidou 1998; Santow 1995; Szreter 1996). Analyses of fertility in 19th century Utah show that stopping behaviour was an important fertility control strategy during the fertility decline, but that birth spacing was also used as a strategy to limit fertility (Anderton and Bean 1985; Bean et al. 1990). Studies of populations in parts of Western Europe have shown that spacing behaviour was used by some families to control their fertility prior to the fertility decline, particularly in times of economic stress (Dribe and Scalone 2010; Kolk 2011; Tsuya et al. 2010; Van Bavel 2004c; Van Bavel and Kok 2010).

Nowadays, as with the associated 'innovation/adaptation' debate, most scholars agree that both stopping and spacing behaviours played a part in the 19th fertility decline, but that the extent to which these behaviours were responsible for the decline within a particular society is a matter for investigation (van Poppel et al. 2012).

The use of theories in this thesis

In this thesis, I examine how findings from the quantitative and qualitative analysis of the fertility decline in Tasmania support the various theories outlined in this chapter and how they compare with findings from studies of Western-Europe and other English-speaking countries. In the qualitative analysis, I pay particular attention to areas in which little research has been undertaken, that is: how ideas and values about fertility control and knowledge of methods were diffused; what methods of contraception were used during the fertility decline; and what was the role of women in the decline.

Chapter 2

The Australian fertility decline

In this chapter, I examine current state of knowledge about the historical fertility decline in Australia. Analyses of the fertility decline have mainly used population census data of the period, retrospective data from the 1911 and 1921 Population Censuses and vital registration data (Anderson 1999; Jones 1971; Larson 1994; Quiggin 1988; Ruzicka & Caldwell 1977). The colonial statistical offices did not publish data on births by age of mother, although this information was available on birth certificates (Larson 1994). Age-specific fertility rates and age-specific marital fertility rates are available only for New South Wales (NSW) , as discussed below. No census forms are available for any period in Australia's history, so that the 'own child' method cannot be used to estimate age-specific fertility rates and age-specific marital fertility rates (Cho et al. 1986).

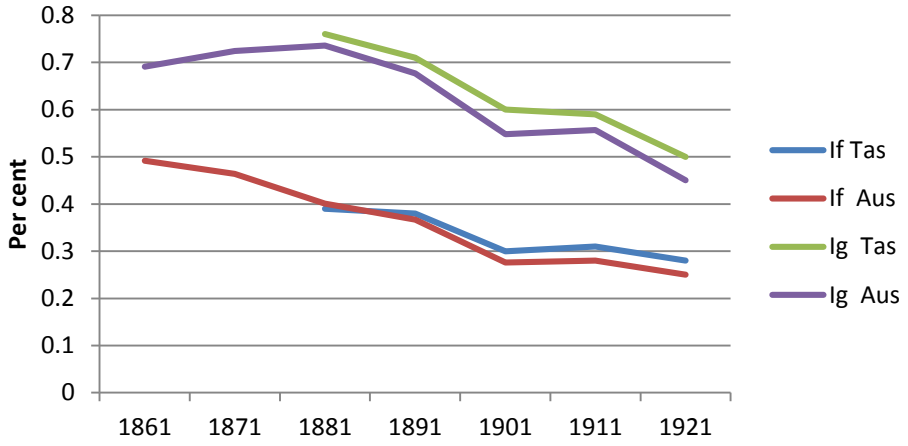
Most analyses of the Australian historical fertility decline have relied on retrospective census data from the 1911 and 1921 Australian censuses to look at trends in the number of children ever born to various cohorts of married women (Jones 1971; Quiggin 1988; Ruzicka and Caldwell 1977). These data are available only in the form of published tables (e.g. Commonwealth of Australia 1914a, 1921). There are also a number of small studies that have used vital registration data from specific colonies or regional areas (Carmichael 1996; Grimshaw et al. 1985; MacKinnon et al. 2005). The two largest of these are Anderson's study of the 19th fertility decline in South Australia with a total of 836 families in three marriage cohorts (1842–6, 1875–79 and 1885–9) and Larson's study of the 19th century fertility decline in Melbourne using a sample of 3,592 registered births for 1871, 1881, 1891 and 1900 (Anderson 1999; Larson 1994).

Coale's fertility indices

Jones (1971) used data on the number of births in a year, the population of women in 5-year age groups and the population of married women in each age group to calculate Coale's fertility indices for Australia from 1861 to 1921 and for Tasmania from 1881 to 1921 (Figure 2.1). These indices show that fertility fell in the Australian colonies overall from around the 1880s. Coale's index of marital fertility (I_g) ranged from 0.69 to 0.74 between 1861 and 1881, but then fell steadily from 1881 onwards until it reached 0.45 in 1921. The level of marital fertility was slightly

higher in Tasmania in 1881 than in the Australian colonies overall—0.76 compared with 0.74—but fell over the same period until it reached 0.50 in 1921 (Jones 1971). The index of overall fertility (I_f) fell from 1861 onwards for Australia as a whole and from 1891 for Tasmania but levelled off after 1901. As the trends in marital fertility for Tasmania are very similar to the trends for Australia, findings in this thesis related to Tasmania are likely to be indicative of the situation in Australia as a whole.

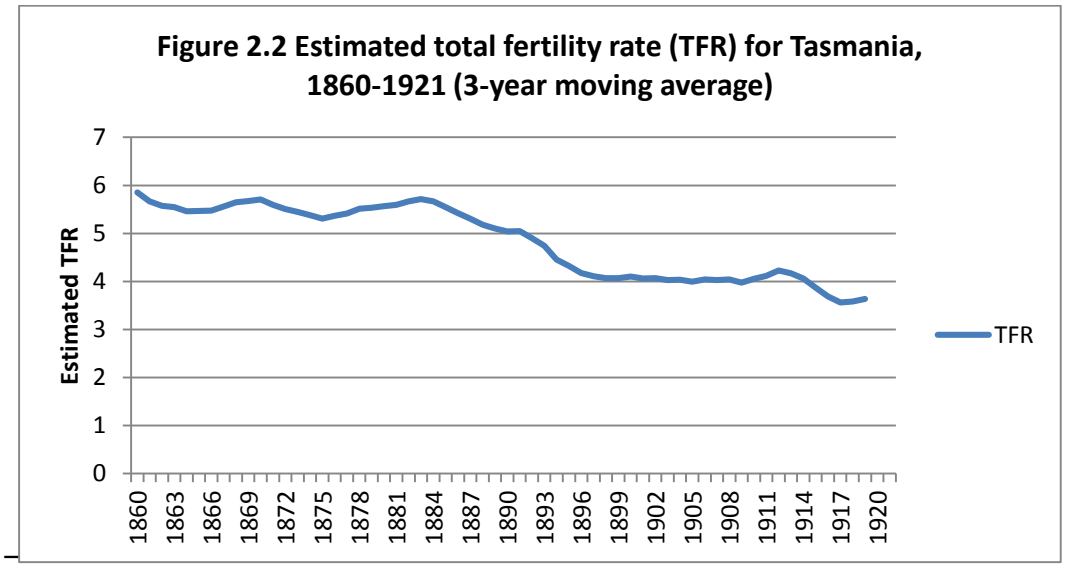
Figure 2.1 Coales' fertility indices (I_g and I_f), Australia 1861-1921 and Tasmania 1881-1921



Source: Jones 1971: 326–7

Tasmania—estimated total fertility rate

I have estimated the total fertility rate (TFR) for Tasmania (Figure 2.2) by indirect standardization, using data for the estimated female population by 5-year age group (Kippen 2002b) and the annual number of registered births (ABS 2008) adjusted for under-registration (Kippen 2002a. See Chapter 4). I applied the age-specific fertility rates for NSW for 1891 (NSW Bureau of Statistics and Economics 1912) to the 5-year age groups to give me an expected number of births for each year and divided the actual number of Tasmanian births by the expected number to give me an index. I multiplied this index by the 1891 TFR for NSW to obtain estimated fertility rates for Tasmania and calculated a 3-year moving average to smooth out the trend. These data show that the estimated TFR for Tasmania fluctuated between 5.80 and 5.20 between 1860 and 1884, but began to fall steadily from 5.77 in 1885 to 4.08 in 1898, then remained fairly flat until around 1914, when it began to fall again reaching 3.69 in 1921.



Age-specific marital fertility rates

As noted above, the only Australian age-specific marital fertility rates available for the fertility transition period are for New South Wales (NSW). Coghlan, who was the NSW Statistician between 1886 and 1905, prepared and presented data on NSW age-specific marital fertility rates for 1871, 1881, 1891 and 1901 to the 1903 NSW Royal Commission into the Decline into the Birth Rate (NSW 1904a, 1904b). In NSW, age-specific marital fertility rates declined from the 1880s onward, with the decline being greater in the 1890s than in the previous decade (Table 2.1). The relative fall in fertility was larger at older ages, suggesting that women may have been stopping their childbearing after having had a number of births (Jones 1971).

Table 2.1 Age-specific marital fertility rates, NSW, 1871, 1881, 1891, 1901

	1871	1881	1891	1901
Age (years)	*Birth rates per 1,000*			
15-19	501.0	516.0	471.1	556.6
20-24	441.5	457.9	416.3	397.0
25-29	407.5	405.2	353.7	298.7
30-34	336.7	338.6	292.2	226.8
35-39	270.4	273.6	236.3	172.5
40-44	134.1	128.9	118.4	88.1

Source: NSW 1904a: 90

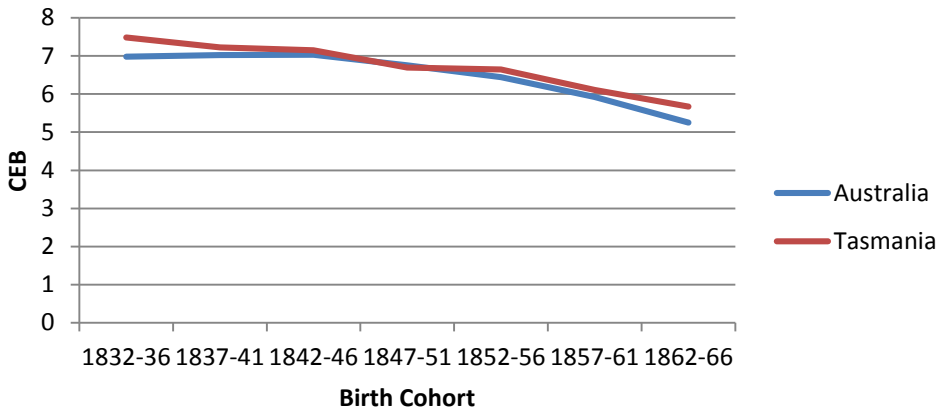
Looking at the data by birth cohort of married women shows an alternative picture (Quiggin 1988). The birth cohort born in 1847–51, who were 30–34 years in 1881 had about the same fertility as the 1837-41 cohort in 1871, but by 1891 when they were 40–44 years, their marital fertility rates

were 8 per cent lower than the 1837-41 cohort 10 years previously (Quiggin 1988: 30). Similarly, the 1852–56 cohort, who were 25–29 years in 1881, had similar fertility to the 1842-46 cohort in 1871, but by the time they were 35–39 years in 1891, their fertility was 14 per cent lower than the earlier cohort at that age. This again suggests that successive birth cohorts of married women were stopping having children towards the end of their childbearing years.

Children ever born

Data from the 1911 Australian Census on children ever born show that married women born in the 1830s and early 1840s had on average 7 children during their childbearing years, but that the number of children ever born fell to 6.75 for the 1847–51 birth cohort and then fell steadily to 5.25 for the cohort born in 1862–66 (Figure 2.3). The number of children ever born for married women in Tasmania was slightly higher for the earlier and later cohorts, but fell over the same period.

Figure 2.3 Children ever born to married women, Australia and Tasmania, 1911 Census

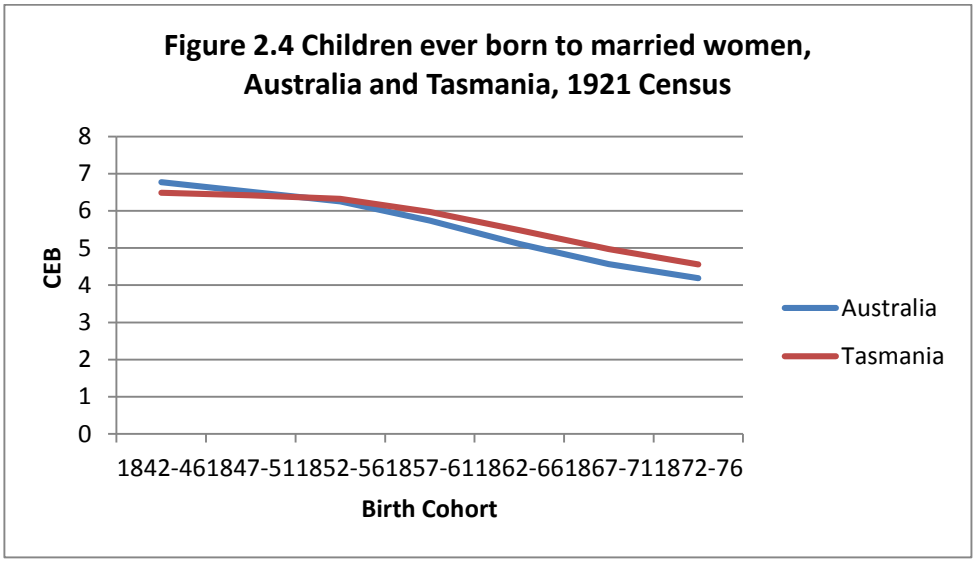


Source: Table A2.1

Equivalent data from the 1921 Census show that fertility continued to fall for the 1867–71 and 1872–76 birth cohorts, reaching 4.19 for the 1872–76 birth cohort in Australia as a whole, and 4.56 for Tasmania (Figure 2.4). Once again, the trends for Tasmania are very similar to those for Australia.

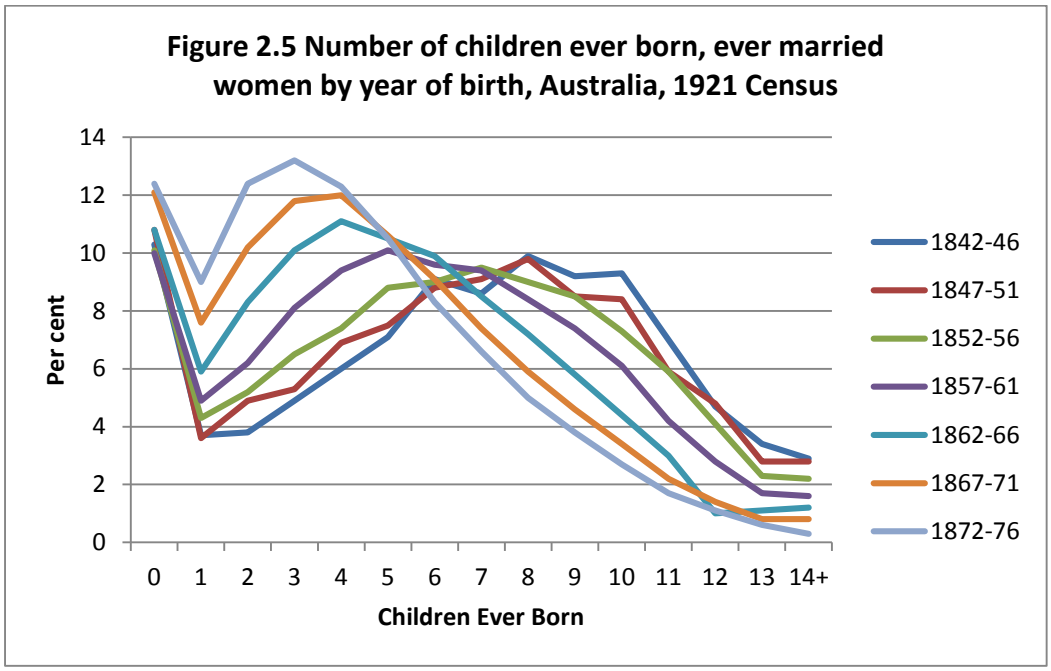
It is important to note, however, that these data refer to women living in Tasmania in 1911 and 1921; some women who had children in Tasmania in the 19th century may have left the state during or after they completed childbearing. Similarly, Australia is a nation of immigrants and

women living in Australia in the 1910s and 1920s may not have been living there during their childbearing years.



Source: Table A2.1

Examining the distribution of the number of children ever born to women who were currently married at the time of the 1921 census indicates that there were marked falls in the proportions of large families and a marked increase in the proportion with small families during the Australian fertility decline (Figure 2.5). The proportion of couples with 7 or more children fell from 55 per cent for the 1842–6 cohort to 21.8 per cent for the 1872–76 cohort, while the proportion with 1–3 children increased from 12.4 per cent for the earliest cohort to 34.6 per cent for the latest cohort.



Source: Table A1.2

It is important to note that the 1911 and 1921 Census data do not include those who were widowed or divorced at the time of the Census. However the 1911 Census data show that the average number of children ever born to currently married women was very similar to that of all women who had ever married (Quiggin 1998).

However, currently married women who were still alive at the time of the Census may not be representative of the entire cohort who had completed their childbearing, that is, there may be a positive or negative relationship between fertility and longevity. A study of couples marrying in Utah in the second half of the 19th century, where both husband and wife survived the wife's childbearing years, found that women who had fewer children lived longer after completing childbearing than other women with children (Smith et al. 2002).

Data from the 1911 and 1921 Australian Censuses indicate that these retrospective data on children ever born may underestimate completed marital fertility for the birth cohorts for this reason (Tables A2.2, A2.3). For each identical birth cohort, the average numbers of children ever born are lower in the 1921 Census compared with the 1911 Census and the proportions of married women without any children are higher. This suggests a negative relationship between fertility and longevity, with husbands and/or wives with no children or with fewer children more likely to survive than those with more children. Thus the apparent increase in childlessness across the birth cohorts may be at least partly due to differential longevity.

Anderson's (1999) study of families in three marriage cohorts in 19th century South Australia, reconstituted from vital registration data shows similar trends to the retrospective Census data (Table 2.2). The mean number of births of women from all marriages dropped between the 1842–6 and the 1875–79 cohort from 8.0 to 6.9 and then fell more steeply to 5.2 for the 1885–89 cohort. The proportion of women without children fluctuated between 4.0 per cent and 6.9 per cent for the three cohorts, but the proportion with 1–3 children increased markedly from 5.3 per cent to 24.3 per cent, while the proportion with 10 or more fell sharply from 34.6 per cent to 8.0 per cent.

Table 2.2 Number of children ever born for women marrying in 1842-46, 1875-79, and 1885-89, South Australia

	1842-6	1875-9	1885-9
No. of births	*Per cent*		
None	5.9	4.0	6.9
1-3	5.3	13.8	24.3
4-5	15.0	17.5	25.8
6-9	39.3	38.2	35.0
10+	34.6	26.5	8.0
Total (per cent)	100.0	100.0	100.0
Total (no.)	153	325	349
Mean/median	*No of births*		
Mean	8.0	6.9	5.2
Median	8	7	5

Note: Includes a small number of illegitimate births.
Source: Anderson 1999:252

Fertility and family characteristics

There have been several analyses of the relationship between 19th century Australian fertility and different family characteristics, particularly husband's occupation, geographic location, religion and mother's birthplace (Anderson 1999; Jones 1971; Larson 1994; Quiggin 1988; Ruzicka and Caldwell 1977). These studies are mainly descriptive, however, and do not place their findings in a theoretical context.

Such studies have mainly used retrospective census data or vital registration data. With regard to the retrospective census data, it is important to note that husband's occupation, religion and geographic location were measured at the time of the census and these were not necessarily the same as at the birth of the children. Caution must be taken in drawing conclusions from census data for the oldest cohorts because of the relatively small numbers in some of the cells.

Husband's occupation

Australian data on children ever born and husband's occupation suggest an inverse relationship between socioeconomic status and fertility.

Jones (1971) and Ruzicka and Caldwell (1977) used retrospective data from the 1911 and 1921 Censuses to look at the relationship between average number of children ever born and husband's occupation. Jones (1971) using data from the 1911 Census found that for every cohort of married men: primary producers had the highest fertility; professional, domestic and commercial workers the lowest fertility; and transport, communication and industrial workers fell between the two. Ruzicka and Caldwell (1977) compared data from the 1911 and 1921 Censuses to examine the relationship between 'occupational status' and fertility decline, finding that in most occupational groupings over the late 19th and early 20th century, 'employers' and 'husbands working on own account, but not employing labour' had larger reductions in family size than 'wage earners'.

Anderson (1999) and Larson (1994) looked at the relationship between the fertility decline and occupational status using colonial vital registration data. Anderson found that fertility fell for her three marriage cohorts in all occupational categories across the cohorts (Table 2.3). She suggests that families of gentlemen and professionals may have started adopting fertility control as early as the 1850s or 1860s and that they were followed by the families of white-collar workers in the 1870s, with families in the remaining occupational groups progressively adopting these practices. She found that there were marked differences in family size by occupational status for the 1885–9 marriage cohort. In this cohort, groups which she describes as 'middle class'— gentlemen, professionals, merchants, white-collar workers, small businessmen and skilled tradesmen—were more likely to have smaller families, that is, fewer than seven children, than farmers and unskilled labourers.

Table 2.3 Average number of children by husband's occupation group, 1842–6, 1875–9 and 1885-89 marriage cohorts, South Australia.

	1842-6	1875-9	1885-9
Occupation Group	Mean number of children ever born		
Gentlemen, Professionals	4.9	5.4	3.8
Small Business	6.6	6.7	4.6
White-Collar	7.9	5.2	5.0
Skilled Trades	8.0	6.9	5.2
Other Labourers	8.0	7.3	5.5
Farmers	7.9	7.0	5.8

Source: Anderson 1999:254

Larson (1994), using Melbourne birth registration data, found that there was an increase in birth spacing between 1871 and 1900, with the percentage of births where the previous sibling was three or more years old increasing from 17 per cent to 35 per cent over the period. Professionals, businessmen and skilled manual workers were significantly more likely to space their births, particularly during the 1890s. White-collar workers also tended to have longer birth intervals over the years, but the differences were not statistically significant. In contrast, the proportion of semi-skilled workers and labourers with long birth intervals, while fluctuating, did not increase between 1871 and 1900.

Geographic location

Analyses of the relationship between fertility and geographic location suggest that there was a strong relationship between fertility and urban/rural residence, with families in urban areas having fewer children than those in urban areas.

There were marked differences in the overall level of fertility and the timing of the fertility decline between women living in rural (ex-metropolitan) areas and those in urban (metropolitan) areas, according to the 1911 Census (Table 2.4). The average number of children ever born was greater for women living in rural areas for every birth cohort. Fertility started to fall earlier for women in urban areas compared with those in rural areas, falling for the 1842–56 birth cohort in urban areas and for the 1852–56 cohort in rural areas (Larson 1984).

Table 2.4 Average number of children ever born by birth cohort of married women by metropolitan/non-metropolitan location, Australia 1911

Birth cohort	1832–6	1837–41	1842–6	1847–51	1852–6	1857-61	1862–6
Place of residence	Mean number of children ever born						
Metropolitan	6.58	6.59	6.36	6.04	5.71	5.16	4.57
Non-Metropolitan	7.21	7.30	7.48	7.27	6.99	6.49	7.21

Source: Commonwealth of Australia 1914a: 1143

Jones (1971) used statistical information of the time (including the censuses) to calculate Coale's fertility indices separately for urban and rural areas of a selection of the colonies in the late 19th and early 20th centuries. This shows a slightly different picture from the 1911 Census data (Table 2.5). While marital fertility was already lower in urban areas than in rural areas in 1871, it began to fall in both areas in the 1880s. However, it fell more sharply in urban areas than in rural areas, plateauing in the rural areas in the first decade of the 20th century.

Table 2.5 Index of marital fertility (I_g) for urban and rural areas, selected colonies of Australia, 1871, 1881, 1891, 1901 and 1911					
	1871	1881	1891	1901	1911
Place of residence	I_g				
Urban	0.63	0.66	0.59	0.46	0.51
Rural	0.76	0.77	0.72	0.59	0.59

NOTE: 1871 data include only NSW and Vic. 1881, 1891 and 1891 data include NSW, Vic, Qld and SA. 1911 data include NSW, Vic, Qld, SA and WA.
Source: Jones 1971:328

In South Australia, there were no significant differences in fertility by geographic location at the time of marriage for the 1842–47 marriage cohort (Anderson 1999). However, rural couples had significantly larger families than urban families in both the 1875–79 and 1885–1889 cohorts, although fertility declined for both urban and rural couples between the two cohorts.

Religion

The relationship between fertility and religion in 19th century Australia is difficult to interpret. The 1911 Census data on children ever born to married women by religion show no clear trends for the first three cohorts, possibly due to small numbers in some of the cells (Table 2.6). However, fertility fell steadily for most religious groups from the 1842–46 birth cohort onwards. In the 1842–46 cohort, Methodists and Lutherans had the highest fertility, Catholics (undefined) and Congregationalists had the lowest. By the time the 1862–66 cohort had completed their childbearing, the Lutherans still had the highest fertility, but the fertility of Methodists had fallen markedly. Congregationalists still had the lowest fertility, only very slightly lower than that of Jewish people. In South Australia, where the Lutherans had a strong presence, they maintained large families from the 1842–6 to the 1885–9 marriage cohorts (Anderson 1999).

Table 2.6: Average number of children ever born to married women by religion, selected groups, Australia 1911							
Birth cohort	1832-36	1837-41	1842-46	1847-51	1852-56	1857-61	1862-66
Religion	Mean children ever born						
Church of England	6.92	7.05	7.00	6.72	6.37	5.84	5.15
Roman Catholic	6.75	6.76	6.96	6.86	6.76	6.29	5.57
Methodist	7.92	7.40	7.39	7.11	6.75	6.17	5.42
Presbyterian	6.82	7.12	7.04	6.59	6.17	5.54	4.95
Baptist	6.69	6.68	7.10	6.61	6.05	5.71	5.10
Protestant (undefined)	5.92	7.14	6.90	6.35	6.06	5.61	4.99
Congregational	6.48	6.27	6.68	6.13	5.79	5.20	4.50
Catholic (undefined)	5.98	7.83	6.56	6.64	6.70	6.30	5.67
Lutheran	6.78	6.69	7.17	7.00	7.40	6.97	6.31
Jewish	7.33	6.16	6.72	6.09	5.83	4.99	4.51

Source: Commonwealth of Australia 1914a; 1144. Jones1971:317.

Data from the 1901 NSW Census, compiled by Coghlan, show a somewhat different pattern (Coghlan 1903). Lutherans are not included as a separate group in this tabulation because the proportion of Lutherans in NSW was very small. These data show that, among all women who had completed their childbearing in 1901 (all cohorts born before 1856), Roman Catholic women had the highest numbers of children at most ages at marriage, Anglican women the lowest of the Protestant groups and Jewish women the lowest of all (Table 2.7). Coghlan argues that since most of these women had their children before fertility control was generally practised, these differences are 'due to social habits rather than to differences in inherent fertility' (Coghlan 1903: 42).

Table 2.7 Average number of children of married women who terminated child-bearing by 1901, by age at marriage and religious denomination. NSW Census.						
	Church of England	Roman Catholic	Methodist	Presby-terian	Jewish	Other Religions
Age at marriage	*Mean no. of children ever born*					
Under 20 years	9.54	9.66	9.62	9.43	8.38	9.18
20–24 years	7.69	8.11	7.83	7.80	7.50	7.19
25–29 years	5.56	5.99	5.83	5.79	4.71	5.46
30–34 years	3.60	3.77	4.10	3.86	3.53	3.53
35–39 years	1.84	1.91	1.96	1.73	1.09	1.61
40–45 years	0.57	0.62	0.49	0.49	0.50	0.51

Source: Coghlan 1903: 42.

Mother's birthplace

Data on fertility by mother's birth place are only available from the population censuses. According to the 1911 Australian Census, there were distinct variations in completed family size by mother's birthplace (Table 2.8). The fertility of married women born in Australia was higher than that of married women born in the United Kingdom for every birth cohort and higher than that of women born in the rest of Europe in all birth cohorts prior to the 1852–56 cohort. Among women born in the United Kingdom, English women had higher fertility than Irish women in the older birth cohorts, but the fertility of English-born women fell so steeply from the 1847–51 cohort onwards that their fertility fell below that of Irish women in the two youngest cohorts.

Table 2.8 Average number of children ever born to married women by birth cohort and birthplace, Australia 1911

Birth cohort	1832-36	1837-41	1842-46	1847-51	1852-56	1857-61	1862-66
Birthplace	Mean no. of children ever born						
Australia	7.72	7.88	7.75	7.28	6.78	6.10	5.33
United Kingdom	6.96	6.90	6.70	6.40	6.01	5.48	4.97
England	*7.08*	*6.98*	*6.73*	*6.40*	*6.01*	*5.35*	*4.82*
Wales	*6.78*	*7.15*	*7.33*	*6.66*	*6.09*	*5.89*	*5.09*
Scotland	*6.87*	*7.03*	*6.87*	*6.63*	*6.01*	*5.49*	*5.01*
Ireland	*6.83*	*6.72*	*6.55*	*6.26*	*5.99*	*5.72*	*5.21*
Other Europe	6.38	6.68	6.94	6.70	6.97	6.41	5.97

Source: Commonwealth of Australia 1914a: 1160–1161

Summary

As outlined above, the Australian historical fertility decline has been examined previously using data from the population censuses or in small studies that have used vital registration data from specific colonies or regional areas. All the data analyses have been bivariate; there have been no multivariate analyses of Australian historical data.

As far as can be determined, fertility began to fall in Australia in the early 1880s, although the decline may have occurred slightly later in Tasmania and from a higher level. There were marked variations in the fertility decline by husband's occupation, urban/rural location and mother's birthplace. The decline probably started earlier in urban areas, for the upper and middle classes and for women born in the United Kingdom. There were some variations in the fertility decline by religion and mother's birthplace. The differences in fertility across religious groups and birthplace groups were relatively small compared with the rural-urban differences and the differences by occupation of husband. These trends are very similar to findings from research on the fertility

decline in Western European and other English-speaking countries discussed in the previous chapter.

Chapter 3

Tasmania in the 19th and early 20th centuries.

In order to set a context for the analysis presented in this thesis, this chapter provides a brief history of Tasmania in the 19th and early 20th centuries, examines changes in its population size and structure and looks at some characteristics of Tasmanian society which are relevant to theories of fertility decline: religion; education and literacy; occupation; and urbanisation. Detailed population data are presented for the years 1861, 1870, 1881 and 1891 to provide a comparison with data for couples marrying in 1860, 1870, 1880 and 1890 who are the subject of the fertility analysis that follows (see Chapters 4 and 5).

Much of the data in this chapter are derived from the Tasmanian population censuses. Legislation for the first Tasmanian census was introduced by Lieutenant-Governor of Tasmania, John Franklin in 1841 (Kippen 2002a). These censuses were conducted in 1842, 1843, 1848, 1851, 1857, 1861, 1870, 1881, 1891 and 1901. This chapter uses the published tables from these censuses, since the original records were destroyed (TAS 1842, 1857, 1861, 1870, 1881, 1891, 1901).

Tasmania's history 1803–1914

Tasmania is an island of just under 68,500 square kilometers, situated 240 kilometers off the south east coast of mainland Australia (Figure 3.1). It was discovered in 1642 by the Dutch explorer Abel Tasman and named 'Van Diemen's Land' (Boyce 2010; Reynolds 2012). The British established a penal colony on the island in 1803 on the Derwent River near present day Hobart, 15 years after the establishment of the penal colony in Sydney, New South Wales. The two major cities, Hobart and Launceston, were established three years later, in 1806 (Figure 3.1: 11D, 10D). Van Diemen's Land was part of the colony of New South Wales until it became a separate colony in 1825 (Boyce 2010). The British transported convicts to Van Diemen's Land for almost 50 years, until the convict system was disbanded in 1853.

In its early years, the colony was administered by a series of Lieutenant-Governors under the authority of England. The Australian Colonies Government Act of 1850 established 'a partially elected legislature with a limited franchise' which subsequently drafted the Tasmanian constitution (Boyce 2010: 241). Self-government was introduced on 1 January 1856 and the colony's name changed to 'Tasmania'. There were two houses of Parliament, the upper house (or

Legislative Assembly) and the lower house (the House of Assembly). The franchise was restricted throughout the second half of the 19th century, since men were allowed to vote only if they had property of a certain value. In 1901, Tasmania became a state of the Commonwealth of Australia, following the federation of the six Australian colonies. With Federation, all males 21 years of age and older became eligible to vote (Reynolds 2012). The right to vote was given to all women aged 21 years and older in 1902 for the federal elections and in 1903 for the state elections.

Figure 3.1 Map of Tasmania, 1900

Source: Google Maps

The colony grew spectacularly in the first 50 years, partly because of the availability of convict labour and investment from England. The British Army was a presence in Tasmania throughout the early years until they left the island in the early 1870s.

The colony's economy was predominantly agricultural in its earliest years, mainly sheep farming but also cattle, wheat, dairy farming and other agricultural produce. The land was very fertile, there was plenty of clean water and the climate was temperate (Boyce 2012). Wool was a major export for much of the 19th century: at the end of the 1860s, for example, wool accounted for around half of Tasmania's export income (Reynolds 2012). Timber-cutting was also an important industry from Tasmania's early years (Robson and Roe 1997).

In the 1820s and 1830s, many of the British immigrants obtained large landholdings in Tasmania's fertile Midlands and in the river valleys south of Launceston through free grants or purchase at cheap prices (Figure 3.1: 10D, 11D). These landholders became the Tasmanian 'gentry', who used the cheap convict labour to develop and maintain their properties (Reynolds 1969). In the early years of the colony, the government granted small landholdings to pardoned convicts and while many of these were forfeited or sold, a number of small farms and commercial gardens remained close to the two major cities.

Shipping was another important area of economic activity in the colony from its earliest years, since Hobart was on the major sea routes between the other colonies of Australia and the rest of the world. Ships sailed frequently from Hobart and Launceston to Melbourne, Sydney, Brisbane and New Zealand, carrying both goods and people. In later years, additional routes were added to Adelaide and Fremantle.

Shipbuilding was an important industry in the colony from the early years and increased in importance during the 1830s (Reynolds 2012). During the late 1820s and early 1830s, a large number of manufacturing ventures were set up in Hobart and Launceston, such as soap and candle making, small breweries and mills.

From the early days of settlement, Hobart's population was in communication with other colonies and other parts of the world. By 1834, Hobart had 'six newspapers, two advertising papers, one official gazette, one magazine and two pocket almanacks' (Haynes 1976: 13) The Hobart newspapers often contained long articles about events in Britain, Europe and the rest of the world, sourced from the British newspapers, which arrived with the ships. If they had the means,

people could subscribe to Hobart's reading rooms where they were able to access many overseas journals and papers (Reynolds 2012).

When transportation of convicts ceased in 1853, money stopped flowing from England. In 1856, a depression set in and did not lift until the discovery of minerals in the early 1870s (Reynolds 2012). There was a decline in shipbuilding and whaling in the 1860s and early 1870s, but from the mid-1870s onwards, new agricultural industries of hops, fruit-growing and jam-making began to make a substantial contribution to the colony's economy (Meikle 2010). From the late 1870s, the manufacturing industry began to expand to include products such as furniture, biscuits, shoes and clothing (Reynolds 2012). A large brewing company was set up in Launceston in the early 1880s.

By the middle of the 19th century, most of the largest rural estates were owned by families who had obtained the land before the 1830s (Reynolds 1969). These families often intermarried, concentrating land in the hands of these large landowners. The Waste Land Act of 1858, however, changed the pattern of landholding in the colony, since it brought the purchase of land within the reach of working men and women with some savings (Meikle 2011). 'Selectors', as these farmers were known, moved into areas of Crown land all over the colony, but particularly in the north-west and north-east coasts and in the Huon Valley south-west of Hobart (Appendix D: Story 2). Many small farming communities were established in these areas in the late 19th and early 20th centuries.

The long depression that started in 1856 began to come to an end with the discovery of tin in the north-west of the island in 1871 and the building of a smelter in Launceston by the Mount Bischoff Tin Mining Company in 1874. Over the decade there were also discoveries of gold, silver, bismuth, antimony, coal and copper in other parts of the island. There were, however, even greater discoveries on the west coast of Tasmania in the 1880s and 1890s, which led to the development of silver mines in Zeehan from 1882 and gold and copper mines in Queenstown from the 1890s (Figure 3.1: 10B and 11B). There was a large movement of the population to these mining areas and settlements grew around these mines, both of miners and their families (if the family moved with them) and workers to service the populations.

Communication within Tasmania improved in the late 1850s with the completion of an electric telegraph line between Hobart and Launceston in 1857 which was soon extended to George Town on the north coast (Cox 2012)(Figure 3.1: 10C). A telegraph line was set up between Tasmania and Victoria in 1859, but this did not work properly and it was not until 1869 that an effective line was

set up between the two colonies. Communication with the rest of the world improved dramatically when the telegraphic cable was permanently established between Tasmania and London in 1872. From this time onwards Tasmanian newspapers were able to publish news from around the world, particularly articles and reports from the English newspapers, with very little delay. During the 1870s, telegraph lines were extended throughout Tasmania. Telephone exchanges were opened in Hobart and Launceston in 1883, but telephone connections were uncommon and the use of telephones very limited until the 1920s (Reynolds 2012)

The railways came relatively late to Tasmania. The first railway line from Launceston to Deloraine (Figure 3.1: 10C), was opened in February 1871 and the first train between Hobart and Launceston ran five years later, in November 1876. In 1883, the government built railways lines from Launceston to Scottsdale (Figure 3.1: 10D) and from Deloraine to Devonport (Figure 3.1: 10C) (Reynolds 2012). In 1892, railways lines were built from Strahan to Queenstown in the far west and from Zeehan to the mining areas (Robson and Roe 1997) (Figure 3.1: 11B and 10B).

In the late 1870s and early 1880s, tourism became an important industry for Hobart with visitors from Melbourne and Sydney spending their summer holidays in the town and surrounding areas (Bolger 1978). For almost 20 years, Hobart was a favoured destination of tourists and invalids.

The 1880s were a prosperous decade for Tasmania: the mining industry grew and the economy of the colony expanded. By the beginning of the 1880s, the income obtained from exporting minerals was greater than that obtained from the wool export (Reynolds 2012). When minerals were first discovered numerous small mining companies were established, but they were quickly absorbed into large mining enterprises, such as the Tasmania Mine in Beaconsfield (Figure 3.1: 10C).

The power and influence of the landed gentry declined markedly from 1875 onwards (Reynolds 1969). Wool ceased to be a dominant commodity in Tasmania and the economic importance of the large land owners declined. In 1875-80, wool accounted for 40 per cent of Tasmania's total export income, but this had fallen to 14 per cent in 1895–1900. By the beginning of the 20th century, the agricultural produce of the small farms in north western Tasmania had become more valuable than the Tasmanian wool clip, while the orchards of the Huon Valley had become famous for their output of apples, pears, berries and other fruit (Reynolds 2012).

As in all other Australian colonies, except Western Australia, an economic depression struck in the early 1890s. In Tasmania, the depression started with the failure of the Van Dieman's Land Bank in August 1891 (Robson and Roe 1997). Unemployment rose and there was an increase in families

seeking food, clothing and fuel from charitable organisations. Public works were commenced in order to provide more employment. Economic conditions improved during the 1890s with the mining discoveries in the far west and the building of a new smelter for production in Mt Lyell (Queenstown). The exports of minerals, but also of timber, boomed (Robson and Roe 1997). By the end of the 19th century, more than half the value of Tasmanian exports was derived from four minerals: copper, tin, gold and silver.

An analysis of raw wages of 'urban' carpenters, bricklayers, masons and blacksmiths in Tasmania shows that wages increased steadily through the 1880s, but that there was a sharp drop in wages in the early 1890s (Famour and Withers 2014). However, by 1900 raw wages for carpenters and bricklayers were back to the levels of the 1880s, while wages for masons and blacksmiths had improved somewhat. Wages of farm labourers and shepherds also fell sharply between 1892 and 1893. They increased to 1900, but not to their former level.

Launceston was the first city in the Southern Hemisphere to be connected with electric light in 1895, followed by Hobart in 1898 and Zeehan in 1900 (Robson and Roe 1997). Both Launceston and Hobart had previously been lit by gas since the late 1850s. In 1893, Hobart became the first city in the Southern Hemisphere to have an electric tram network. Bicycles became a popular form of transport in the 1890s and 1900s for both men and women. Agriculture became more mechanised in the late 19th and early 20th centuries, with the introduction of steam-driven threshing machines (Pink 1990).

Tasmania was generally prosperous in the early years of the 20th century leading up to the First World War (Roe and Robson 1997). Mining prosperity lasted until the beginning of the First World War and jam-making and fruit production were also very important during the first decade of the 20th century. With Federation in 1901, the federal government embarked on a construction program of federal buildings in the state (Reynolds 2012). Federation also brought in free trade with the mainland, which lowered the cost of imported goods but increased competition with Tasmanian produce and manufactured goods. The states, however, were protected from the impact of free trade in the early years of the 20th century, with the federal government returning three-quarters of the customs and excise revenue to the states for the first ten years.

Population size and composition

1803–1860

In the first 30 years of European settlement the indigenous population, which was estimated at about 7,000 in 1817, decreased dramatically, mainly due to massacre by the European population (Boyce 2010). Fewer than 250 of the original inhabitants remained by 1830 and the last 'full-blooded' Aboriginal, Truganini, died in 1876 (Boyce 2010; Kippen 2002a). There is little information on the size of the Tasmanian indigenous population in the 19th and early 20th centuries, since Aboriginal people were not counted in the Tasmanian population censuses[1].

From 1803 to 1822, the European population grew to 8,422 inhabitants (Table 3.1); 58.1 per cent were convicts, 16.9 per cent were 'free by servitude of pardon' and 25.0 per cent were free settlers (Borrie 1994: 40). There was a marked imbalance of the sexes in the very early years of the colony among the adult convict population. Between 1821 and 1825, for example, only 8.6 per cent of the 6,101 convicts who arrived in the colony from Britain were female (Borrie 1994: 28).

The population grew rapidly between 1822 and 1842 (Table 3.1). There were increasing numbers of free settlers coming to the colony with about 11,000 arriving in the 1830s (Robson and Roe) 1997). In 1842, convicts made up a smaller proportion of the population than in 1822, accounting for 36.6 per cent of males and 13.2 per cent of females (TAS 1842). Another 7.9 per cent of men and 2.0 per cent of women were 'ticket-of-leave', that is, they were convicts who were on parole (Alexander 2014: 36). Among the remainder of the population: 15.9 per cent of males and 36.1 per cent of females were born in Tasmania; 19.6 per cent of males and 37.8 per cent of females arrived in the colony as free settlers, either from other colonies or from other countries; and 20.0 per cent of males and 11.0 per cent of females were 'other free', presumably ex-convicts. It is important to note, however, that the Census under-reported the convict population, since there was a strong tendency for convict 'ticket of leave holders' to represent themselves as free persons (Alexander 2014; Kippen 2002a).

[1] There were 19,625 Aboriginal and Torres Strait Islander people in Tasmania in 2011 accounting for 4.0 per cent of the Tasmanian population (ABS 2011).

Table 3.1 Population of Tasmania: 1822, 1832, 1842 and 1857					
	1822	1832	1842	1851	1857
Males	..	..	39,604	44,080	45,916
Females	..	..	17,816	25,482	34,886
Military (1)	..	..	..	568	690
Total	8,422	25,318	57,240	70,130	81,492

(1) Military includes wives and children for whom no details were given
" .." not available
Source: Borrie 1994: 40; TAS 1842, TAS 1851, TAS 1857

There was still a marked imbalance in the sexes in 1842. In the population as a whole, there were 223 males for every 100 females (TAS 1842). The convict population, however, was much more imbalanced, with 617 male convicts for every 100 female convicts.

By 1857, the colony's population had grown to 81,492 (Table 3.1). This census year was the last in which the population was categorized according to its 'free' or 'convict' status. In 1857, convicts or 'ticket-of-leave' made up only a very small proportion of the adult population (excluding the military): 4.7 per cent of males and 2.5 per cent of females (TAS 1857). Around a third of adult males, 33.7 per cent, and 18.0 per cent of adult females were ex-convicts. The majority of the total population—61.7 per cent of males and 79.5 per cent of females—were either free settlers or were born in the colony. Just over a third of all the population (37.3 per cent) in 1857 was born in Tasmania—32.5 per cent of men and 43.7 per cent of women. Some of those born in the colony would have been the children of former convicts.

There was a marked imbalance of the sexes in 1857 among unmarried males and females aged 14 and over, with 2.64 males for every 1 female (McDonald 1974). However, the imbalance was far greater in the areas outside Hobart where the ratio was 3.80, than in Hobart and surrounding districts where it was 1.18.

While free settlers continued to arrive from Britain in the 1840s and 1850s, the colony also lost population during the period, mainly to the neighbouring colony of Victoria. The outflow of population began in the late 1840s and increased markedly during the Victorian Gold Rush in the mid-1850s (Reynolds 2010).

1861–1911

Between 1861 and 1901, Tasmania's population almost doubled (Table 3.2). Between 1861 and 1879 net migration to Tasmania was negative, that is more people left the colony than settled there (Table A3.1). Many Tasmanians went to New Zealand in the early 1860s with the discovery

of gold in Otago (Kellaway 1999). However, in the 1880s, more people settled in the colony than left, probably due to the mining boom, while the numbers were fairly even in the 1890s. Many Tasmanians went to Western Australia in the late 1890s and early 1900s, attracted by the discovery of gold in the colony.

Table 3.2 Population of Tasmania: 1861, 1870, 1881, 1891, 1901 and 1911

	1861	1870	1881	1891	1901	1911
Males	49,593	52,853	61,162	77,560	89,624	97,591
Females	40,384	46,475	54,543	69,107	82,851	93,620
Total	89,977	99,328	115,705	146,667	172,475	191,211

Source: TAS 1861, TAS 1870, TAS 1881: 02_27, TAS 1891: 01_xxxi, TAS 1901: 02_xx, Commonwealth of Australia 1914b:10–12

The population of Tasmania was very young in 1861 with around half of the female population and around 40 per cent of the male population being under 20 years of age (Tables 3.3 and 3.4). Males had an older age structure than females, with the proportion of males over 40 years of age being almost twice that of females.

The age structure of the female population changed little over the three decades, although the proportions of the female population in the age ranges 30–49 years fell slightly and the proportion 50 years and older increased (Table 3.3). While the census data for 1861 and 1870 present the population only by 10 year age groups, estimated population data for females aged 15-49 years by 5-year age groups show little difference in the trends (Table A3.2).

Table 3.3 Female population by age, Tasmania, 1861, 1870, 1881 and 1891

	1861	1870	1881	1891
Age	Per cent			
0-14 years	42.1	45.3	39.8	41.0
15-19 years	9.7	9.8	12.2	9.9
20-29 years	17.7	14.1	17.9	18.3
30-39 years	14.0	11.8	9.6	12.1
40-49 years	9.3	9.1	8.7	7.4
50 years and older	7.2	9.8	11.6	11.3
Not specified	0.0	0.0	0.1	0.03
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	40,384	46,475	54,543	69,107

Source: TAS 1861, TAS 1870, TAS 1881: 02_27, TAS 1891:01_xxxi

The age structure of the male population became younger over the three decades with the proportion of males aged 20-29 years increasing and the proportion of males aged 30 years and older falling, particularly in the age group 40-49 years (Table 3.4). Estimated population data for

males aged 15-49 years by 5-year age groups show that the proportions of males in the age ranges 15–29 years increased between 1861 and 1891 while the proportion of males in the age ranges 35–49 years fell over the same period (Table A3.3).

Table 3.4 Male population by age, Tasmania, 1861, 1870, 1881 and 1891				
	1861	1870	1881	1891
Age	Per cent			
0-14 years	35.0	40.4	36.6	37.4
15-19 years	6.8	8.1	11.0	9.1
20-29 years	12.0	10.7	16.4	18.6
30-39 years	16.1	9.8	9.2	13.2
40-49 years	14.8	11.9	8.2	7.5
50 years and older	15.3	19.0	18.1	13.4
Not specified	0.0	0.0	0.4	0.7
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	49,593	52,853	61,162	77,560

Source: Tasmania 1861, Tasmania 1871, Tasmania 1881: 02_27, Tasmania 1891: 01_xxxi

In 1861, there more than twice as many unmarried adult men in Tasmania as there were unmarried adult women. The ratio of unmarried males aged 15 and over to unmarried females of the same age was 2.10 in the colony as a whole, but varied markedly by geographic region, being 1.07 in Hobart and 2.72 in the rest of the colony (McDonald 1974: 55). In 1881 in Tasmania as a whole, the balance of the sexes in the 'marriage market', measured as the number of unmarried males aged 17.5–49 years per 100 unmarried females aged 15–44 years (McDonald 1974), was still uneven at 110. However, in Hobart, there were many fewer unmarried males than unmarried females with a ratio of 61 unmarried males aged 17.5–49 years to 100 unmarried females aged 15–44 years (TAS 1881: 02_104). By 1891, the balance of the sexes in the 'marriage market' had risen to 122 in Tasmania as a whole, while in Hobart the ratio of unmarried males to unmarried females had risen to 84 (TAS 1891: 04_61).

The proportion of the population born in the colony continued to increase in the last decades of the 19th century, with a corresponding fall in the proportion born in the British Isles (Table 3.5). In 1881 and 1891, the majority of those born in the British Isles—around 60 per cent—were born in England, while about 25 per cent were born in Ireland, 13 per cent in Scotland and 2 per cent in Wales (TAS 1881, 1891). The proportion of the population born in other Australian colonies was very small, but increased slightly between 1870 and 1891. More than half of those born in other colonies were born in Victoria (TAS 1891). Only a very small proportion of the Tasmanian population was born in 'foreign countries'. In 1881 and 1891 around a third of this group was born

in Germany and another third was born in China. By 1901, 79.3 per cent of the Tasmanian population was born in Tasmania, another 7.2 per cent was born in the other Australia colonies, while the proportion born in the United Kingdom had fallen to 11.8 per cent (TAS 1901: 02_xlv).

Table 3.5 Birthplace of the Tasmanian population, 1870, 1881 and 1891

	1870	1881	1891
Birthplace	Per cent		
Tasmania	59.5	69.1	73.6
Other Australian colonies (1)	1.8	3.4	5.0
British Isles	37.4	24.4	18.4
Other British Possessions	0.3	0.8	0.6
Foreign countries	0.9	1.9	2.0
Not specified	0.0	0.3	0.4
Total (per cent)	100.0	100.0	100.0
Total (no.)	99,328	115,705	146,667

(1).Includes New Zealand
Source: TAS 1891 : 04_71

The increase in the native born population and decrease in the proportion born in the British Isles are related to the age structure of the population. Younger Tasmanians were more likely to have been born in Tasmania, while a greater proportion of the older population was composed of ex-convicts and free settlers from the British Isles. Thus the large majority of those marrying between 1870 and 1890 would have been born in Tasmania.

Characteristics of Tasmanian society

Religion

In the first decades of settlement, a number of religious denominations established ministries in the colony. The Church of England (or Anglican Church) was the established religion in Tasmania, with Robert Knopwood as the first minister (Boyce 2010). The first Catholic priest arrived in the colony in 1821 and a Wesleyan missionary settled permanently there in 1822 (Robson 1983). Both the Catholic and the Wesleyan church were highly committed to working with the convicts. The first Presbyterian ministry began in Hobart in 1823, a Congregational community was founded in Hobart in 1824 with a minister arriving in 1832, and the first Baptist church was established in Hobart in 1835.

The Nonconformist denominations made an important contribution to the intellectual life of the colony (Breward 1988; Robson and Roe 1997). The Presbyterians, Congregationalists and Baptists

were often engaged in business or trade and were very important in founding community organisations such as libraries and the Mechanics Institute, 'where the respectable working man might read newspapers and attend improving lectures' (Robson and Roe 1997: 20). The Methodists were responsible for founding Hobart's first public library (Breward 1988). All religious denominations held Sunday Schools where children received a basic education in the three 'R's (Breward 1993; Robson and Roe 1997).

Religious affiliation was collected in all 19th century Tasmanian censuses, except in 1881. It is important to note that these data were collected for the total population, that is, both adults and children, so that differences in religious affiliation over time may be affected by differential changes in fertility among the various religious groups. The 1842 census did not collect religious affiliation from 17.0 per cent of the population, mainly convicts, so that it is difficult to compare these data with the other census years.

The Church of England was the dominant religion in Tasmania in 1851 but the proportion of the population who were Anglican fell between 1851 and 1901 (Table 3.6). Catholics made up around a fifth of the population in most census years. The arrival in Tasmania of nearly 10,000 convicts from Ireland between 1840 and 1853 markedly increased the Catholic population of the colony (Boyce 2010), but 'Van Dieman's Land was never as Irish or as Catholic as New South Wales' (Alexander 2014: 23). The proportion of Methodists increased between 1851 and 1901, similar to other Australian colonies (Breward 1988). The proportion of 'Other' religions also increased markedly over the period. The rise between 1870 and 1901 was due to an increase in the numbers of 'Mahommedans, Buddhists and other non-Christian sects' and the commencement of the Salvation Army's work in Australia in the 1880s (TAS 1891: 01_xlvii).

Table 3.6 Population by religion, Tasmania, 1842, 1851, 1861, 1870 and 1891						
	1842	1851	1861	1870	1891	1901
Religion						
Church of England	60.7	64.2	54.7	53.4	51.7	48.6
Church of Scotland	6.6	6.4	10.0	9.1	6.9	6.7
Wesleyan Methodists	3.9	5.4	6.9	7.2	12.1	14.5
Other Protestants (1)	3.3	3.4	4.5	4.9	5.5	5.9
Roman Catholics	7.8	17.7	21.6	22.4	18.2	17.6
Jews	0.5	0.6	0.4	0.2	0.06	0.06
Other (2)	0.05	0.03	1.9	2.9	5.5	4.7
Religion not stated (3)	17.0	2.2	0.0	0.0	0.0	2.0
Total (per cent)	100.0	100.0	100.0	100.0	100.0	100.0
Total	57,420	70,130	89,977	99,328	141,493	172,475

(1) In 1842 and 1851 'Other Protestant' includes 'Other Protestant Dissenters', and in 1861, 1870 and 1891 ''Independents' and 'Baptists'.
(2) In 1842 and 1851, 'Other' includes 'Mahommedans and Pagans', in 1861 'Other Sects', in 1870 'Mahommedans and Pagans', 'Society of Friends' and "Other Sects" and in 1891 and 1901, 'Mahommedans, Buddhists and other non-Christian Sects', 'Society of Friends', 'Other Christian Sects' and 'Salvation Army'
(3)In 1842 'Religion not stated' includes 'Employed in Government Vessels', 'Convicts on Public Works', 'Convicts at Penal Settlements on Tasman's Peninsula' and 'Female Convicts in House of Corrections Hobart'. In 1851 'Religion not stated' includes 'Military including women and children' and 'Convicts on Public Works'
Source: TAS 1851, TAS 1861, TAS 1870 , TAS 1891: 01_xlvii, TAS 1901: 02_lvii

Anglicans had the lowest church attendance of all groups in 19th century Tasmania, followed by Presbyterians (Breward 1988). The Irish Catholics who came to Tasmania in the 1840s had low levels of attendance at Mass, similar to those in rural Ireland (Boyce 2010). The Congregationalists, Methodists and Baptists were probably more committed to their faith than other Protestants because of the discrimination these religious groups had experienced in Britain (Breward 1988). The Nonconformist denominations became 'evangelical in emphasis and practice' from the 1870s onwards and even the Church of England had a strong evangelical wing (Evans 2005). Towards the end of the 19th century, some sections of the Protestant churches became increasingly more liberal with efforts to 'adapt the Christian message to the findings of science and philosophy' (Breward 1993: 93).

Religious affiliation may have been more fluid in a rapidly evolving society such as Tasmania than in 19th century Britain and Western Europe. In the 1830s and 1840s, before the various denominations were able to establish churches or ministries throughout the colony, people in the country areas would attend a church service even though they belonged to another Christian denomination (Breward 1988). This practice may have continued in the latter half of the 19th

century in the newly opened areas of settlement, such as the mining towns of Zeehan and Queenstown. People also changed their religious denomination, for instance, with Presbyterians becoming Anglicans and Anglicans becoming Methodists (Breward 1993; Critchett 2012a).

Education

In the early years of the colony, children's education was provided in a variety of ways. Sons of the gentry were sent to England for schooling or their children had tutors or governesses, there were a number of private fee paying schools for young ladies and gentleman, church schools were publicly funded and a small number of government schools were established (Grundy and Yuan 1987; Reynolds 2010; Roe and Robson 1997). All schooling, whether public or private, required some sort of monetary contribution from parents. A Board of Education was set up in 1839 to fund and supervise the government schools (Sprod 1984). In 1840, there were 25 schools under the Board of Education with 1,046 students enrolled.

In 1868, Tasmania became the first Australian colony to have a compulsory state education system, administered by the local school boards. This meant that girls as well as boys were required to receive an education. Under the 1868 Education Act, children aged between 7 and 12 years who lived within a mile of the school in 'settled districts' were required to attend school unless they were being educated privately, could read and write, were in poor health or their parents depended on their labour (Sprod 1984). In 1873, the Public Schools Amendment Act made it compulsory for all children from 7 to 14 years of age in all districts living within two miles of a public school to be sent to a public or private school. The local School Board was given the discretion to exempt any child, and children 12 years and older were exempt if they were employed by parents or others.

The Tasmanian Education Act of 1885 set up a Department of Education which worked to improve the education system. The Act also required children to attend for three days a week and this was amended to five days a week in 1898 (Sprod 1984). Several exemptions from compulsory schooling were, however, still in force during this period. The education system and school attendance improved from 1905, when Thomas Neale, the new Director of Education began to reform the public education system. School fees were abolished in 1908 and state education became free.

Absenteeism was a problem throughout the last three decades of the 19th century. While the number of schools and average enrolments almost tripled between 1870 and 1901, average daily

attendance as a proportion of average enrolments remained the same throughout the three decades, at around 70–75 per cent (Table 3.7). Attendance, however, had improved with the introduction of compulsory education in 1868. Kippen (2002a: 210) estimated that school attendance for children aged 7–13 years probably increased from less than 30 per cent to around 70 per cent between 1860 and 1900, suggesting that compulsory education had a major impact on daily attendance in the late 1860s.

Table 3.7 State school students and attendance, Tasmania, 1870, 1881, 1891 and 1901

Year 31 Dec	1870	1881	1891	1901
Schools	128	175	244	338
Average Enrolments (1)	6,678	9,258	13,491	19,236
Average Daily Attendance	5,041	6,701	9,680	14,259

(1) Average number of students on the roll. This was an average of the monthly, weekly or quarterly enrolments.

Source: Grundy and Yuan 1987: 337.

Government schools were generally attended by children of the lower middle class, skilled workers, small to medium farmers, and the urban and rural working class. Upper middle class families tended to send their children to private academies and colleges, while the gentry sent their children to the 'grammar' schools (Sprod 1984: 24). Catholic families sent their children to Catholic schools, regardless of social class.

Sprod (1984) concluded that it was the children of the urban and rural working classes and of small farmers who did not attend government schools regularly during the latter decades of the 19th century. Most of these children were working on the family farm, looking after younger children and doing domestic chores, or working in paid employment outside the family home to supplement the family income. Although the Tasmanian Women's and Children's Employment (Factories) Act of 1884 forbade the employment of children in factories under the age of 12 years it specifically excluded seasonal work in the jam factories (Sprod 1984). Children 12 years and older were legally allowed to work in factories despite being required by law to attend school until they were 14. This Act was amended in 1905 so that 'No person under the age of Thirteen years shall be employed in any factory' (TAS 1905).

Even though some children's school attendance was irregular, they did attend school for some of the time and received at least a basic education. The literacy status of the population improved markedly during the second half of the 19th century, with the proportion of the total population

that could read and write increasing between 1861 and 1901 (Table 3.8). The literacy status of the population was not published prior to 1861 and for the years 1861 and 1870 it was not disaggregated by age or sex. Between 1881 and 1901 the proportion of the population aged 20 and over that was literate increased from 79.0 per cent to 92.1 per cent. In 1901 almost all the population aged 15–20 years could both read and write. Children's literacy also improved between 1881 and 1901.

Table 3.8: Proportion of the population who could read and write, Tasmania, 1861, 1870, 1881, 1891 and 1901

	1861	1870	1881	1891	1901
Age	*Per cent*				
All ages	53.7	56.3	64.7	70.3	77.5
5-15 years	..	..	61.6	67.0	76.2
15-20 years	..	..	87.5	95.5	96.6
20 years and older	..	..	79.0	87.4	92.1

Source: TAS 1881 : 02_45, 02_55, TAS 1891 : 04_89, 04_90, TAS 1901: 02_li

In relation to further education, the first technical school was established in Hobart in 1888, the University of Tasmania opened in the Hobart Domain in 1890 and a School of Mines and Metallurgy was set up in Zeehan in 1892 by the miners themselves (Robson and Rowe 1997). A teacher's training college was established in Hobart in 1906, with the reform of the public education system.

Occupation

Occupational data from various Colonial Censuses and the first Australian Census of 1911 (Tables 3.4–A3.10) reflect the economic changes that occurred in Tasmania in the 19th century and early 20th centuries. They also show the marked growth in white-collar and more 'modern' occupations in the last two decades of the 19th century.

The occupational categorizations varied somewhat in each census, so that the data are not strictly comparable. However, the broad occupational data show the dominance of agriculture between 1842 and 1870, the growth in importance of industry and mining in the 1880s and 1890s and the emergence of new occupations, for instance, in transport and communication, in these years. Agriculture clearly declined in importance during the last decades of the 19th century, with the proportion of the population employed in agriculture falling from around 50 per cent in 1851, 1861 and 1870 to around 33 per cent in 1891, 1901 and 1911 (Tables A3.4–A3.7). More detailed

occupational data (discussed below) show the growth of white-collar occupations in the late 19th and early 20th centuries.

Occupation by age and sex was published only from 1881 onwards. Data on adult men's occupations for 1881, 1891 and 1901 are difficult to compare, since the classifications changed in each census (Tables A3.8–A3.10). People who were not employed were classified as 'Indefinite and non-productive' in the 1881 Census, but in the two later censuses the population was divided into 'Breadwinners' and 'Dependants', with 'Breadwinners' classified by occupation. There were several other changes within the occupational categories. Miners, for instance, were classified as 'industrial' in the 1881 census, but as 'primary producers' in later censuses. In 1901, occupations related to transport and communication, which were previously in the 'commercial' category, were given their own separate category, reflecting the growth of these more 'modern' occupations (Appendix D: Story 3).

It is difficult to obtain precise numbers showing the changes in occupations between 1881 and 1891 because of the changes in occupational classifications at the detailed level (TAS 1881: 20_190–196, 1891: 04_290–318, 1901: 05_394–426). However, there was clearly a rise in the number of men employed in white-collar occupations over this period. 'Accountant', for instance, was not an occupational classification in 1881, but there were 162 males employed as accountants in 1891 and 257 in 1901. This was an increase of 57 per cent, compared with an increase of 17.9 per cent in the number of male breadwinners. The number of men employed as 'Agents'—e.g. Commission, Insurance, Sewing Machine—also rose markedly between 1881 and 1901, as did the number of 'Clerks' and 'Messengers'. The number of males who were 'Railway Clerks and Stationmasters' grew more than threefold, from 53 in 1881 to 117 in 1891 and to 185 in 1901. This compares with an increase of 44.0 per cent in the population of males aged 15 years and older over the same period. The number of schoolteachers, both men and women, almost doubled between 1881 and 1901, from 602 to 1109.

There is no information about married women's occupations in any of the colonial censuses. In 1881, of the 26,181 women aged 20 years and older, 82.0 per cent were classified as 'domestic' (TAS 1881: 02_139). Around three-quarters of this group were 'wives and widows with no occupation specified' (TAS 1881: 02_142). It is not possible to tell whether women classified in specific occupations were married or single. In the 1891 census, of the 33,963 women aged 20 years and older, three-quarters were classified as 'dependants' with the remainder being 'breadwinners' (TAS 1891: 04_175). The largest group of breadwinners—41.1 per cent—was

classified as 'domestic'. McDonald and Quiggin (1985) note that for the 1891 Colonial Censuses, Colonial Statisticians instructed that a woman should be recorded as 'domestic duties' if there was any doubt about her occupation (McDonald and Quiggin 1985: 80). The 1901 Tasmanian Census had a similar occupational classification for women.

It appears that in 19th and early 20th century Tasmania, most married women did not work outside the home, family business or farm. Working on the family farm or in the shop or hotel, however, was probably fairly common as indicated by newspaper articles of the time. Some women did outwork, taking in washing and sewing. In the latter part of the 19th century, some married women also worked as schoolteachers. Many married women also worked as local midwives (Fahy 2007).

The 1911 Census, which provides data on women's occupations by marital status supports this view (Table A3.11). Only a small proportion of married women—4.7 per cent— were classified as 'breadwinners', with the largest group working in the 'domestic category', supplying board and lodging or domestic services. 'Breadwinners' included those who were 'assisting (not receiving wages)' which were mainly married women working in lodging houses, shops and on farms.

Urbanisation

Prior to 1881, the Tasmania censuses did not provide information on the population of any of the towns/cities except Hobart and Launceston. The censuses gave the population of the electoral districts such as Campbell Town which included both a town and its surrounding areas. It is difficult to tell the proportion of the population living in various districts prior to 1857, because the precise location of the convicts and the military population were not stated.

In 1857, the population of Hobart was 18,258 accounting for 22.6 per cent of the colony's population (excluding the military), while the population of Launceston was much smaller, 7,874, or 9.7 per cent (TAS 1857). Unlike the other Australian colonies, reflecting Tasmania's dependence on agriculture and mining, the population living in its capital city, Hobart, did not grow markedly during the 19th century (McCarty 1974). Instead, there was marked growth in the north of the colony. In the late 1870s and 1880s new towns were established in the north through the expansion into new areas for agriculture, saw milling and mining (Meikle 2010). It was possible to export from Launceston and from the smaller northern towns of Devonport and Burnie (Burnley 1980). Launceston grew by 62.0 per cent between 1857 and 1881 compared with Hobart's growth of 15.7 per cent (TAS 1861, TAS 1881: 02_30). Hobart's population may have been understated in

1881, however, since in that year there were several towns adjoining Hobart which by the 1891 and 1901 Censuses were classified as 'suburbs of Hobart'. (Table A3.12).

Between 1881 and 1901, the population of the 'metropolis' of Hobart grew from 21,118 to 24,654 (16.7 per cent) but an additional 7,764 people resided in the Hobart suburbs in 1901 (Table A3.12; TAS 1901: 02_viii). In the far west, mining towns such as Zeehan and Queenstown grew spectacularly in the last two decades of the 19th century (Table A3.12). Queenstown, which was not even included in the 1891 Census had a population of 5,051 by 1901, while Zeehan grew from 1,965 to 5,014 over the same period. Towns in the north of the colony such as Burnie, Devonport and Ulverstone also grew markedly, while the towns in the Midlands, such as Campbell Town and Oatlands either declined or stagnated (Figure 3.1: 10D, 11C, 11D). By 1901, there were 27 towns with populations of 500 or more (excluding Hobart and Launceston), most of them in close proximity to one another and to the larger cities of Hobart and Launceston. At the same time, there were small settlements, such as Marrawah on Tasmania's far north west coast, which were in very remote locations (Appendix D: Story 2). By 1901, 30.1 per cent of Tasmania's population was living in Hobart and Launceston and suburbs, 21.0 per cent lived in other towns of 500 or more and 48.9 per cent lived in the remainder of the state.

Summary

In its first 50 years, the colony's history was dominated by convict settlement, but after transportation ceased in 1853, the convict society began to die out. By 1857, free settlers or people born in the colony accounted for the majority of the population. Convicts made up only a very small proportion of the population.

Tasmania was highly dependent on agriculture in its early years, but from the 1870s mining emerged as a major industry. The colony was prosperous from settlement until the mid-1850s when a depression set in, but this lifted in the early 1870s with the mining discoveries. Like most other colonies Tasmania experienced a great depression in the early 1890s, but the economy improved at the end of the 19th and in the early 20th centuries. The late 19th and the early 20th centuries were a time of great social and economic change for the colony, with improvements in communication, transportation, the introduction of electricity to cities, compulsory primary education and universal suffrage.

By the last decade of the 19th century, a high proportion of the population was born in Tasmania and was literate. There was a large rise in white-collar and 'modern' occupations, communication

was good and news from other colonies and overseas reached Tasmania with very little delay. The population was not strongly religious and there was a relatively high urban-orientation.

It is against this backdrop that the historical fertility decline to be examined in this thesis took place.

Chapter 4

Research design and data sources

This chapter describes the research design for the quantitative analysis, the data sources used to construct the database and the issues encountered in its construction.

Family reconstitution of four Tasmanian marriage cohorts

In order to obtain the data for the bivariate and multivariate analyses, I reconstituted families in four Tasmanian marriage cohorts using 19th century Tasmanian registration data plus information from many other sources. The family reconstitution involved tracking couples from marriage through their childbearing years. This allows me to compare the fertility and birth patterns of couples in these marriage cohorts by various characteristics.

I use a marriage cohort approach in my study because examining the birth histories of couples provides me with the information I need to answer my research questions, that is, when, how and why fertility fell during this period. The cohort approach also allows me to look at the impact of temporal change on fertility in broad terms, for instance, the effects of the 1890s depression which lasted for around 10 years. The task of reconstructing the birth histories of four marriage cohorts, while time-consuming, is at least feasible. A cross-sectional approach is not feasible. Because the birth registration data do not provide information on age of mother at the birth, parity of the birth or whether the birth is the last (see below), I would have had to reconstitute the birth histories of all mothers giving birth in any of the years under examination. Additionally, because of the under-registration of births, I would have had to examine the birth histories of every married woman of childbearing age in order to try to find births that were not registered (see below). This is an impossible task. Cross-sectional data would allow me to examine the impact of short-term events on fertility, but to do this thoroughly I would have to include births in every single year within the period, which would also not have been feasible. Finally, from a theoretical perspective, it can be expected that the long-term trend towards lower fertility was the result of longer-term social and economic changes over several years rather than of one-off events occurring in single calendar years.

The technique of ‘family reconstitution’, that is, the reconstitution of families using parish records on births, deaths and marriages, has been used by demographers to study the decline of fertility in

historical populations, but it has a number of problems (Gutmann and Alter 1993; Henry et Blum 1988; Wrigley 1966; Wrigley et al 1997). A major problem is that the data are only available for events within a parish and families who move out of the parish are excluded from the study, giving rise to issues of the representativeness of the study population (Gutmann and Alter 1993; Ruggles 1992). I have used an 'enhanced' form of family reconstitution in my thesis, where I first reconstituted families using Tasmanian vital registration data, but then used several other sources, described below, to track families who moved outside Tasmania, either temporarily or permanently.

As noted in Chapter 1, I selected the marriage cohorts for 1860, 1870, 1880 and 1890 for my study, that is, the population of couples who were married in Tasmania in these years. Examining the available evidence (see Chapter 2), it appeared that the earlier cohorts would have had children before the fertility decline, and the 1880 and 1890 cohorts during the fertility transition. I chose the 1860 cohort as my first cohort, rather than an earlier cohort, for a number of reasons.

- By 1860, the Tasmanian population was more settled: transportation had ended in 1853 and the exodus to Victoria as a result of the Gold Rush was all but over (Chapter 3). The majority of the population were free settlers or were born in the colony.
- Registration which started in 1838 had greatly improved by 1860 (Kippen 2002c). Although there was still under-registration of births, registration improved throughout the second half of the 19th century (discussed below).
- Population data were available from 1860 onwards (Kippen 2002a).

The fertility analysis in this thesis concentrates on the fall in fertility among those who had children and does not investigate trends in childlessness. It was not possible to obtain an estimate of childlessness among couples in the Tasmanian marriage cohorts, since many couples could not be traced to the end of their childbearing years (Table A5.2). It is difficult to tell whether there was an increase in childlessness during the Australian fertility decline, but there was clearly a marked decline in completed family size of couples who had children (See Chapter 2). According to the 1911 Census, the proportion of childless women born in the years 1842–46 to 1862–66 was relatively small and remained unchanged for each birth cohort at around eight per cent of all married women.

I decided to examine completed fertility within marriage and to concentrate on women whose childbearing had not been interrupted by widowhood. Thus the analysis of marital fertility decline is undertaken for a sub-population of couples of the marriage cohorts, that is, couples where the

wife was in her first marriage, there was at least one child of the marriage and both partners survived the wife's childbearing years. In the discussion that follows I refer to this sub-population as the *complete* group (see Chapter 5).

Although my fertility analysis concentrates on the complete group, I reconstituted the birth histories of all couples marrying in the four cohorts, as far as this was possible, in order to provide some descriptive data to set the fertility analysis in context (see Chapter 5).

Data sources

I used several databases to reconstitute the families from the four marriage cohorts (see Appendix B). The main database used in this research was the Tasmanian Civil Registration Digitised Database—Tasbirths, Tasdeaths and Tasmarriages (Gunn and Kippen 2008; Kippen and Gunn 2011). This database contains digitised records of births, deaths and marriages registered in Tasmania from the beginning of registration in August 1838 until the end of the 19th century. Tasmania was the first British colony to introduce civil registration of vital events, shortly after civil registration was introduced in Britain (Kippen 2002c).

The Tasmanian Civil Registration Digitised Database contains the following information:

- Tasbirths : data and place of birth; name; sex; name of both parents; maiden name of mother; occupation of father; date and district of registration; name, status and residence of informant; and name of officiating deputy registrar. From 1895 onwards, the date and place of the parents' marriage were also listed.
- Tasmarriages: name; age; occupation of husband and wife (if any); marital status of the husband and wife; date and place of marriage; date and district of registration; religion; names of witnesses; whether or not the husband and/or wife signed the marriage certificate.
- Tasdeaths: name; age; sex; occupational status of deceased, or spouse (if wife), or father (if a minor); date of death; cause of death; date and district of registration; name, status and residence of informant; and name of officiating deputy registrar.

I was very fortunate to have access to another database which linked the births in the Tasmanian Civil Registration Database to the marriages (Kippen and Gunn 2011). While this database was not 100 per cent complete, when I reconstituted the families I found that only about five per cent of births in the four marriage cohorts had not been linked to a marriage. Kippen and Gunn (2011)

initially linked the births by computer linkage with a 70 per cent success rate, although the rate of linkage was much lower for earlier years than for later years. Once they had completed the computer linkage, they began to link the unlinked births manually, but this process was not complete by the time I started my study. Of the unlinked births that I was able to attach to a marriage, the majority were births in the 1890s, which had been a later addition to the original database. Other unlinked births were those to widows, where the birth was registered in the woman's maiden name, not in the name in which she married. Widows commonly gave their previous married name at the cohort marriage, but used their maiden name when registering the children of the cohort marriage.

Many couples in the 1880 and 1890 marriage cohorts had births in the early decades of the 20th century and parents in all cohorts, particularly the later cohorts, died during the 20th century. In order to find births and deaths occurring in Tasmania after 1899, I used the Tasmanian Federation Index which provides information for births from 1900 to 1919 and for deaths from 1900 to 1930.

The Tasmanian Federation birth index provides information on: date of birth; name; sex; full name of father; full name of mother, including her maiden name; and the place of birth. The Tasmanian Federation death index contains information on: name; sex; and date and the place of death. I also had access to a sample of digitised Tasmanian death registrations for 1900–1930 (Kippen 2013). These death registrations contain the following information: name, age and sex of deceased: date and place of death; place of birth; cause of death; occupational status of deceased or spouse (if wife) or father (if a minor); name of medical attendant; name, relationship and place of informant; date and district of registration; and name of deputy registrar.

The Tasmanian vital registration data were not wholly adequate for fully reconstituting families in the four marriage cohorts, partly because many families had births or deaths outside Tasmania, and partly because many deaths for the later cohorts occurred after 1930. I therefore used a number of other sources to reconstitute families (Appendix B). These data sources include the Australian National Library digitized newspapers; the Australian Dictionary of Biography; the Australian Birth, Deaths and Marriage indexes (on the website 'Ancestry' www.ancestry.com) ; the Australian and New Zealand Electoral Rolls; New South Wales, Victorian, Queensland, South Australian, West Australian, and New Zealand births, marriage and deaths historical indexes; the English births, deaths and marriage indexes; the English Population Census Forms; the Tasmanian Colonial Family Links Database; Tasmanian divorce records; Tasmanian wills; Tasmanian land records and Boer War, World War One and World War Two service records. The Australian

digitised newspapers were a very rich source of information. This was because Tasmania had a relatively small population during the 19th and early 20th centuries and, unlike the other colonies, the newspapers reported mundane events about ordinary people often in great detail. From 1900 onwards, it also became very common for people from all socioeconomic classes to put births, deaths and marriage notices in Tasmanian newspapers. Family trees on the website 'Ancestry' were a very useful source of information, but I used these data only if they were confirmed by other sources.

Process of family reconstitution and issues encountered

Using Tasmanian records

In order to reconstitute a family, I started with a marriage and attached the computer-linked births to the couple's marriage record. I then compared these births with those attributed to the couple on the Colonial Tasmanian Family Links Database, to see if there were any other births listed on that database. If I found additional births, I then searched the unlinked registered births on the Tasbirths to confirm that a birth was correctly attributed to a family. I also searched the Tasmanian Federation Birth Index for births occurring in the 20th century. This index provided me with enough information to be confident that the births I found belonged to the correct family.

Once I had attached all the Tasmanian registered births to a marriage, I searched for the deaths of infants and children under 15 years and of parents**,** using a variety of sources. I initially used Tasdeaths and the sample of Tasmanian digitised death registrations for deaths occurring between 1900 and 1930. If I could not find a death on these digitised databases, I searched the Tasmanian Federation Death Index and then checked with the Australian digitised newspapers and the Australian Cemetery index to confirm that a death on the index belonged to the correct family. The digitised newspapers and the Australian Cemetery index were also very useful in finding deaths that had occurred after 1930. Death notices in a newspaper almost always provided information on whether or not that person's spouse was still living: 'death of George Brown, dearly beloved husband of Mary Brown' or 'death of Mary Brown, relict of the late George Brown'. In the case of a child's death, they also identified the child's parents.

If the husband died during the wife's childbearing years, I looked at Tasmarriages to see if the wife remarried in Tasmania. If she remarried, I followed the same steps to reconstitute the second family as with the first. If the wife and/or husband was a widow or widower when they married in

the study marriage cohorts, I searched the marriage records for a previous marriage and if I found this marriage, reconstituted the previous family using the same method.

Family mobility

I did not assume that all couples who married in Tasmania stayed there throughout their lives, so I searched for events that had occurred in other locations. This would not have been possible without the digitised records that have become available on the internet in the past 5–10 years. Larson (1994) writing about family reconstitution in the 1980s and early 1990s, considered that one of the problems of family reconstitution was that it was impossible to trace families who moved out of the study area or learn about events that 'were never recorded, such as a baby born while the family was on a visit to England' (Larson 1994: 33). The availability of digitised records accessible through the internet has largely overcome this problem.

Once I had reconstituted a family using Tasmanian records, I searched for births and deaths that occurred outside Tasmania, that is, in the other colonies, in New Zealand and in other countries. I did not assume that if a couple had births in Tasmania and both parents died in Tasmania all their births had occurred in Tasmania.

The Victorian (VIC), New South Wales (NSW), Queensland (QLD), South Australian (SA), Western Australian (WA), New Zealand (NZ) and English births, marriage and deaths indexes, and the English Censuses were useful in providing information on events occurring elsewhere. The VIC, QLD and SA indexes all gave births by the wife's maiden name, which gave me a high degree of certainty that the birth belonged to the correct family. NSW and WA indexes, however, were much less detailed and I only attached the birth to the family if I could find other sources of information that confirmed the relationship. There was very little information on deaths in most of the indexes, although the VIC, QLD and NSW indexes gave some information about the parents of the deceased. The digitised newspapers were an important source of information on deaths occurring in other colonies or countries.

I found a wide variety of patterns of mobility among couples in the four marriage cohorts. Some couples had all their births in Tasmania but moved around Tasmania during the wife's childbearing years, some couples had births in Tasmania and in another location, while other couples married in Tasmania but had all their births elsewhere (see Chapter 5).

- Only a small proportion of the couples who married in Tasmania did not have any births in Tasmania. For instance, Ernest Augustus Smith, a solicitor, and Grace Fisher married in Hobart in 1890, but all their children were born in Sydney, NSW, and both Ernest and Grace died there in the 1930s.
- Some couples had their first birth outside Tasmania, but the rest of their children were born in the colony. John Blythe, a wealthy landowner, and Caroline Delittle were married in Launceston in 1880 and had a son Robert born in Invercargill, New Zealand in 1881. They returned to Tasmania shortly after and had a daughter born in Launceston in 1882 and another born in Beaconsfield in 1887. John died in Tasmania in 1912, but Caroline was still living there in the late 1930s.
- Some couples had some of their children in Tasmania and then moved to another place and had other children there. Bowden Carthew, a stonemason, married Mary Anne Carpenter in Swansea in 1860. They had their first child in Glamorgan in 1861, their second in Spring Bay in 1862 and two other children in Hobart in 1865 and 1866. By 1869, they had moved to Ballarat, Victoria where they had a child born in that year and another born in 1870. Both Bowden and Mary Anne died in Melbourne, Victoria.
- Other couples had one or more children born in Tasmania, then one or more born elsewhere, then went back to Tasmania and had more children there. Richard Fleming, a farmer, married Eliza Barwick in 1860 in Oatlands (Appendix D: Story 4). They had two children in Oatlands, went to New Zealand where they had another three children, then returned to Oatlands where the rest of their 13 children were born. Richard died in Oatlands and Eliza in Launceston.
- Some families were extremely mobile and had children in many different locations. Ernest Graham, a labourer, married Sarah Freeman in Hobart in 1890. They had four children born in Hobart between 1892 and 1896 and then moved to New Zealand where they had another four children, born between 1901 and 1904. In 1908, when their ninth child was born, they were back in Australia, living in Cobar in the far west of NSW. At some stage they moved again, since by 1934 they were living in Darwin, in the Northern Territory where Ernest was a 'retired civil servant'.

Defining the wife's childbearing years

Although I originally assumed that women would have completed their childbearing by age 45 years, I found that 11 per cent of women in the 1860 and 1870 cohorts had their last birth

between the ages of 45 and 49 years. I thus decided to extend the wife's childbearing years to age 50. However, there were a small number of couples where one partner died before the wife turned 50, but there were several years between the last birth and the spouse's death, suggesting that these couples had completed their childbearing. Within each marriage cohort, I examined the birth patterns of women in couples where both partners had survived to age 50 to investigate the probability of having another birth. Among those women who gave birth at each age, I looked at the number of women who went on to have another birth and for those who had another birth, the length of time to the next birth. Based on this analysis, I included couples in the complete group where one spouse died before the wife turned 50: if a woman had her last birth in her 20s and there was a 99 per cent probability that she had completed her childbearing at the time of the death; if she had her last birth in her 30s and there was a 95 per cent probability of completion; or if her last birth was in her 40s and there was a 90 per cent probability (because of small numbers).

Ascertaining whether both partners lived through the wife's childbearing years

If I could not find any information on the deaths of a husband and wife, I used sources such as the Electoral Rolls to ascertain if either or both partners had lived through the wife's childbearing years. The Electoral Rolls listed partners and children living at the same address and also gave each person's occupation.

However, in every cohort, there was a small proportion of marriages where the wife was in her first marriage, they had at least one child of that marriage, but they then effectively 'disappeared' from the records (See Tables 5.1, A6.3). I suspect that a relatively high proportion of these marriages ended in separation, particularly in the earlier cohorts. I found separations serendipitously, through sources such as newspaper articles or birth records with the husband or wife having births with another partner. Separations that were initiated by women seem to have been fairly common in the colony from its earliest years (Boyce 2010). In these situations, the husband often placed a notice in the newspaper disclaiming all responsibility for his wife's debts.

Margaret Clark and John Stacey, for example, were married in 1860, but he subjected her to considerable physical and emotional abuse in the first years of their marriage (*The Mercury* (Hobart) 15 May 1863, 26 September 1863). When Margaret left him, John put an advertisement in the newspaper, saying

> '*CAUTION: My wife, MARGARET STACEY, having left her home without my consent, I hereby caution the public from giving her credit on my account, as I*

shall not be responsible for any debts she may incur. JOHN STACEY, JUN., Dated this 29th of September, 1863' (*The Mercury*, 1 October 1863).

The digitised divorce records on the Tasmanian Archives website enabled me to find out whether and when a couple divorced. Divorce legislation was first passed into law in Tasmania in September 1860 (Finlay 1999. See Chapter 8). However, very few of the couples in my study were divorced: in total, only 15 couples in all four cohorts had divorced during the wife's childbearing years. Some couples appear to have separated with one of the partners marrying another partner without being divorced. Some of these men and women went to Victoria and remarried despite having a spouse living in Tasmania. As in earlier times, Victoria was a 'refuge for those seeking ….freedom away from social and economic controls' (Boyce 2010: 250). I suspect that a small number of men and women also remarried in other parts of Tasmania despite being married to another partner at the time.

Where I had no information to ascertain whether the couple survived the wife's childbearing years or separated or divorced, I continued to search the family histories on Ancestry to see if I could find any clues about the family. I also developed my own website requesting information on the families. I contacted all the State and Territory family history societies, asking them to put a short article in their newsletter or magazine about my search. The article gave a brief summary of my Ph.D. research, details of the website and asked for any help in tracing the families. Most of the family history societies very generously agreed to my request, but I obtained little information through this source. Many of the people who contacted me had been unable to trace the relevant individual or couple and had no more information than I did about their fate.

The 1860 cohort proved to be the most difficult to trace (see Table 5.1), partly because some of those marrying at this time, mostly men, were ex-convicts. I suspect that ex-convicts were more likely to have been mobile and to have changed their names when they moved. I found some instances where a husband or wife was an ex-convict and had changed their name at marriage or subsequent to the marriage. There were several ex-convict men in the 'complete' group in the 1860 marriage cohort and a possible two or three ex-convict women, as far as I can tell, but most of the women were too young to have been convicts. Most ex-convict men marrying in the 1860 cohort married widows, while ex-convict women were either widows or, if marrying for the first time, did not have any children of the marriage. I did not find any ex-convicts in any of the other marriage cohorts.

The 1890 cohort was the easiest to trace (see Table 5.1). One of the reasons for this was that names, both first names and last names, became much more diverse throughout the 19th century. In the 1860 cohort, most women were called Margaret, Catherine, Anne, Mary, Jane, Elizabeth and Sarah, while men were mostly called Henry, John, James, George, Thomas, Charles and William. There were also a limited number of last names in the colony. Thus 'John and Mary Davis' or 'George and Margaret Brown' were almost impossible to identify correctly. From the 1870s onwards, however, children were given a much wider variety of first names, and last names also became more diverse with immigration into the colony, both from other countries and other colonies.

Unregistered births

Under-registration of births was an issue in Tasmania during the 19th and early 20th centuries (Kippen 2002a). Kippen (2002a) estimated that the proportion of unregistered births was 13 per cent in the 1860s and 1870s, 7 per cent in the 1880s, 5 per cent in the 1890s and fell to 2 per cent by the beginning of the first decade of the 20th century (Kippen 2002a:55–56 and personal communication). Kellaway (1999) similarly estimated the proportion of unregistered births in Tasmania at 10.4 per cent for the 1860s and early 1870s. Tasmanian experts writing at the time believed that many of the unregistered births were of illegitimate children, although they had no evidence for this (Hall 1872 cited in Kippen 2002a). There is some evidence, however, that in 19th century Victoria ex-nuptial births were less likely to be registered than nuptial births (Carmichael 1996).

Searching for unregistered births was a very time consuming and painstaking task. For this reason, I decided to limit the search for unregistered births to the 'complete' group that is the focus of the fertility analysis.

I found unregistered births in Tasmania through a number of sources:

- Where the family's religion was 'Catholic', I used microfilms of some of the Catholic parish records to search for baptisms of children whose births were not registered. I concentrated on families with very large birth intervals, particularly between marriage and the first birth.
- Some families listed on the Tasmanian Colonial Family Links Database had births attributed to the family (usually sourced from church records) that were not on Tasbirths

- Some family histories on 'Ancestry' had an additional child or children attributed to a family.
- I sometimes found an additional child or children mentioned in a newspaper article or notice about a parent's death.
- I found some infants and/or children whose deaths were registered, but for whom there was no birth registration. In most of these cases, the child had only lived a few hours and presumably the family thought it too costly to register the birth. Deaths were more likely to be registered than births, since a family wishing to bury a family member was required to show the death certificate to the clergyman, otherwise he was required to notify the deputy registrar of non-compliance with the registration act (Kippen 2002c).

When I found the additional child or children, I went through several steps to confirm that the child/children belonged to the family in my study. Firstly, I checked to see if the additional child or children belonged to any other family. If not, I checked the family reconstitution to see if the child or children fitted into any possible birth gaps. If so, I then used various sources to check on the likelihood of the child belonging to the family. These sources included: the Australian birth index; VIC, QLD and NSW death indexes; births, deaths and marriage notices in the digitised newspapers; parents' obituaries; the Australian Cemetery index; names of witnesses at sibling's weddings; and Boer War, World War One and World War Two service records.

- The Australian birth index on Ancestry listed several births that were not in the Tasmanian digitised data base. The birth index gave: full date of birth; both parents' first names and surnames, including the mother's maiden name; and place of birth.
- If a person died in Victoria or Queensland, either as a child or an adult, the death index gave both parents' first names and surnames, including the mother's maiden name. NSW death indexes gave both the parents' first names.
- The Australian digitized newspapers were a good source of information. Some births were not registered, but were announced in the newspaper. Marriage notices would often say that the person was, for example, the third son of John and Mary Smith. A death notice of the child (as an adult) might also provide evidence that the person belonged to the correct family. Death notices for parents were sometimes very useful, in that they listed all the children in the family by name and in birth order. Newspaper obituaries nearly always listed the number of children by sex and sometimes gave their names.

- The Australian Cemetery index listed members of the family that were buried with that person.
- The Boer War and the World War One and World War Two records provided information on age, occupation, geographic location and next of kin.

In using the family trees on the website Ancestry, I was very cautious about children attributed to the family who were born before the couple married. Where I did not have a birth registration for the child in the husband's name, I often found a birth registration for the mother, but with another man listed as the father. In these cases, the husband had taken his wife's illegitimate child into the family and given the child his surname. In several instances, I found that a child listed as the youngest in the family was the illegitimate child of one of the older daughters.

Another problem that I encountered was that children sometimes changed their names in adulthood. A child who was called 'Charles George' at birth changed his name to 'Claude Carlos George' in adulthood, presumably to distinguish himself from his brother who was called 'Charles Henry'. Children often used their second names, rather than their first and sometimes had unusual nicknames, for instance, 'Frederick' was called 'Eric'.

The following examples show the use of various sources in tracking unregistered births.

- William Ritchie and Margaret Fawns married in Morven in 1860. I found five children in the birth registration data: three sons and two daughters. These children were born in 1861, 1863, 1864, 1868 and 1870. William was a solicitor in Launceston throughout his career and when he died in 1897, his obituary was published in The Examiner (Launceston). In the obituary, it stated that he left a widow and six children, three sons and three daughters. It also said that one of the daughters had married the previous year to William G. Baird, a bank manager. I searched for this marriage and found that the daughter referred to was the missing child, Florence Margaret Ritchie. She married William in October 1896 at the age of 29 years, and her sister Elizabeth Agnes Ritchie was a witness at her wedding. I thus estimated Florence's year of birth as 1867, meaning that her birth filled a gap between a birth in October 1864 and the following birth in November 1868.
- Donald McKenzie married Marjorie McDonald in Launceston in 1870. They had six children, whose births were registered: John (1872), Jeannie (1875), Margaret (1881), Ann (1883), Mary (1885) and Donald James (1887). All the children were born at around 2 year

intervals, except for a 6 year gap between Jeannie and Margaret. Donald McKenzie died in January 1916 and his death certificate was signed by 'his son Lachlan'. I found a notice of Lachlan McKenzie's death in *The Examiner* on the 4 April, 1951. The notice said that Lachlan was the brother of John, Jeannie, Alexander, Margaret, Ann, Mary and James. It also said that Lachlan had served in the A.I.F. (Australian Imperial Force—World War One). When I looked up the World War One Embarkation records, I found that Lachlan McKenzie, aged 37, a farmer in Glengarry, along with his brother Donald James, aged 28, a sawmill hand, also of Glengarry, had enlisted on 31 May, 1916. Both men gave their next of kin as their brother John McKenzie, also of Glengarry. Lachlan's estimated year of birth was 1879. Since Alexander was listed between Jeannie and Margaret in the newspaper obituary, I estimated his year of birth as 1877, thus filling the 6 year gap between two registered births.

- John MacLaine and Emily Salier were married in Hobart in 1870 and went to live on Clarke's Island, which is located 24 kilometres off the north east coast of Tasmania. They had 11 children, several of whom were unregistered. Several Ancestry family trees said that the couple had twins, born on the 8 July, 1877. I could not find any birth registrations, but by searching the Australian digitised newspapers I found the following birth announcement: ' *MACLAINE: On Clarke's Island on the 8th July, the wife of J.Maclaine, of twins (son and daughter)*' (*The Mercury* , 1 October 1877)

I cannot claim to have traced all unregistered births to the complete group in the four cohorts, but I have made every effort to find as many as possible. In the process of finding unregistered births in Tasmania, I was also able to find other unregistered births that occurred in other colonies or in New Zealand.

My estimates of unregistered Tasmanian births are consistent with Kippen's findings outlined above in that they show that the proportion of Tasmanian births that were not registered fell steadily from the 1860s to the first two decades of the 20th century (Table 4.1). While 6.8 per cent of the 1860s births to the complete group were not registered, this proportion fell to 1.7 per cent for births in the 1890s and to under 1 per cent for births in the first two decades of the 20th century.

Table 4.1 Unregistered births and total births for children born in Tasmania, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania.			
	Unregistered births	Total births	
Year of birth	*No.*	*No.*	*Per cent of total births*
1860-69	64	939	6.8
1870-79	66	1,667	4.0
1880-89	65	2,563	2.5
1890-99	50	2,955	1.7
1900-09	7	976	0.7
1910-19	1	130	0.8
Total	254	9,231	2.6

The proportion of couples with one or more unregistered births fell markedly from 24.6 per cent for the 1860 cohort to 4.0 per cent for the 1890 cohort (Table 4.2). The extent of under-registration was related to the year of the birth, however, not to the marriage cohort. A slightly higher proportion of couples marrying in 1860, for instance, registered their 1870s births compared with couples marrying in 1870—3.2 per cent of 1870 births to the 1860 cohort were unregistered compared with 4.4 per cent of 1870 births to the 1870 cohort. Several families had more than one unregistered birth, with 62 families in the 1860 cohort, for instance, having a total of 85 unregistered births. Many of these families were Catholics, who were less likely to register their births than parents from other religions, in every marriage cohort. In 1860, for example, Catholic families accounted for 12.5 per cent of complete families, but 19.0 per cent of those who had unregistered births. In an extreme case, one Catholic family in the 1870 cohort had all their children baptised, but none of the births was registered.

Table 4.2. Couples with unregistered births in Tasmania as a proportion of couples with at least one birth in Tasmania, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania.			
	Couples with unregistered births	Total couples	
Marriage cohort	*No.*	*No.*	*Per cent of all couples*
1860	62	256	24.2
1870	48	286	16.8
1880	44	417	10.6
1890	21	529	4.0
Total	182	1442	11.8

Date of birth

As noted above, full date of birth was missing for some of the unregistered births. Similarly for births in NSW, VIC, WA and NZ birth indexes gave only year of birth, not date and month of birth. I

found some full birth dates from notices in the digitised newspapers or from the family histories on Ancestry. For some births I had month of birth, but for the others I imputed a birth month based on the birth spacing in the family. A birth day of 30 was imputed where the birth month was June, and a day of 15 for every other month.

Missing (full) dates of birth were much more of an issue for children born outside Tasmania. In the complete group, day of birth was missing for 626 of the 952 births occurring outside Tasmania, compared with 136 of the 9,235 births occurring in Tasmania. I ran the multivariate analysis on birth spacing for the complete group excluding families who had no children born in Tasmania and had identical results to the analysis for the entire group (see Chapter 7), indicating that the imputation of birth dates had little impact on the birth spacing analysis.

Stillbirths

Data on the reconstituted families only include births that were 'live births' and do not include 'still births', since parents were not required to register stillbirths as either births or deaths in 19th century Tasmania (Kippen 2002a). Although there were 179 stillbirths registered as 'deaths' in the Tasdeaths database, only three of these births occurred after 1869 and most occurred before 1860.

The family reconstitution data suggest that there was probably a change in the definition of 'live births' at some time in the 1860s. Data on infant deaths show that in the 1860 marriage cohort the proportion of deaths occurring on the same day as the birth was much lower than in the three later cohorts. In the 1860 cohort, only 3 of the 129 infant deaths occurred on the day that the infant was born, compared with 28 of the 158 infant deaths in the 1870 cohort, 22 of the 219 infant deaths in the 1880 cohort and 20 of the 191 infant deaths in the 1890 cohort. This strongly suggests that prior to the late 1860s, when infants died within a few hours of birth, many births were classified as stillbirths and neither the birth nor death was registered (Kippen 2002a). This suggests another source of under-registration for births as well as deaths during this period. From the late 1860s onwards, most infants who were alive at birth but died shortly afterwards were classified as 'live births' and both their birth and their death were registered.

Ex-nuptial births

As noted above, there is some evidence that ex-nuptial births were less likely to be registered than births within marriage. Where Tasmanian ex-nuptial births were registered, it was often difficult to

allocate a birth to a woman in my study because of insufficient information on the registration certificate. Thus, ex-nuptial births were mainly allocated to women with unusual names living in small towns or remote areas. For instance, it was relatively easy to allocate a birth to 'Sedina Woodlands' living in Glamorgan, but impossible to know if the birth to 'Mary Ann Jones' living in Hobart was to the woman in my study unless I found evidence from other sources. It was also very difficult to find ex-nuptial births that occurred outside Tasmania. In cases where a woman had more than one ex-nuptial birth, however, I had sufficient information to be confident that I had allocated the births correctly.

In cases where I could ascertain that the wife had had an ex-nuptial birth and there was no father named on the birth certificate, it was impossible to tell whether this was a birth to the couple who later married. Unless, I had evidence to the contrary, I made the assumption that the husband was not the child's father.

The number of women that I identified as having an ex-nuptial birth prior to marriage to a man other than the husband was relatively small. In 1860, for instance, only 8 out of 482 women in their first marriage with at least one child of that marriage had one ex-nuptial child with another man prior to marriage. It is highly likely that this understates the number with an ex-nuptial birth because of the problems of under-registration and of correctly allocating those ex-nuptial births that were registered. For these reasons, I did not use data on these ex-nuptial children in my analysis of completed fertility.

In relation to all births outside marriage, I excluded a small number of couples who had one or more births before their marriage from the fertility analysis because the timing of their births was different from other couples in the marriage cohort, for instance, their marriage took place between the first and second births, or between the second and third births or even later. A few couples had a number of children several years before they married, suggesting that the husband may not have been free to marry. I also excluded a very small number of couples where the woman had several ex-nuptial births with another man or men before her marriage, since I reasoned that her birth patterns more closely resembled those of widows.

Widows and widowers

It was difficult to find a prior marriage and children for widows and widowers, particularly for the earlier marriage cohorts, since many people had married in other places and had children there before settling in Tasmania. Although there were marriage indexes for the other colonies, there

was insufficient information on these indexes to identify couples. Tracing marriages where the woman had children in the cohort marriage was easier, since I was able to use both the woman's maiden name and her previous husband's last name.

I found some prior marriages that had taken place in Tasmania through checking the names and ages of the partners at the first marriage, the dates of birth of any children, the death of the previous spouse and the widow or widower's details at marriage. For some widows or widowers, I found Tasmanian-born children from the previous marriage and the previous spouse's death, but was unable to find a marriage. These marriages would have taken place outside the colony and other children may have been born to the marriage before the couple arrived in Tasmania.

Although I would have liked to have used the data on widowers and their previous issue in the fertility analysis, the data were not of sufficient quality. Data on widows and their issue are presented in the descriptive analysis (see Chapter 5).

Missing data

Marital status

Marital status was missing for a relatively large proportion of husbands in the 1860 and 1870 cohorts and a smaller proportion of wives, but the recording of marital status improved in the two later cohorts (see Tables 5.2, A5.8, A5.9). Where a woman's marital status was missing and the woman had children from the cohort marriage, I checked the mother's name in the birth registrations. Because of the naming practices for widows, noted above, if the last name given in the birth registration/s was different from the last name at marriage, then the woman was classified as a widow. Where husband's marital status was missing, I tried to find a previous marriage and/or children from that marriage to ascertain if he was a widower or bachelor.

In a small number of cases men and women stated that they were a 'Bachelor' or 'Spinster', but I found a previous marriage for the person, children of that marriage and the death of the previous spouse. In my analysis, I classified these people as a widow or widower, rather than the status they gave at the marriage.

Age of husband and wife

Where an actual age at marriage was provided, I used these data to estimate the year of birth from the year of marriage. In a proportion of marriages, age was given only as 'of age' or 'not of age', that is, the person was or was not of a legal age to marry without consent of their parents. If I

found the husband's or wife's death, I estimated birth year from age at death—either from the death registration data or from other sources such as the digitized newspapers or the Australian Cemetery Index. For those cases where I did not have actual age at marriage or age at death, I tried to find the husband or wife's date of birth. It was easier to find date of birth for the two later cohorts since a much higher proportion of spouses were born in Tasmania. However, it was harder to find age at death for the later cohorts, since many of the husbands and wives died in the 1940s and 1950s.

I concentrated my efforts on finding the birth year of the parents of my complete group, since 'age' was a crucial variable for my analysis. For the complete group, I obtained the age (or an estimate of the age) of all mothers in the 1860 and 1870 cohorts and 99 per cent of mothers in the two later cohorts (See Table 5.3). I also obtained data on the age of 98–99 per cent of their husbands (see Table 5.4).

Occupational status

Data on Tasmanian births from 1900 onwards were derived from the Tasmanian Federation Index, which did not contain details of husband's occupation. Data indexes for other colonies and for New Zealand also did not provide information on occupation. In some instances, I was able to find information from sources such as digitised newspapers, or electoral rolls. Where a child or parent had died in Tasmania in the early 20th century, I was able to obtain information on husband's occupation from the digitised death record.

In the bivariate analysis, I used occupation at the birth of the first child, since the data were of better quality than occupation at marriage. Where occupation at the birth of the first child was missing and I could not find any information on husband's occupation at the birth of the next child, I used husband's occupation at marriage. In the multivariate analysis, where occupation was missing for children other than the first, I used occupation at the birth of the previous child (Vézina et al. 2014).

Although information on women's occupation was recorded on the marriage registration certificate, these data were missing for around three-quarters of couples in the earlier three cohorts. Most of the female occupations listed for women in these cohorts were servant, dressmaker, free or farmer's daughter. Occupation at marriage was recorded for around half of women in the 1890 cohort, but these occupations were mainly domestic, servant or daughter of a farmer (or labourer, or carpenter). Mother's occupation was not recorded on the birth

registration certificate. Married women's occupation on the death certificate either related to their husband's occupation—for instance, widow (wife) of farmer—or was listed as 'domestic duties'.

Summary of accuracy

Throughout the family reconstitutions, I was very careful to avoid recording information unless it was able to be verified. In the end, I have a high degree of confidence about the accuracy and completeness of the family histories in my complete group. This gives me a database with complete birth histories of couples in all social strata of Tasmania, including those who left Tasmania either temporarily or permanently at some time after they married. This database is used in the descriptive analysis of the marriage cohorts in Chapter 5, in the bivariate analyses of the fertility of couples in the complete group in Chapter 6 and in the bivariate and multivariate analyses of starting, stopping and spacing behaviour in Chapter 7.

Chapter 5

Characteristics of the Tasmanian marriage cohorts

This chapter describes the characteristics of the group of interest in the analysis of the Tasmanian historical fertility decline, that is, the complete group, where women were in their first marriage, had at least one child of that marriage and both partners survived the wife's childbearing years. The chapter examines these couples according to their characteristics at marriage—marital status, age at marriage, age difference, religion and whether or not the husband and/or wife signed the marriage register. Husband's socioeconomic status and the couple's geographic location, two important characteristics relating to theories of fertility decline, are also examined. Although the discussion concentrates on the complete group, where data are available, their characteristics are compared with those of two other groups in the marriage cohorts—the 'incomplete' and 'unobserved' groups (Box 5.1).

Box 5.1 Complete, incomplete and unobserved groups

Complete group—couples where the wife was in her first marriage, there were children of the marriage and the husband and wife survived the wife's childbearing years

Incomplete group— couples where the wife was in her first marriage, there were children of the marriage and the husband and/or wife died during the wife's childbearing years.

Unobserved group— couples where the wife was in her first marriage, there were children of the marriage and could not be traced to the end of the wife's childbearing years.

In the first section of this chapter, I describe the types of marriages in each of the four marriage cohorts, in order to look at the complete group in the context of the entire marriage cohort.

Types of marriage

The four Tasmanian marriage cohorts were not only different in size, but also in composition. The smallest marriage cohort was the 1870 cohort with 673 couples while the 1890 cohort was the largest with 952 couples (Table 5.1).

Table 5.1 Type of marriage: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Type of marriage	Per cent			
Widow at marriage	14.6	15.2	11	8.5
Wife's first marriage, no children (1)	12.1	11.7	10.9	10.7
Wife's marital status unknown, no children (1)	5.8	2.5	0.6	0.4
Wife's first marriage with children	67.6	70.6	78.1	80.4
Complete	*53.1*	*59.6*	*63.1*	*69.2*
Incomplete	*25.1*	*25.7*	*23.6*	*21.2*
Unobserved	*15.6*	*8.4*	*8.9*	*6.5*
Premarital births	*6.2*	*6.3*	*4.4*	*3.1*
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	713	673	846	952

(1) No children were found of the marriage cohort

Widows made up a much larger proportion of the women marrying in the early cohorts, accounting for around 15 per cent of women marrying in 1860 and 1870, but only 8.5 per cent in 1890 (Table 5.1). Several of these women had Tasmanian-born children from their previous marriage, some had children of the cohort marriage and some had both (Table A5.1).

Women in their first marriage with no children of that marriage accounted for around 11–12 per cent of every marriage cohort (Table 5.1). It was often difficult to trace these couples after their marriage, but some of these couples separated or divorced during the wife's childbearing years, while in other cases the husband and/or wife died during these years (Table A5.2). While I could not find any children of the cohort marriage, in some instances I found that the wife had an ex-nuptial child before marriage or that she had a child or children to another man after the cohort marriage ended.

In every marriage cohort, there was a small proportion of *women without children whose marital status was unknown* (Table 5.1). However, the recording of marital status improved in the late half of the 19th century, so that this proportion dropped from 5.8 per cent of women in the 1860 cohort to 0.4 per cent in the 1890 cohort. The age distribution of these women suggests that some were widows and others single at marriage (Table A5.3). A few of these women had children in another relationship (Table A5.4)

Women who were in their first marriage and had children of that marriage accounted for two-thirds of women marrying in 1860, but this rose to 80 per cent by 1890 (Table 5.1).

Of this group, the proportion where both partners survived the wife's childbearing years—the *Complete* group— increased from just over half in 1860 to around two-thirds in 1890. The vast majority of these couples both survived until the wife turned 50 years. However, there was a small proportion where both partners did not survive until the wife turned 50 but there was a very high probability that the couple had completed their childbearing (see Chapter 4).

The proportion of couples where the husband and/or wife died before the wife turned 50, and they had not completed their childbearing—the *Incomplete* group— fell slightly from 25.1 per cent in 1860 to 21.2 per cent in 1890. A small number of these couples were separated or divorced (Table A5.5). In all cohorts except the 1890 cohort, a higher proportion of husbands died than wives. Several widows re-partnered and had more children in the subsequent relationship.

The *Unobserved* group consists of couples whom I could not trace to the end of the wife's childbearing years. They accounted for 15.6 per cent of couples with children in the 1860 cohort, but fell to 6.5 per cent in the 1890 cohort (Table 5.1). As noted in Chapter 4, it was considerably more difficult to trace couples in the 1860 cohort than in later marriage cohorts.

Couples with premarital births, that is, couples who had a birth before marriage or where the wife had two or more ex-nuptial births before marriage to another man, halved from 6.2 per cent in 1860 to 3.1 per cent in 1890 (Tables 5.1, A5.6). Some of these couples survived the wife's childbearing years, in others one spouse died, while others had unobserved outcomes (Table A5.7). As discussed in Chapter 4, these couples are excluded from the fertility analysis.

Characteristics of the complete, incomplete and unobserved groups

Marital status of husband and wife

It is difficult to comment on the marital status of men marrying in the two earlier marriage cohorts, because so much of the data are missing. However, in 1880 and 1890 it is clear that in the complete group the vast majority of women married bachelors, with only a very small proportion marrying widowers (Table 5.2). The trends for the incomplete and unobserved groups were similar (Tables A5.8, A5.9).

Table 5.2 Marital status of husband and wife, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Marital status of husband and wife at marriage	Percent			
Wife and Husband's marital status not given (1)	14.8	11.0	0.2	1.5
Spinster, husband's marital status not given	20.7	14.1	0.2	0.2
Spinster married Bachelor	57.0	69.6	92.8	94.1
Spinster married Widower	7.4	5.3	6.7	4.2
Total (per cent)	100	100	100	100
Total (no.)	256	283	417	529

(1) Wife's marital status was determined from other information if not given

Wife's age at marriage

Legally, husbands and wives who were single at marriage could not marry if they were under 21 years of age unless they had obtained their parents' consent to the marriage. Most women in the complete group were young at marriage, with the mean age of marriage being 21.5 years (median 21.5) for the 1860 cohort, increasing to 23.1 years for the 1890 cohort (median 22.3) (Table 5.3).

Table 5.3: Wife's age at marriage, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	*Per cent*			
Less than 20 years	*38.3*	*35.3*	*30.5*	*21.4*
Less than 21 years	49.6	46.6	45.8	31.2
21-24 years	34.4	33.2	37.6	40.3
25-29 years	11.3	14.8	9.6	20.8
30-34 years	3.9	4.2	4.8	5.8
35-39 years	0.8	1.1	1.4	0.8
40-44 years	0.0	0.0	0.0	0.2
Missing	0.0	0.0	0.7	0.9
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529
Mean/Median	*Age at marriage*			
Mean (1)	21.5	22.0	22.0	23.1
Median (1)	21.0	21.3	21.2	22.3

(1) Excludes missing data.

Just under half of women in the first three marriage cohorts were under 21 years at marriage, but this fell sharply to 31.2 per cent for the 1890 cohort. The proportion of women marrying as teenagers also fell markedly between the 1860 and 1890 cohorts, from 38.3 per cent to 21.4 per cent, while the proportion marrying at age 25–29 years almost doubled over the four marriage

cohorts. These differences are not explained by differences in the age structure of the population (Table 3.3, A3.2), but may be related to the increase in the ratio of unmarried women to unmarried men in the marriageable age group (see Chapter 3).

Wives in the incomplete group tended to be slightly younger than in the complete group (Table A5.10). It is difficult to draw conclusions for the unobserved group because of the high proportions of women for whom age is missing (Table A5.11).

The high proportion of women in Tasmania marrying at a young age is consistent with trends in similar 19th century frontier societies (Bean et al 1992; Gauvreau 1992 cited in Vézina et al. 2014). Mean age at marriage for those marrying in the Saguenay region of Quebec, for example, was around 21–22 years for those marrying in the 2nd half of the 19th century (Vézina et al. 2014).

The somewhat later age of marriage for women in the 1890 Tasmanian cohort is similar to trends in other Australian colonies. Women marrying in Victoria in 1881 and 1891 and in South Australia in 1891 also married at a somewhat older age than in previous years (McDonald 1974). McDonald attributes this partly to the idea of a 'proper time to marry', that is, the need to maintain living standards for the middle classes and the rising aspirations of the working class.

Husband's age at marriage

On average, men in the complete group were 5 or 6 years older than their wives with the mean age at marriage for men being 26–27 years (Table 5.4). Mean age at marriage fell from 27.6 years (median 26.7) for the 1860 cohort (median 24.8) to 26.2 years (median 24.5 years) for the 1870 cohort and then increased to 26.8 years (median 25.4) for the 1890 cohort. Unlike women, in every marriage cohort only a small proportion of men married under the age of consent. The proportion of men marrying at age 35 and older was higher in 1860 than in the other three marriage cohorts, with 15.3 per cent of men being 35 years or older in 1860 compared with 9–10 per cent in the other cohorts. This is consistent with changes in the age structure of the male population in Tasmania over this period, with the male population becoming younger between 1861 and 1891 (Table 3.4, A3.3).

Table 5.4 Husband's age at marriage, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	*Per cent*			
Less than 21 years	9.8	11.3	7.7	8.3
21-24 years	31.3	42.8	44.6	36.1
25-29 years	31.6	23.7	29.5	32.5
30-34 years	12.1	12.4	9.1	14.0
35-39 years	9.0	4.9	5.0	4.2
40-44 years	3.5	0.7	1.4	3.0
45 years and older	1.6	2.8	0.7	0.8
Missing	1.2	1.4	1.9	1.1
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529
Mean/Median	*Age at marriage*			
Mean (1)	27.6	26.2	26.0	26.8
Median (1)	26.7	24.5	24.8	25.4

(1) Excludes missing data.

Age of husband at marriage was very similar for the incomplete group in the 1880 and 1890 cohorts. However, it is difficult to comment on the age distribution of men in the other cohorts or in the unobserved group, because of the relatively high proportion of men for whom age is missing (Tables A5.12, A5.13).

Age difference between husband and wife

Although on average husbands were older than their wives, a slightly different picture emerges when looking at the actual age difference between spouses (Table 5.5). In the complete group, the largest proportion of couples was those in which men were the same age as their wives or up to four years older, ranging from 36.7 per cent of the 1860 cohort to 46.1 per cent of the 1890 cohort. Men in the 1860 cohort were more likely to be much older than their wives: just over half of men in the 1860 cohort were five or more years older than their wives compared with around a third in the other marriage cohorts. A quarter of all men in the 1860 cohort were 10 or more years older than their spouse. In contrast, women in the 1860 marriage cohort were less likely to be older than their husbands: around 10 per cent of women in the 1860 marriage cohort were older than their husbands, compared with 17–18 per cent of wives in all other cohorts. These differences may be related to changes in the age structure of the male population over the period.

Table 5.5 Age difference between husband and wife at marriage, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age difference	Per cent			
Wife 5 or more years older	1.2	1.1	3.2	2.3
Wife 1–4 years older	8.6	16.6	13.7	16.1
Same age or Husband 1–4 years older	36.7	43.5	44.8	46.1
Husband 5–9 years older	27.3	20.1	24.5	20.8
Husband 10–14 years older	16.8	11.0	8.4	9.2
Husband 15 or more years older	8.2	6.4	3.8	3.6
Husband and/or wife's age unknown.	1.2	1.4	1.9	1.9
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

In the 1880 and 1890 cohorts, husbands in the incomplete group were more likely than those in the complete group to be much older than their wives: around 20 per cent of men in the incomplete group were 10 or more years older than their wives compared with around 12 per cent in the complete group (Table A5.14). It is difficult to compare the difference in age for the couples in the other cohorts or in the unobserved group because of the relatively large proportion of couples where husband's and/or wife's age is missing (Tables A5.14, A5.15).

Religion

Almost all couples in the complete group were married by a minister of religion, either in a church or a minister's house, although some couples were married by a minister in a private residence. Only four couples were married in a civil ceremony in a registry office, one in 1880 and three in 1890.

Couples were married according to several different types of religious rites (Table 5.6). Couples married according to the rites of the Church of England or the United Church of England and Ireland are classified as *Anglican* and those married according to the rites of the Holy Catholic Church as *Catholics*. *Presbyterians* consist of couples marrying according to the rites of the (Free) Presbyterian Church, and the (Free) Church of Scotland. *Methodists* are couples who married according to the rites of the Wesleyan Methodist Church, the Primitive Methodist Church and the United Free Methodist Church. *Other Nonconformists* consist of couples who married according to the rites of the Baptist Church, Congregational / Independent Church, the Christian Mission Church and those marrying in a civil ceremony. The composition of Other Nonconformists changed over the marriage cohorts with Congregationalists/Independents accounting for almost all the group in

the 1860 and 1870 cohorts, but Baptists making up half the group in the 1890 cohort (Table A5.16). A very small number of couples in all cohorts married in two ceremonies, as Catholics and according to the rites of another religion. I have classified these couples as Catholics for the purposes of the fertility analysis.

Anglicans made up just under half of the complete group marrying in 1860, but this fell over the four marriage cohorts to just under a third in 1890 (Table 5.6). Catholics comprised 9–12 per cent of couples in every marriage cohort and Presbyterians 13–17 per cent. Methodists and Other Nonconformists accounted for an increasing proportion of couples marrying in each cohort. Between 1860 and 1890, the proportion of Methodists increased from 13.3 per cent to 22.3 per cent, while Other Nonconformists increased from 11.3 per cent to 20.0 per cent.

Table 5.6 Type of religion at marriage, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Type of religion at marriage	Per cent			
Anglican	45.7	37.1	33.3	31.8
Catholic	12.5	8.8	12.5	10.0
Presbyterians	16.8	13.8	12.9	15.8
Methodist	13.3	19.1	23.3	22.3
Other Nonconformists	11.3	21.2	18.0	20.0
Missing	0.4	0.0	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

It is difficult to compare the distribution of religion at marriage for the complete group with population data, since the census data are not disaggregated by age or sex and include persons under 15 years of age and over 45 years, that is, who were not in the 'marrying ages' (Table 3.6). In both 1861 and 1870, Catholics accounted for around 22 per cent of the population of Tasmania, but the Catholic population consisted of a large proportion of Irish ex-convicts who would have been over 45 years of age (Alexander 2014).

Couples in the incomplete group were very similar to the complete group in their religious denomination at marriage (Table A5.17). In most cohorts, couples in the unobserved group were more like to be Catholic or Other Nonconformist and less likely to be Anglican or Methodist than those in the other two groups (Table A5.18).

Signing the marriage register

Both husband and wife signed the marriage register in most marriages in the complete group, with the proportion increasing from 76.2 per cent in the 1860 cohort to 94.9 per cent in the 1890 cohort (Table 5.7). This increase reflects the introduction of state compulsory education in 1868 and the subsequent increase in literacy over the period (Table 3.8). In only a very small proportion of couples neither husband nor wife signed the marriage register, with the proportion falling from 6.6 per cent to 0.8 per cent between the 1860 and 1890 cohorts. These trends are very similar to population trends, with the proportion of the population (of any age) being able to read and write increasing from 53.7 per cent to 70.3 per cent between 1861 and 1891 (Table 3.8). The proportion of couples in the 1890 cohort in which both husband and wife signed the register—94.9 per cent—was very similar to the proportion of the Tasmanian population aged 20–29 years who could read and write—93.3 per cent (TAS 1891: 04_90).

Table 5.7 Whether husband and/or wife signed the marriage register, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Signing the marriage register	Per cent			
Both husband and wife signed	76.2	80.6	86.8	94.9
Wife did not sign, husband signed	9.8	7.8	4.8	1.3
Husband did not sign, wife signed	7.4	6.4	7.0	3.0
Neither husband nor wife signed	6.6	5.3	1.4	0.8
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

These trends were very similar for the incomplete and the unobserved groups (Tables A5.19, A5.20). However, husbands and wives in the unobserved group were less likely sign the register than in the other two groups, particularly in the three later marriage cohorts.

Occupation and socio-economic status

As outlined in Chapter 4, husband's occupation was obtained from the birth registration data or imputed from other sources. Data on women's occupation were not available. In 19th century Tasmania married women were unlikely to work outside the home, although many women helped in the family business or on the farm and some women took in washing or sewing at home (see Chapter 3).

As noted in Chapter 4, for the bivariate analysis in this chapter and in Chapter 6, I examine husband's occupation and socioeconomic status according to his occupation at the birth of the first child and in the multivariate analysis I use husband's occupation at the birth of each specific child. This is important since occupation and socioeconomic status could change over the course of the wife's childbearing years. The more births the couple had, the more information is available about changes in the husband's occupation. However, if a couple had a small number of births in a relatively short time period, the opportunity to observe occupational change is very limited.

It is also important to note that the composition of various socio-economic groups may have changed between the marriage cohorts. For example, given the changes in farming that occurred in Tasmania in the second half of the 19th century with the growth of selectors, the waning importance of sheep farming and increasing importance of fruit growing, farmers in the 1860 may have been quite a different group from those in the 1890 cohort.

The occupational data in the Tasmanian Civil Registration Database were classified to the detailed five digit classification system of the Historical International Classification of Occupations (HISCO) and then to the nine broad HISCO occupational groups (HISCO 2013). Each HISCO code was then classified to one of the 12 occupational HISCLASS categories to obtain a measure of socioeconomic status (Van Leeuwen and Maas 2005).

In all four marriage cohorts, the largest proportion of men in the complete group was engaged in mining, manufacturing and transport (Table 5.8). More than a third of men in the 1860 and 1870 cohorts were engaged in agriculture, forestry, fishery and hunting, but this dropped to a quarter in the 1880 and 1890 cohorts, with a corresponding rise in the proportions engaged in mining, manufacturing and transport. The proportion of men who were professional, administrative, clerical, sales or service workers was lowest in 1870 at 16.3 per cent but had risen to 21 per cent by 1890.

These trends mirror change in economic conditions in Tasmania over the period and are consistent with trends in the broad occupational data for the Tasmanian population (Tables A3.5–A3.7). Examination of the detailed occupational data in the four marriage cohorts (Moyle 2012) show an increase in the diversity of occupations that occurred in late 19th century Australia (McDonald 1974). New occupations, such as mining manager, railway porter, coffee house proprietor and pastry cook appeared from 1880 onwards. Specialist shopkeepers, such as florists, tobacconists and wine merchants also became more common, reflecting improving living standards.

Table 5.8 Husband's occupational group (HISCO) at the birth of the first child, complete group: 1860, 1870 , 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
HISCO occupational group	Per cent			
Professional, technical & related workers	5.1	4.2	5.0	5.3
Administrative & managerial workers	1.2	2.5	2.6	4.5
Clerical & related workers	5.1	2.8	3.6	4.7
Sales workers	3.9	3.9	3.4	4.7
Service workers	2.0	2.8	3.4	1.7
Agricultural, forestry, fishery, hunting	35.2	41.0	27.8	26.3
Mining, manufacturing and transport	46.5	42.0	53.7	52.0
Missing	1.2	0.7	0.5	0.8
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

The proportion of men engaged in mining, manufacturing and transport was higher for the unobserved group, than for the other two groups, particularly in the three later marriage cohorts (Tables A5.21, A5.22). In the 1890 cohort, for instance, 68 per cent of men in the unobserved group worked in mining, manufacturing and transport compared with 52 per cent of men in the complete group and 58 per cent in the incomplete group. In contrast, a lower proportion of men in the unobserved group were engaged in agriculture, forestry, fishing and hunting. Only 12.0 per cent of men in the unobserved group in the 1890 cohort worked in agriculture, forestry, fishing and hunting compared with 26.3 per cent of the complete group and 21 per cent of the incomplete group.

In relation to socioeconomic status based on HISCLASS, farmers accounted for around a quarter of all workers in the complete group, except in the 1870 cohort where they accounted for more than a third (Table 5.9). The proportion of workers who were unskilled workers was 32.4 per cent in the 1860 cohort, but fell to 25.6 per cent in the 1890 cohort, mainly because of the fall in the proportion of unskilled farm workers. The proportion of lower skilled and of managerial, professional, clerical and sales workers increased between the 1860 and 1890 cohorts, from 7 per cent to 14 per cent for lower skilled workers and from 16 per cent to 21 per cent for managerial, professional, clerical and sales workers. Skilled workers made up around 16 per cent of workers in all marriage cohorts. These data are not comparable with population census data (see Chapter 3) because the census did not classify occupation by socioeconomic status. However, these data appear to be consistent with the census data.

Table 5.9 Husband's socioeconomic status (HISCLASS) at the birth of the first child, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
HISCLASS group	Per cent			
Higher managers (1)	0.0	1.1	1.4	1.3
Higher professionals (2)	3.1	2.8	4.6	4.5
Lower managers (3)	1.6	2.5	1.9	4.7
Lower prof & clerical, sales (4)	7.4	6.0	5.3	6.6
Lower clerical & sales (5)	3.9	3.2	4.8	3.8
Foremen (6)	0.4	0.0	0.0	0.0
Skilled workers (7)	16.4	14.5	17.3	16.1
Farmers (8)	27.0	36.4	24.0	23.3
Lower skilled workers (9)	6.6	6.0	11.5	14.0
Lower skilled farm workers (10)	0.4	1.1	1.2	0.0
Unskilled workers (11)	24.2	22.3	25.4	22.6
Unskilled farm workers (12)	8.2	3.5	2.6	3.0
Missing	0.8	0.7	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

Men in the unobserved group were less likely to be farmers than those in the other two groups (Tables A5.23, A5.24). In the 1880 cohort, for example, only 10.2 per cent of men were farmers compared with 24 per cent of men in the complete group and 20.5 per cent in the incomplete group. They were also less likely to be managerial, professional, clerical and sales workers and more likely to be skilled workers than men in the other two groups. For example, skilled workers accounted for 24 per cent of men in the unobserved group in the 1890 cohort, compared with 16.1 per cent of men in the complete group and 17.9 per cent in the incomplete group.

In Table 5.9 (and the appendix tables), all men who gave their occupation as farmer are classified to the HISCLASS category Farmer (8). However the occupation farmer is difficult to classify, since the term can cover a wide range of circumstances (Van Leeuwen and Maas 2005). In 19th century Tasmania, there was a group of gentlemen farmers, many of whom owned large properties in the Tasmanian Midlands (Meikle 2011; Reynolds 1969, 2012). They called themselves farmers, but employed others to manage their land holdings. I reclassified farmers in the complete group to the HISCLASS category Higher Manager (1) if the husband or wife was a member of these large land-owning families that were identified in Boyce (2010) and Reynolds (1969, 2012). I also reclassified other men who identified themselves as gentleman farmer on their children's birth registrations to this category if I could find information supporting their claim, for instance, their marriage was reported in the newspaper and they were named as an Esquire or the son of an Esquire. The

number of farmers reclassified as Higher Manager (1) was 12 in 1860, 10 in 1870, 11 in 1880 and seven in 1890.

Because of small numbers in some HISCLASS groups, in the analyses that follow husband's socioeconomic status has been reclassified into five groups: *white-collar* (HISCLASS 1,2,3,4 and 5); *skilled workers* (6 and 7); *farmers* (8); *lower skilled workers* (9 and 10); and *unskilled workers* (11 and 12). With the reclassification of gentlemen farmers as higher managers, white-collar workers accounted for around 20 per cent of men in all marriage cohorts, while farmers made up around 22 per cent of every cohort except the 1870 cohort where they accounted for a third (Table 5.10). The 1870 group of farmers probably included a large group 'selectors', some of whom were unsuccessful at farming in the longer term.

Table 5.10 Husband's socioeconomic status at the birth of the first child, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Occupational status	Per cent			
White-collar	20.7	19.1	20.6	22.5
Skilled workers	16.8	14.5	17.3	16.1
Farmers	22.3	32.9	21.3	21.7
Lower skilled	7.0	7.1	12.7	14.0
Unskilled	32.4	25.8	28.1	25.7
Missing	0.8	0.7	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

As noted above, men did not necessarily stay in the same occupation over their wife's childbearing years. Around 40 per cent of men in the complete group in the three earlier marriage cohorts who had at least one child changed their socioeconomic status at some time between the birth of the first child and the birth of the last child (Table 5.11). Many also changed their occupation but stayed within the same socioeconomic status group. The patterns of change by socioeconomic status were varied: some men had the same socioeconomic status for most of the wife's childbearing years and then changed their occupation and status towards the end of this period; others had one occupation for the first few years, but changed their occupation and status for the remainder of the period; others changed their occupation and status at some time and then changed back to their previous occupation (and status) for the rest of the period; while others changed their occupation (and status) periodically.

Table 5.11 Occupational characteristics of husbands between first and last births for couples with more than one child, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Occupational characteristic	Per cent of total			
Changed occupational status	42.0	43.7	42.9	30.2
Was a farmer for some or all of the period	42.8	49.3	36.0	33.1

Note: Includes only couples with two or more children

One reason for these changes may be that a large proportion of men were farmers at some time over this period (Table 5.11). Some of these men may have taken up a different occupation because they were unsuccessful at farming, while others may have been selectors, who often worked as labourers, miners or sawyers while they were establishing their farms in the rugged and inaccessible country in the north of Tasmania (Reynolds 2012). The discovery of precious minerals in various parts of Tasmanian in the last three decades of the 19th century also encouraged men to leave their jobs and work as miners. The proportion of men who changed their occupational status and/or were ever a farmer was somewhat lower in the 1890 cohort. This is probably because the occupational data for 20th century births was of much poorer quality (see Chapter 4) and because people tended to have smaller families so that opportunities to observe occupational change were more limited, as noted above.

Geographic location

In examining the geographic area where the family lived, I used the location of the children's births rather than the location of the marriage. Couples were often married in a different location from that of the births of their first and subsequent children. For instance, a couple may have married in the bride's parents' house, but then gone to live in another location.

In 19th and early 20th century Tasmania, most children were born in the parents' home, although a small number were born in private hospitals (lying-in homes); births did not take place in public hospitals until well into the 20th century. Only nine of the 2,974 births to the 1890 cohort took place in a public hospital. There are a small number of cases where it appears that a woman may have come from the country to give birth in a hospital in Hobart or Launceston, but in the vast majority of cases the location of the place of birth was the same as the location of the family's residence.

When I began to develop a classification of geographic location of the family's residence, I wanted to use a measure which discriminated between rural and more remote geographic areas and

differentiated the population living in large towns such as Devonport and Beaconsfield from the population living in the smaller hamlets (See Chapter 3, Table A3.12). However, prior to 1896, although parents were required to register the 'place of birth' (see Tasbirths Chapter 4), only registration district was recorded on most birth registrations. Rural registration districts covered both regional towns and more remote areas. Boundaries often changed and the number of registration districts increased markedly between 1859 and 1913, from 30 to 55 (Archives Office of Tasmania 2014). From 1896 onwards the name of the place where a child was born was included on all birth registrations, probably because the 1895 Registration Act brought in a fine of £10 for parents who 'did not give to the Registrar….information of the particulars required to be registered' (Tasmania 1895). Even where a place name was given, however, this often covered a large area, for instance, a mining town and the agricultural areas surrounding that town. This made it impossible to develop a consistent, detailed geographic classification for the four marriage cohorts or even to develop a detailed classification for the last cohort.

For this reason, I assigned the Tasmanian births to an *urban* or *rural* category, with *urban* comprising the Hobart and Launceston registration districts and *rural* all other Tasmanian registration districts. Even this was not perfect, since both the Hobart and Launceston registration districts contained some outlying rural areas, such as Glenorchy in the Hobart registration district. Also births that occurred outside Tasmania were assigned to the category *Outside Tasmania*, since I did not always have the information to classify the location to an urban or rural category and numbers were relatively small.

The bivariate analysis in this chapter and in the following chapter is based on the type of geographic location at the birth of the couple's first child. As discussed in Chapter 4, however, many couples were very mobile and had children born in different geographic locations. A couple could move from an urban area to a rural area, for instance, or from an urban area in Tasmania to another colony. Many couples also moved within rural areas, for instance, from the Tasmanian midlands to the north-west of Tasmania. It is very difficult to develop data on moves within rural areas of Tasmania, because of the constant addition of new registration districts and changes in registration district boundaries. Similar to data on husband's occupation, the more births the couple had, the more information I have about their geographical mobility. As with occupational status, the actual geographic location at the time of a child's birth is used in the multivariate analysis.

Consistent with the spread of the population in Tasmania (See Chapter 3), a higher proportion of first births to all cohorts in the complete group were in areas outside Hobart and Launceston (rural) than in the two cities (urban) (Table 5.12). In the last three marriage cohorts around 60 per cent of first births were in Tasmanian rural districts, while 32–37 per cent were in urban areas. Only a small proportion of first births in all cohorts, 4–8 per cent, were outside Tasmania.

Table 5.12 Type of location of first birth, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania.

	1860	1870	1880	1890
Type of location	Per cent			
Urban	42.2	32.2	37.2	35.9
Rural	51.2	60.1	58.5	59.0
Outside Tasmania	6.6	7.8	4.3	5.1
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

In most marriage cohorts, couples in the unobserved group were more likely to have their first child in an urban area than couples in the other two groups (Tables A5.25, A5.26). In the 1870 cohort, for instance, 50.0 per cent of these couples had their first birth in an urban area, compared with 35.9 per cent of the complete group and 39.5 per cent of the incomplete group. In the 1870 cohort, a relatively high proportion of couples in the unobserved group, 17.5 per cent, had their first child outside Tasmania.

In order to look at geographic mobility, as measured by the location of couple's births, I developed a classification which categorised couples according to whether all their children were born in Tasmania, whether they had some births in Tasmania and one or more elsewhere, or whether all their children were born elsewhere. The proportion of couples having all births in Tasmania increased over the marriage cohorts, from 78.9 per cent to 88.7 per cent (Table 5.12). This was because of a decrease in the proportion of couples having some births in Tasmania and some elsewhere, from 15.2 per cent in the 1860 cohort to 7.4 per cent in the 1890 cohort. The proportion of couples having all births outside Tasmania was very small in all cohorts, from 3–6 per cent.

Table 5.13 Location of all births, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Location of family births	Per cent			
All births in Tasmania	78.9	82.7	87.1	88.7
Births in and outside Tasmania	15.2	11.7	10.1	7.4
All births outside Tasmania	5.9	5.7	2.9	4.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (number)	256	283	417	529

Even using such a broad measure as type of geographic location, it is clear that a substantial proportion of couples were mobile, particularly in the earliest cohort. In the 1860 cohort, a third of all couples changed their geographic location between their first and last births, for instance, they moved from an urban location to a rural location or from Tasmania to another colony (Table 5.14)

Table 5.14. Changes in type of geographic location (urban, rural, outside Tasmania) over the period between the first and last births for couples with more than one child, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Geographic mobility	Per cent			
Remained in same type of location	66.7	70.4	71.8	75.0
Changed type of geographic location	33.3	29.6	21.2	25.0
Total (per cent)	100	100	100	100
Total (number)	243	270	408	504

Note: includes only couples with two or more children

Summary

This chapter has examined the characteristics of three groups of couples in the four marriage cohorts where women were in their first marriage with at least one child of that marriage —the complete group, the incomplete group and the unobserved group. The analysis presented here indicates that there were very few differences between the three groups. While there were some small differences between the complete and the unobserved group, the unobserved group accounted for only a small proportion of all couples where women were in their first marriage and there was at least one child of that marriage. The analysis shows that the complete group is representative of women marrying for the first time in Tasmania who had children of that marriage and that it is highly appropriate to use this group to analyse the decline in marital fertility over the period.

Chapter 6

Fertility patterns of the couples in the marriage cohorts.

In this chapter, I undertake a bivariate analysis of the fertility of the complete group in the four marriage cohorts. I look at patterns of fertility and infant/young child mortality, mean (median) numbers of children according to family characterics and parity progression ratios. Data on fertility patterns of the incomplete and unobserved groups are presented where appropriate.

Patterns of fertility and infant/young child mortality

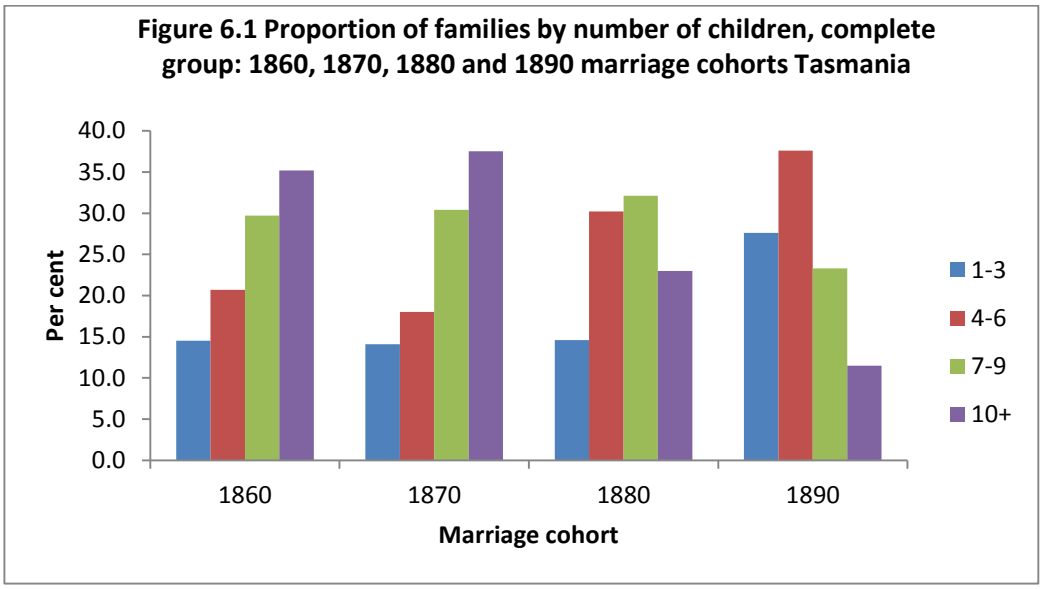
Marriage cohort

According to theories of why fertility declined, there would be differences in the fertility behaviour of the various marriage cohorts because they were having their children in very different time periods in Tasmanian society. There were marked differences between the earlier cohorts and the 1890 cohort in the mean (median) numbers of children ever born (Table 6.1). Families in the 1860 and 1870 cohorts tended to be very large with a mean of 7.84 children (median 8) for the 1860 cohort and 7.98 (median 8) for the 1870 cohort. The average number of children was somewhat lower for the 1880 cohort, with a mean of 7.06 (median 7), but fell markedly for the 1890 cohort to a mean of 5.62 (median 5).

The 1860/70 levels of completed fertility are very similar to the completed fertility of couples in Utah who married around the same time, although fertility declined more slowly in Utah. Completed fertility in Utah declined from a mean of 8.11 for couples married from 1860–1874 to a mean of 6.44 for the 1895–1904 marriage cohorts (Mineau et al. 2002).

Table 6.1 Number of children ever born, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
No of children	Per cent			
One	5.1	4.6	2.2	4.7
Two	3.5	3.9	4.3	10.0
Three	5.9	5.7	8.2	12.9
Four	3.9	4.6	8.2	12.9
Five	7.4	5.3	13.2	15.7
Six	9.4	8.1	8.9	9.1
Seven	8.6	10.2	10.8	8.7
Eight	11.7	10.2	9.4	8.1
Nine	9.4	9.9	12.0	6.4
Ten	11.7	11.7	9.8	3.2
Eleven	6.6	9.5	4.8	4.5
Twelve	6.6	7.8	3.8	2.1
Thirteen	6.6	3.9	1.7	0.8
Fourteen	2.0	2.5	1.2	0.4
Fifteen	1.6	1.4	1.4	0.4
Sixteen	0.0	0.7	0.2	0.2
Total (per cent)	100.0	100.0	100.0	100.0
Total (no)	256	283	417	529
Mean/Median	*Number of children ever born*			
Mean	7.84	7.98	7.06	5.62
Median	8	8	7	5

A relatively large proportion of couples in the 1860 and 1870 cohorts had very large families, with 35.2 per cent of the 1860 cohort and 37.5 per cent of the 1870 cohort having 10 or more children (Figure 6.1). The proportion of couples with very large families fell markedly in the 1880 cohort to 23.0 per cent and then halved in the 1890 cohort to 11.5 per cent. Similarly, the proportion of medium sized families, 4–6 children, increased from the 1870 to the 1880 cohort and then to the 1890 cohort. The proportion of small families, 1–3 children, remained at around 14 per cent for the three earlier cohorts, but almost doubled to 27.6 per cent in the 1890 cohort. The proportion of large families, 7–9 children, was around the same in the three earliest cohorts, but fell from the 1880 to the 1890 cohort.



Source: Table A6.1

Thus the fall in the mean number of children from the 1870 to the 1890 cohort was due to a decline in the proportions of large and very large families and an increase in the proportions of small and medium-sized families. This is consistent with trends in the fertility decline for Australia as a whole (see Figure 2.5). The fertility decline from the 1870 to the 1880 cohort was different from the decline from the 1880 to the 1890 cohort. The decrease in the proportion of very large families and increase in the proportion of medium sized families began in the 1880 cohort, while the decrease in the proportion of large families and increase in the proportion of small families did not occur until the 1890 cohort. This suggests that these two cohorts were stopping their childbearing at different parities. This will be investigated in the analysis of parity progression ratios.

Not surprisingly couples in the incomplete group had fewer children than the complete group, although in the three earlier cohorts around seven per cent of couples had 10 or more children by the time one spouse died (Table A6.2). Among the incomplete group, the proportion of couples in the 1890 cohort with very large families was very small—1.2 per cent. These women were no younger than women in the other cohorts when their childbearing was curtailed by death: 15.8 per cent of women in the 1890 cohort were 40 years or older when one spouse died, compared with 15.1 per cent of the 1880 cohort, 17.1 per cent of the 1870 cohort and 26.4 per cent of the 1860 cohort. The difference in the proportions of very large families probably reflects differences in fertility preferences between the 1890 cohort and the other cohorts. It is difficult to comment

on the fertility of the unobserved group, since I was not able to trace the family after the birth of the last child (Table A6.3).

Multiple births

The number of children ever born to a mother is not necessarily the same as her number of pregnancies because of the incidence of multiple births. The proportions of families in the four marriage cohorts having multiple births was small, ranging from 8.6 per cent in the 1860 cohort to 4.3 per cent in the 1890 cohort (Table 6.2). The fall in the proportion of couples with multiple births is related to the fall in the proportion of large families and in mother's age at last birth (see Table 7.3), since there are higher rates of twins at high parities and/or where mothers are older (Rao 1978). Twins made up only a tiny proportion of all pregnancies, falling from 1.3 per cent in the 1860 cohort to 0.8 per cent in the 1890 cohort.

Most multiple births were births of twins, although one couple in the 1880 cohort and one in the 1890 cohort had triplets. Some families had more than one set of twins. One couple in the 1860 cohort, three in the 1870 cohort and two in the 1880 cohort had two sets of twins, while one couple in the 1860 cohort had three sets of twins.

Table 6.2 Couples with multiple births, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Type of family	Per cent			
Multiple birth/s	8.6	8.5	5	4.3
Singletons only	91.4	91.5	94.7	95.7
Total (per cent)	100	100	100	100
Total (number)	256	283	417	530

A study of women born in Utah between 1807 and 1899 found that mothers with twins tended to have larger families than other mothers (Robson and Smith 2011). The authors concluded that mothers of twins had higher fecundity because of their genetic make-up (Robson and Smith 2012).

In all the Tasmanian marriage cohorts, couples with twins tended to have larger families than couples with singleton births only (Table 6.3). The difference between the two types of families was largest for the 1890 cohort, with families with twins having a mean of 8.13 children (median 8) and those without twins a mean of 5.51 (median 5). Fertility fell for both groups from the 1870 to the 1880 cohort, although the fall in fertility was steeper from the 1880 to the 1890 cohort.

Table 6.3 Mean and median numbers of children by singleton/multiple births, complete group; 1860, 1870, 1880 and 1890 cohorts				
	1860	1870	1880	1890
Multiple births	Mean			
Twins in family (1)	9.00	9.50	9.19	8.13
Singleton only	7.73	7.84	6.95	5.51
	Median			
Twins in family	8.5	10	10	8
Singleton only	8	8	7	5

(1) Means are illustrative only, because of small numbers in this group i.e. in 1860 n=22, in 1870 n=24, in 1880 n=21, in 1890 n=2

Deaths of infants and children under 5 years

In Tasmania as a whole, there were large fluctuations in infant mortality over the period 1860–1899, but the overall trend 'remained fairly flat' (Kippen 2002a: 65). In contrast, mortality of children aged 1–14 years fell over the same period, although there were some large annual fluctuations due to epidemics of measles and scarlet fever.

Consistent with these trends, in every marriage cohort there were between 64 and 74 infant deaths per 1,000 births (Table 6.4). In every cohort, male infants were more likely to die than female infants; for example, in the 1860 cohort there were 70 infant deaths per 1,000 male births compared with 56 infant deaths per 1,000 female births. The rates of young children dying aged between one and four years were smaller and fell for each subsequent marriage cohort, from 45 deaths per 1,000 children in the 1860 cohort to 22 deaths per 1,000 in the 1890 cohort.

Table 6.4 Infant and child mortality rates, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Type of death	Per 1,000 (1)			
Infant deaths (<1 year)	64	70	74	64
Child deaths (1-4 years)	45	40	30	22
Total births (no.)	2,008	2,259	2,946	2,974

(1) Rates for infants' deaths are calculated per 1,000 live births, for child deaths per 1,000 children reaching age one.

The proportion of births where children died in infancy was lower for the 1860 cohort than the 1870 and 1880 cohorts, 64 infant deaths per 1,000 births compared with 70 and 74 respectively. This may be due to a change in the practice of defining a birth as either a live birth or a stillbirth as discussed in Chapter 4.

While the trends in infant mortality for the complete group are consistent with the trends for Tasmania overall, the infant mortality rates were lower. The Tasmanian infant mortality rates 'ranged from 90 to 140 deaths per 1,000 male births, and 70 to 140 deaths per 1,000 female births' for the period 1860–99 (Kippen 2002a: 65). However, it is important to note that births to the complete group accounted for only a proportion of Tasmanian births, that is, total registered births to the complete group made up an estimated 50–60 per cent of all registered births in Tasmanian in any year.

It is likely that infant mortality rates for couples in which both partners survived the wife's childbearing years were lower than for other groups giving birth in the same period, possibly because these families were healthier. Infant mortality rates for the incomplete group were higher than for the complete group in every marriage cohort and for the unobserved group in the first two marriage cohorts (Tables A6.4). A study of maternal and infant mortality in New York State in the 1930s found that infants were five and a half times as likely to die within the first month of life when their mother died in childbirth (Yerushalmy et al. 1940). In 19th century NSW and Victoria, infant mortality rates for ex-nuptial children were markedly higher than for children born in wedlock over the period (NSW 1904a; Swain and Howe 1995).

Although the proportion of infants and young children who died was fairly small, the proportion of families who experienced the death of an infant and/or young child was much higher. In the 1860 cohort, half of all couples experienced the death of an infant and/or young child, with 34.8 per cent experiencing the death of an infant and 25.0 per cent the death of a young child (Table 6.5). The proportion of families experiencing the death of an infant and/or young child fell markedly in subsequent marriage cohorts, from 51.6 per cent for the 1860 cohort to 34.4 per cent for the 1890 cohort. This was mainly due to a fall in the proportion of couples experiencing the death of a young child.

Table 6.5 Proportion of families with at least one infant and/or child death, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Infant/child death in family	Per cent			
Infant death/s (<1 year)	34.8	34.6	33.6	26.7
Child death/s (1-4 years)	25.0	24.7	17.5	11.2
Infant and/or child death/s (<5 years)	51.6	49.5	45.3	34.4
Total families (no.)	256	283	417	529

Of all families who experienced the death of an infant and/or young child, most experienced only one death, with the proportion being around 60 per cent for the 1860 and 1870 cohorts and increasing to 72.0 per cent for the 1890 cohort (Table 6.6). The proportion experiencing three or more deaths was around 15 per cent in the earliest three cohorts, but fell to 7.6 per cent in the 1890 cohort. This is related to the marked fall in the number of very large families described above, since families with three or more deaths tended to be concentrated in families with 9 or more children. For instance, in the 1870 cohort, 18 of the 20 families who experienced the deaths of three or more infants and/or young children had nine or more children. This is consistent with findings about the relationship between high fertility and high infant mortality discussed in Chapter 1.

Table 6.6 Number of deaths for families experiencing at least one death of an infant and/or young child, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Number of deaths	Per cent			
One	61.4	57.9	66.1	72.0
Two	23.5	27.9	18.5	20.3
Three	9.1	6.4	9.5	5.5
Four	3.8	2.9	3.2	1.6
Five or more	2.3	5.0	2.7	0.5
Total (per cent)	100.0	100.0	100.0	100.0
Total families (no.)	132	140	189	182

Children ever born

In this section I look at mean and median numbers of children ever born according to family characteristics which relate to the theories of fertility decline discussed in Chapter 1, or are associated with a woman's fecundity. These characteristics are: wife's age at marriage, the age difference between husbands and wives, socioeconomic status, type of geographic location, religion and literacy.

Wife's age at marriage

In examining the mean (median) number of children by women's age at marriage, because of the small numbers of women marrying at older ages, age at marriage is divided into three categories: under 20 years, 20–24 years, and 25 years or older. I have used the category under 20 years for the youngest group, rather than under 21 years, because I wanted to look at women who married as teenagers, rather than those who were required to obtain their parents' consent to marry.

In all marriage cohorts, women who married at younger ages had substantially higher mean (median) numbers of children than other women (Figure 6.7). In the 1870 cohort, for example, the mean number of children for women marrying under the age of 20 was 9.51 (median 10), compared with a mean of 7.77 (median 8) for women marrying between the ages of 20 and 24 years and 5.77 (median 5) for women marrying at ages 25 and older. While the mean (median) number of children fell for all women across the cohorts, it fell markedly for woman marrying under 25 years of age.

Table 6.7. Mean and median number of children by mother's age at marriage, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)

	1860	1870	1880	1890
Age at marriage	Mean			
<20 years	9.38	9.51	8.42	7.33
20-<25 years	7.65	7.77	6.87	5.64
25+ years	4.73	5.77	5.11	4.32
	Median			
<20 years	10	10	8	7
20-<25 years	8	8	7	5
25+ years	5	5	5	4

(1) Excludes three women in the 1880 cohort and five in the 1890 cohort for whom age at marriage was missing

Age difference between husbands and wives

The relationship between fertility and the age difference between husband and wife is affected by the wife's age at marriage, since women who are older than their husbands are likely to be older at marriage and those with much older husbands are likely to be younger at marriage. For this reason, I examine the relationship between fertility and the age difference between husbands and wives for women who married at aged 20–24 years.

There were no consistent differences in fertility across the marriage cohorts according to the age difference between husband and wife (Table 6.8). In the two earliest cohorts, couples where the husband was much older than the wife had fewer children on average than couples where the

husband and wife were the same age or the husband was 1–4 years older. In the 1880 cohort, couples where the wife was older than the husband or the husband was much older than the wife had fewer children on average than couples where the husband and wife were the same age or the husband was 1–4 years older, although the differences were relatively small . In the 1890 cohort, however, couples of the same age or where the husband was 1–4 years older had slightly fewer children on average than other couples: they had a mean of 5.49 (median 5) children compared with a mean of 5.88 (median 6) for couples where the wife was older than the husband and 5.83 (median 5) for couples where the husband was much older than the wife.

Table 6.8 Mean and median number of children by difference in age between husbands and wives for women marrying aged 20–24 years, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)

	1860	1870	1880	1890
Difference in age	Mean			
Wife older (2)	8.62	7.21	6.80	5.88
Same age or husband 1-4 years older	7.91	8.37	7.03	5.49
Husband 5 or more years older	7.23	7.11	6.74	5.83
	Median			
Wife older	8	7	7	6
Same age or husband 1-4 years older	8	9	7	5
Husband 5 or more years older	7	7	7	5

(1) There are three women in the 1880 cohort and five in the 1890 cohort for whom age is missing. Also excludes one couple in the 1860 cohort, two in the 1870 cohort, four in the 1880 cohort and two in the 1890 cohort for whom age of husband is missing.

(2) Means for 1860 and 1870 are illustrative only because of small numbers in the group i.e. n=13 for 1860 and n=28 for 1870

Socioeconomic status

While fertility declined for every socioeconomic group across the four marriage cohorts, there were marked differences in the mean (and median) numbers of children according to the husband's socioeconomic status (Table 6.9). White-collar workers had the lowest mean (median) numbers of children in every marriage cohort, while farmers and unskilled workers had the highest. In the 1860 cohort, the mean number of children for white-collar workers was 6.34 (median 6) compared with a mean of 9.02 (median 9) for farmers and 8.55 (median 9) for unskilled workers. The fertility of white-collar workers in 1860 was considerably lower than fertility overall (Table 6.1). White-collar workers in the 1860 cohort may have had lower fertility because they started to restrict their fertility earlier than other groups or because they married at older ages. This will be investigated in the multivariate analysis.

Table 6.9 Mean and median number of children by husband's socioeconomic status at first birth, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)

	1860	1870	1880	1890
Occupational status	Mean			
White-collar	6.34	6.20	5.76	4.19
Skilled workers	6.98	7.29	6.69	4.90
Farmers	9.02	8.80	7.48	6.90
Lower skilled (2)	7.44	7.05	7.09	5.35
Unskilled	8.55	8.86	7.92	6.35
	Median			
White-collar	6	7	5	4
Skilled workers	7	8	7	4
Farmers	9	9	8	7
Lower skilled (2)	8	7/8	7	5
Unskilled	9	10	8	6

(1) Excludes three couples in the 1860 cohort, three in the 1870 cohort and two in the 1880 cohort for whom socioeconomic status is missing
(2) Means are illustrative only for lower skilled workers in 1860 & 1870, because of small numbers i.e. in 1860 n=18, in 1870 n=20.

There were differences in timing of the fertility decline between the socioeconomic groups, according to falls in the mean numbers of children. Fertility fell steadily for white-collar workers over the cohorts, with the largest fall from the 1880 to the 1890 cohort. Fertility fell for skilled workers, farmers and unskilled workers from the 1870 to the 1880 cohort onwards, but the decline was larger for skilled and unskilled workers from the 1880 to the 1890 cohort and for farmers from the 1870 to the 1880 cohort. While the means are illustrative only for the two earlier cohorts, lower skilled workers' fertility declined from the 1860 cohort onwards with the largest decline from the 1880 to the 1890 cohort.

Type of geographic location

Couples living in urban areas had fewer children on average than those living in rural areas in all marriage cohorts (Table 6.10). In the 1860 cohort, couples in urban areas had a mean of 7.24 children (median 7/8) while couples in rural areas had a mean of 8.41 (median of 9). Fertility fell steadily for urban couples from the 1860 cohort, while for rural couples it began to fall from the 1870 to the 1880 cohort. Fertility declined more for both urban and rural couples from the 1880 to the 1890 cohort than between earlier cohorts. By the 1890 cohort, the mean number of children for couples living in urban areas had fallen to 4.74 (median 4), while the mean for rural couples had fallen to 6.25 (median 6). Although the means (medians) are illustrative only, couples who had

their first birth outside Tasmania had fewer children on average than couples who had their first birth in Hobart or Launceston, except in the 1860 cohort.

Table 6.10 Mean and median number of children by location at first birth, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Type of location	Mean			
Urban	7.25	6.81	6.25	4.74
Rural	8.41	8.81	7.74	6.25
Outside Tasmania (1)	7.24	6.41	4.89	4.48
	Median			
Urban	7/8	7	6	4
Rural	9	9	8	6
Outside Tasmania (1)	8	6	5	4

(1). *Means are illustrative only because of small numbers i.e. in 1860 n=17, in 1870 n=22, in 1880 n=18 and in 1890 n=27.*

As outlined in Chapter 5, couples did not necessarily have all or any of their births in Tasmania. Couples who had births in Tasmania and elsewhere had more children on average than couples who had all their births in Tasmania in every cohort except the 1880 cohort (Table 6.11). Fertility fell from the 1870 to the 1880 cohort onwards for couples who had some or all their births in Tasmania, although for couples who had births in Tasmania and elsewhere the fall in fertility was larger from the 1870 to the 1880 cohort than from the 1880 to the 1890 cohort. Although the means (medians) are illustrative only, couples who had all their births outside Tasmania had fewer children on average than other couples and their fertility fell from the 1860 to the 1870 cohort onwards.

Table 6.11 Mean and median number of children by location of family births, complete group; 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Type of location of family births	Mean			
All births in Tasmania	7.69	8.03	7.22	5.65
Births in Tasmania and elsewhere	7.92	8.61	6.35	5.95
All births outside Tasmania (1)	7.13	6.00	4.92	4.29
	Median			
All births in Tasmania	8	9	7	5
Births in Tasmania and elsewhere	8	8	6	5
All births outside Tasmania	8	5.5	5	4

(1) *Means are illustrative only, because of small numbers in this group i.e. in 1860 n=15, in 1870 n=16 in 1880 n=12, in 1890 n=21.*

Religion

The relationship between religion and the number of children ever born is not very clear. Catholics had the highest mean (median) numbers of children in most marriage cohorts (Table 6.12). No other religious group consistently had the smallest mean (median) numbers of children, although Presbyterians and Other Nonconformists tended to have lower fertility than Anglicans and Methodists. The fall in fertility occurred later for Catholics than for the other religious groups. The mean (median) numbers of children fell from the 1880 cohort to the 1890 cohort for Catholics, while for Anglicans, Methodists and Other Nonconformists fertility started to fall from the 1870 to the 1880 cohort onwards. Fertility fell steadily for Presbyterians from the 1860 cohort to the 1890 cohort. Methodists tended to have more children than the other Protestant groups and fertility fell more slowly.

Table 6.12 Mean and median number of children by religion at marriage, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)

	1860	1870	1880	1890
Type of religion	Mean			
Anglican	7.74	8.50	6.87	5.51
Catholic (2)	8.28	7.44	8.00	6.36
Presbyterian	7.95	6.97	6.22	5.27
Methodist	7.97	8.37	7.57	6.21
Other Nonconformist	7.51	7.62	6.73	5.12
	Median			
Anglican	8	9	7	5
Catholic	8.5	8	8.5	6
Presbyterian/Church of Scotland	8	7	6	5
Methodist	8	8/9	7	6
Other Nonconformist	8	7	7	5

(1) Religion missing for one couple in the 1860 cohort.
(2) Means are illustrative only for 1870 because of small number, n=25

Literacy

In the analysis of literacy and fertility, I use data on whether the husband and/or wife signed the marriage certificate as an indicator of the husband and wife's literacy (Alter 1988). In examining mean (median) numbers of children by couple's literacy levels, I collapsed the categorisation used in Chapter 5 from four to two groups: both partners literate and husband and/or wife illiterate. This is because of small numbers in the illiterate groups, particularly in the two later cohorts.

In all marriage cohorts, the mean (median) numbers of children were considerably higher for couples where the husband and/or wife was illiterate compared with couples where both were

literate, but the differences were much smaller for the 1890 cohort than for the earlier cohorts (Table 6.13). In the 1860 cohort, couples where the husband and/or wife was illiterate had a mean of 9.00 children (median 10) while the mean for couples where both were literate was 7.48 (median 8). By the 1890 cohort, the comparable means were 6.00 (median 6) for the illiterate group and 5.60 (median 5) for the literate group. Fertility fell for illiterate couples from the 1860 to the 1870 cohort onwards and for literate couples from the 1870 to the 1880 cohort onwards. For both literate and illiterate couples the largest fall in fertility was from the 1880 to the 1890 cohort.

Table 6.13 Mean and median number of children by parents' literacy, complete group; 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania

	1860	1870	1880	1890
Literacy type	Mean			
Husband and/or wife illiterate	9.00	8.47	8.05	6.00
Both husband and wife literate (1)	7.48	7.86	6.91	5.60
Literacy type	Median			
Husband and/or wife illiterate	10	9	8	6
Both husband and wife literate (1)	8	8	7	5

(1) *Means are illustrative only for 1890, because of small numbers in this group i.e. n=27.*

Parity progression ratios

In the final section, I examine parity progression ratios by marriage cohort and by three family characteristics that are important in relation to theories of fertility decline—socioeconomic status, type of geographic location and religion.

Marriage cohorts

Parity progression ratios, that is, the proportion of mothers at a given parity who went on to have another child, were fairly similar for mothers in the 1860 and 1870 cohorts (Table 6.14). However, parity progression ratios began to fall from the third to the fourth child onwards in the 1880 cohort and from the second to the third child onwards in the 1890 cohort. The largest percentage falls in progression between the 1870 and the 1880 cohorts were at parities five, nine and ten. For example in the 1870 cohort, 93.5 per cent of those who had five children went on to have another child, whereas in the 1880 cohort, the corresponding proportion was 82.9 per cent. The differences in the percentage falls in parity progression ratios at low parities were larger between the 1880 and 1890 cohorts than between the 1870 and 1880 cohorts. For instance, 94.7 per cent of women in the 1870 cohort who had four children went on to have a fifth child, compared with 90.5 per cent of women in the 1880 cohort and 82.3 per cent in the 1890 cohort.

Table 6.14 Parity progression ratios, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Parity i	Parity progression ratios (i, i+1)			
One	0.9531	0.9541	0.9784	0.9528
Two	0.9590	0.9593	0.9559	0.8950
Three	0.9359	0.9382	0.9128	0.8496
Four	0.9543	0.9465	0.9045	0.8229
Five	0.9091	0.9348	0.8292	0.7373
Six	0.8737	0.8930	0.8614	0.7940
Seven	0.8675	0.8490	0.8043	0.7514
Eight	0.7917	0.8221	0.7892	0.6906
Nine	0.7895	0.7910	0.6575	0.6458
Ten	0.6667	0.6887	0.5729	0.7258
Eleven	0.7167	0.6301	0.6364	0.4667
Twelve	0.6047	0.5217	0.5429	0.4762
Thirteen	0.3462	0.5417	0.6316	0.6000
Fourteen	0.4444	0.4615	0.5833	0.6667
Fifteen	0.0000	0.3333	0.1429	0.0000
Sixteen	..	0.0000	0.0000	..
Total families (no)	256	283	417	529

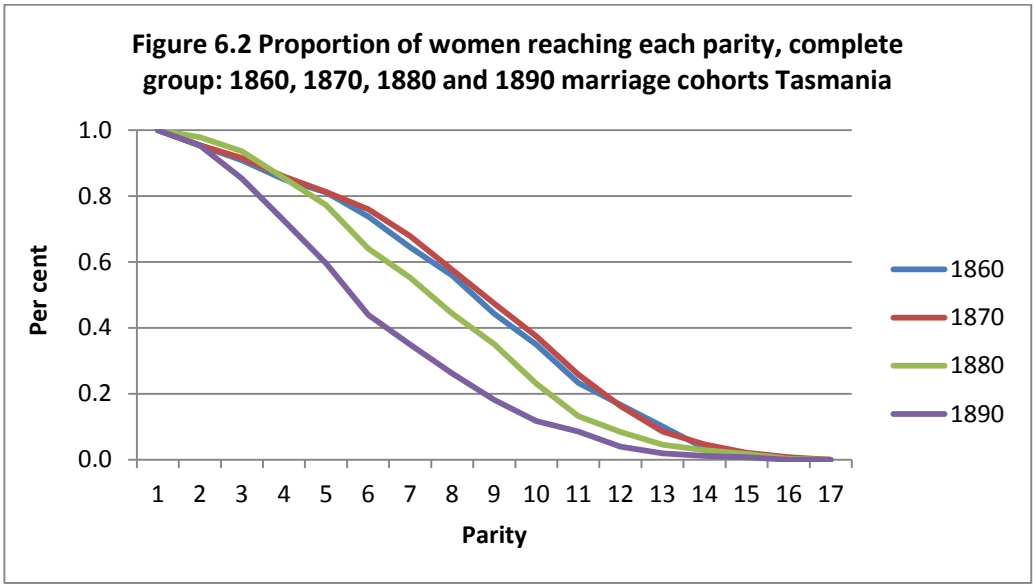
Note: '..'= not applicable

Parity progression ratios can be used to calculate the percentage of mothers reaching each parity, that is, proportion of mothers having 'i' children is equal to proportion of mothers having 'i-1' children multiplied by the parity progression ratio 'i'. This is a useful way of measuring the fertility and changes in fertility of different groups.

The fertility levels of the 1860 and the 1870 cohorts were very similar with very small differences in the proportions of women reaching each parity (Figure 6.2). For example, 85.6 per cent of women in the 1860 cohort had four or more children compared with 85.9 per cent in the 1870 cohort, while 56.3 per cent of the 1860 cohort had eight or more children compared with 57.6 per cent of the 1870 cohort.

Fertility fell from the 1870 cohort to the 1880 cohort and then to the 1890 cohort. From the 1870 to the 1880 cohort, the proportions of women reaching each parity began to fall steadily after parity four. In the 1870 cohort, for instance, 76.0 per cent of mothers had six or more children, compared with 64.0 per cent of mothers in the 1880 cohort, while for those with 11 or more children, the proportions were 25.8 per cent and 13.2 per cent respectively.

There was a much larger fall in fertility from the 1880 to the 1890 cohort, with the proportion of women reaching each parity dropping sharply after parity two. In the 1880 cohort, 85.4 per cent of mothers had four or more children compared with 72.5 per cent in the 1890 cohort, while 35.0 per cent of mothers in the 1880 cohort had nine or more children compared with 18.1 per cent in the 1890 cohort.



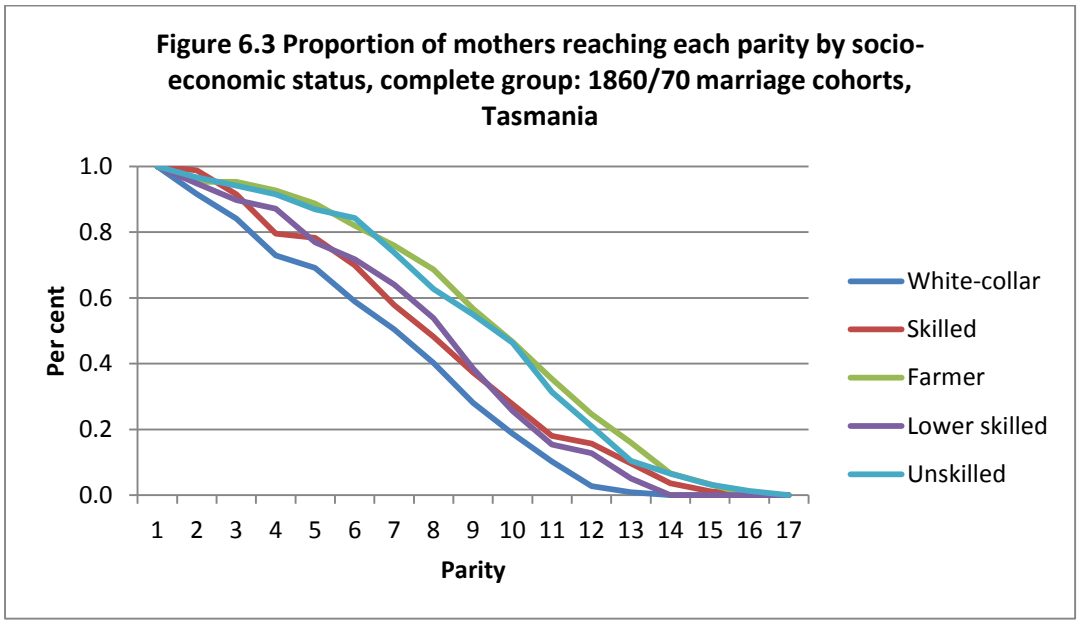
Since the proportions of mothers reaching each parity were very similar in the 1860 and 1870 cohorts and the numbers in each cohort are considerably smaller than in the other two cohorts, these cohorts are combined in fertility analysis that follows.

For each characteristic—socioeconomic status, geographic location and religion—the following analysis compares the proportion of mothers reaching each parity in each marriage cohort by the various groups for each marriage cohort, then looks at trends for each group across the marriage cohorts.

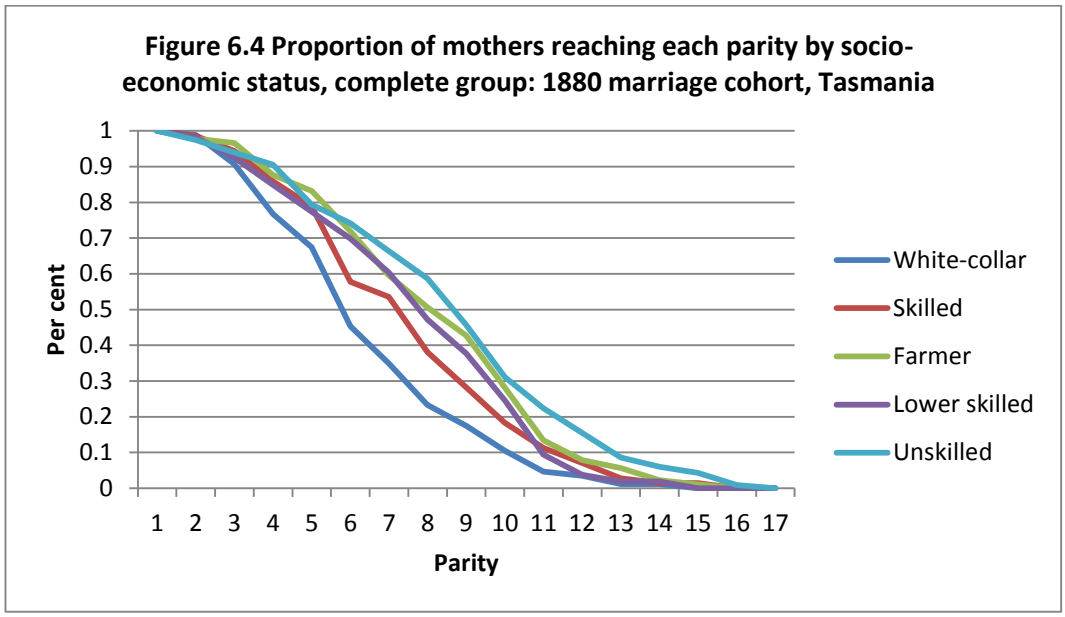
Socioeconomic status

Examining the proportion of mothers reaching each parity by husband's socio-economic status shows differences in fertility among the various socio-economic groups within each marriage cohort (Figure 6.3). In the 1860/70 cohorts white-collar workers had the lowest fertility while farmers and unskilled workers had the highest. The largest differences in the proportions of women reaching each parity were between the white-collar, skilled and lower skilled workers on the one hand and farmers and unskilled workers on the other. For instance, 69.2 per cent of

white-collar workers had five or more children, compared with 76.2 per cent of skilled workers, 76.9 per cent of lower skilled workers, 86.9 per cent of unskilled workers and 88.7 per cent of farmers.



White-collar workers again had the lowest fertility in the 1880 cohort, but their fertility was substantially lower than the other four groups of workers (Figure 6.4). The fertility levels of farmers and unskilled workers were closer to that of the skilled and lower skilled workers than in the earlier cohorts. The proportion of women in white-collar couples reaching parities higher than five was much smaller than for other groups. Only 45.4 per cent of white-collar couples had six or more children, compared with 57.7 per cent of skilled workers, 77.4 per cent of lower skilled workers, 79.3 per cent of unskilled workers and 83.2 per cent of farmers.



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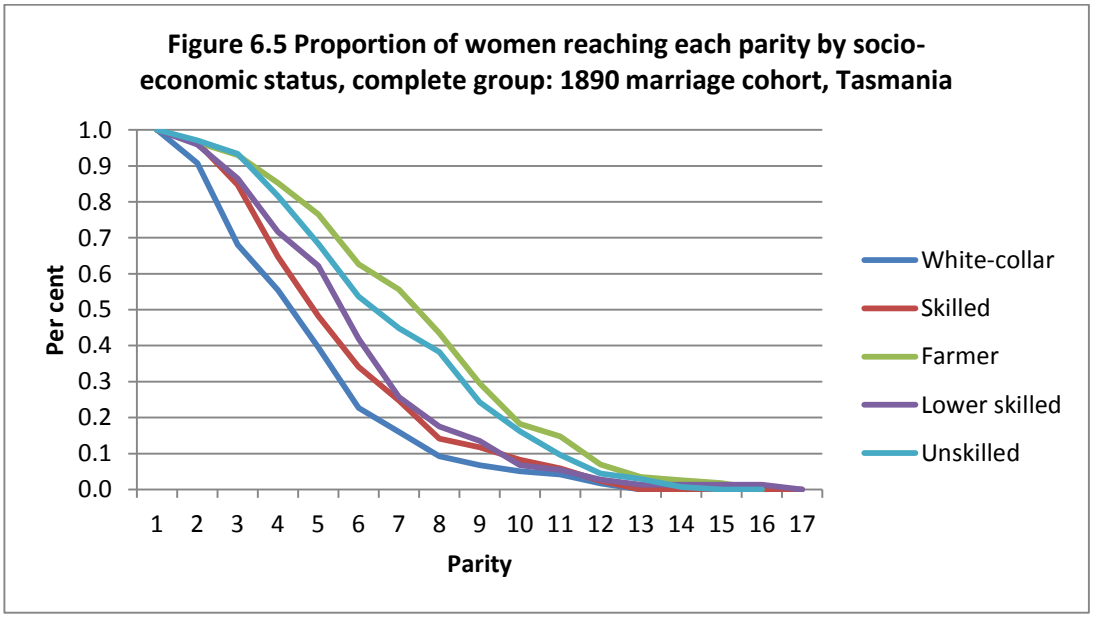
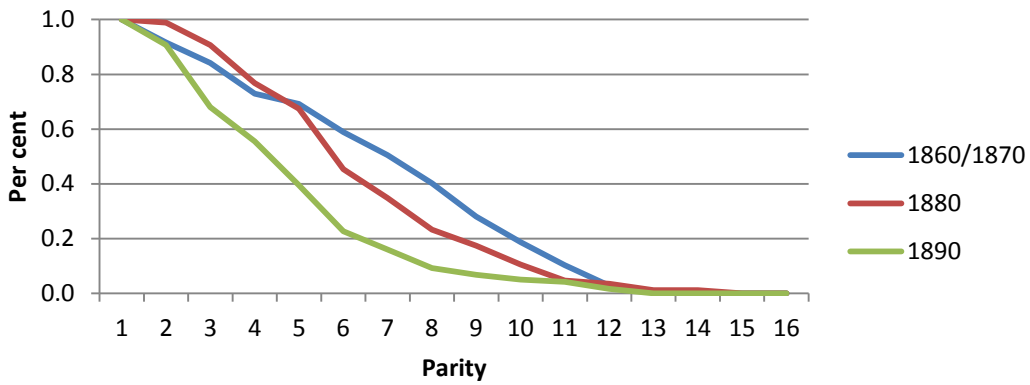
White-collar workers still had the lowest fertility in the 1890 cohort, but the largest differences were between the white-collar, skilled and lower skilled workers on the one hand and the farmers and unskilled workers on the other, particularly at higher parities (Figure 6.5). The proportions of farmers and unskilled workers with eight or more children, for instance, was more than double that of white-collar, skilled and unskilled workers: 43.5 per cent of farmers and 38.2 per cent of unskilled workers had eight or more children, compared with 9.3 per cent of white-collar workers, 14.1 per cent of skilled workers and 17.6 per cent of lower skilled workers.



Fertility fell for white-collar workers from the 1860/70 cohorts to the 1880 cohort (Figure 6.6). While the 1880 cohort had a somewhat higher proportion of women reaching the lower parities than the 1860/70 cohorts, the proportion of women at each parity fell steadily after the fifth. From the 1860/70 to the 1880 cohorts, the proportion of women in white-collar couples with six or more children fell from 58.8 per cent to 45.4 per cent, the proportion with seven or more fell from 50.5 per cent to 34.9 per cent and so on.

Figure 6.6 White-collar workers. Proportion of women reaching each parity, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania



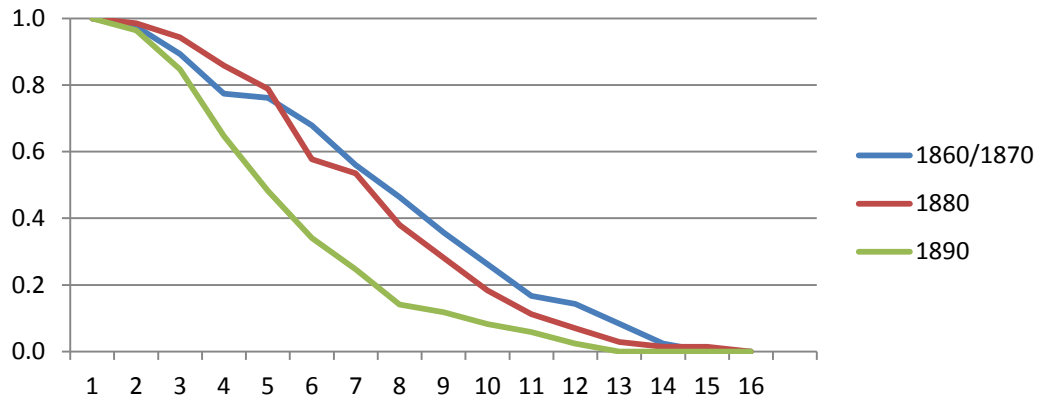
Fertility also fell between the 1880 and 1890 cohorts, with the proportions of mothers reaching each parity falling after parity one and falling sharply after parity two. The proportion of mothers having two or more children fell from 98.8 per cent to 90.8 per cent from the 1880 cohort to the 1890 cohort, while the proportion having three or more children fell from 90.7 per cent to 68.1 per cent.

Fertility fell somewhat for skilled workers from the 1860/70 cohorts to the 1880 cohort (Figure 6.7), with the proportion of women reaching each parity falling after parity five. The proportion of women with six or more children fell from 67.9 per cent to 57.7 per cent, while the proportion with nine or more fell from 35.7 per cent to 28.2 per cent. The proportions of women at parities three and four increased somewhat between the cohorts, with the proportion with three or more children increasing from 89.3 per cent to 94.4 per cent and the proportion with four or more increasing from 77.4 per cent to 85.9 per cent.

The fall in fertility was much more substantial between the 1880 and the 1890 cohorts, with the proportions of women at each parity falling sharply after parity two. The proportion of women in

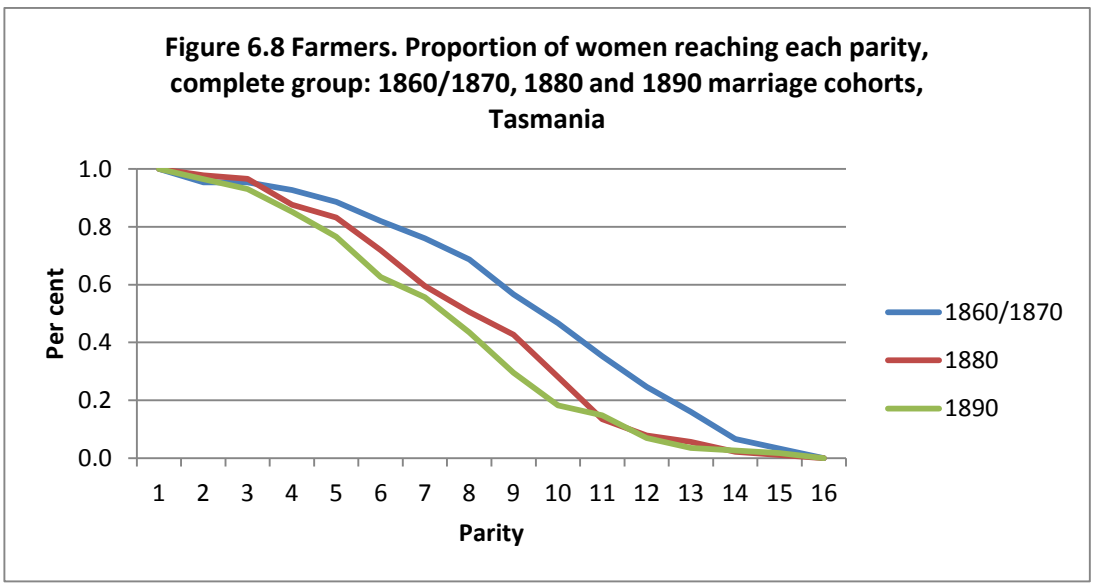
skilled couples with three or more children was 85.9 per cent in the 1880 cohort compared with 64.7 per cent in the 1890 cohort, while the proportion with four or more was 78.9 per cent compared with 48.2 per cent.

Figure 6.7 Skilled workers. Proportion of women reaching each parity, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania



In contrast, there was a substantial fall in the fertility of farmers' wives between the 1860/70 cohorts and the 1880 cohort (Figure 6.8). While the proportion of women reaching each parity began to fall after parity three, differences were not large until after the sixth parity. The proportion of farmer's wives with seven or more children was 76.0 per cent in the 1860/70 cohort, but fell to 60.0 per cent in the 1880 cohort, while the proportion with eleven or more children fell from 35.3 per cent to 13.5 per cent.

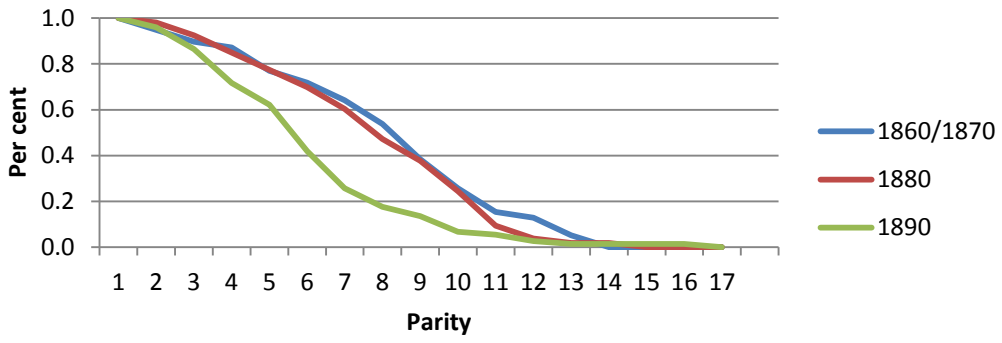
Figure 6.8 Farmers. Proportion of women reaching each parity, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania



Fertility also fell from the 1880 to the 1890 cohort after parity four, but the differences in the proportions reaching each parity were not as large as between the earlier cohorts. There was a relatively large fall in the numbers having at least 9 or 10 children, however, from 42.7 per cent to 29.6 per cent for those having nine or more children and from 28.1 per cent to 18.3 per cent for those having 10 or more.

Fertility levels of lower skilled workers were very similar in the 1860/70 and 1880 cohorts, except for a fall in the proportions of women reaching very high parities in the 1880 cohort, that is, after parity 10 (Figure 6.9). The proportion of women in the 1860/70 cohorts with 11 or more children was 15.4 per cent compared with 9.4 per cent in the 1880 cohort, while the proportion with 12 or more was 12.8 per cent compared with 3.8 per cent.

Figure 6.9 Lower skilled workers. Proportion of women reaching each parity, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania



Fertility fell markedly between the 1880 and 1890 cohorts, with the proportions of lower skilled workers' wives reaching each parity dropping sharply after parity two. The proportion of women with three or more children fell from 92.5 per cent to 86.5 per cent, the proportion with seven or more fell from 60.4 per cent to 25.7 per cent and the proportion with 10 or more from 24.5 per cent to 6.8 per cent.

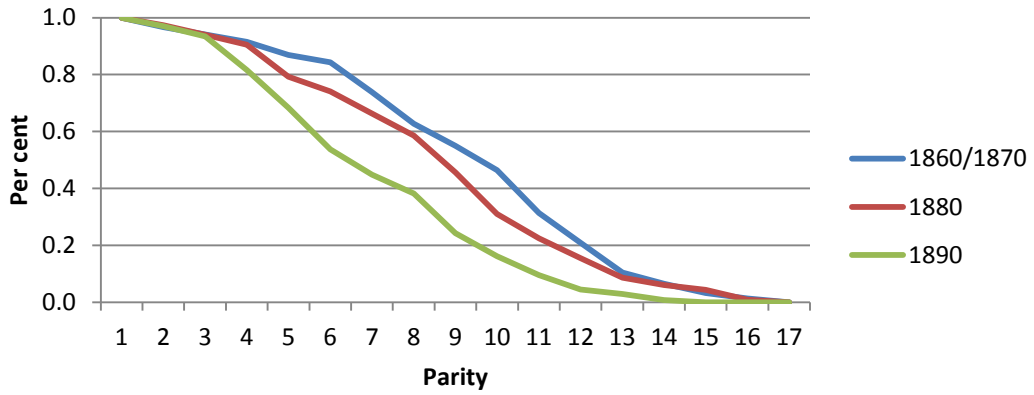
The large fall between the 1880 and 1890 cohorts may be related to changes in the composition of the lower skilled group with the 1890 cohort including men in the more 'modern' occupations of 'Engine Driver' and 'Fireman–Gas Works'.

Fertility fell for unskilled workers between the 1860/70 and 1880 cohorts, with the proportion reaching each parity falling after parity four (Figure 6.10). In the 1860/70 cohorts, the proportion having five or more children was 86.9 per cent but this fell to 79.3 per cent in the 1880 cohort. The

largest percentage fall was at parity 10, with 46.6 per cent of women in the 1860/70 cohorts having 10 or more children compared with 31.0 per cent in the 1880 cohort.

The fall in fertility was much larger between the 1880 and the 1890 cohorts and occurred after parity three. Among unskilled workers, 90.5 per cent of women in the 1880 cohort had four or more children compared with 81.6 per cent in the 1890 cohort. Differences between the two cohorts were much larger at higher parities. For instance, 66.3 per cent of women in the 1880 cohort had seven or more children compared with 44.9 per cent in the 1890 cohort, while the corresponding proportions for those with 11 or more children were 22.4 per cent and 9.6 per cent.

Figure 6.10 Unskilled workers. Proportion of women reaching each parity, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

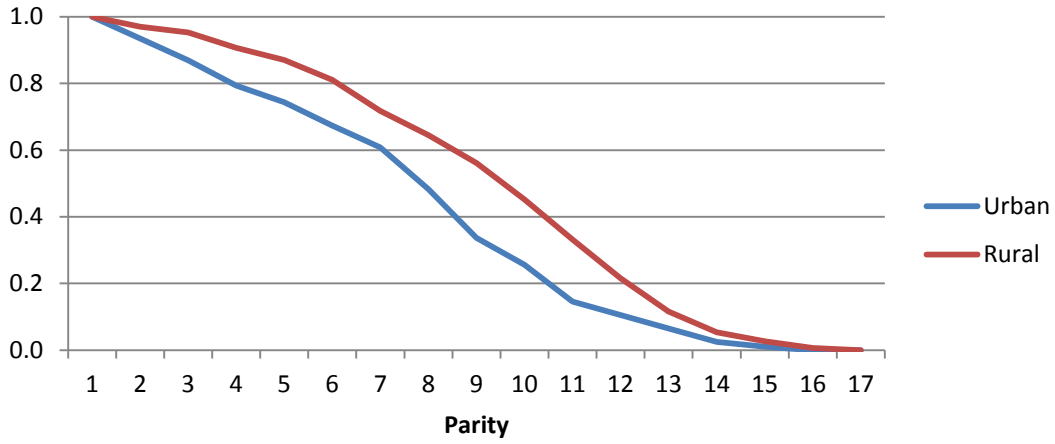


Type of geographic location

Women having their first birth outside Tasmania are excluded from this analysis because of the small numbers in the group.

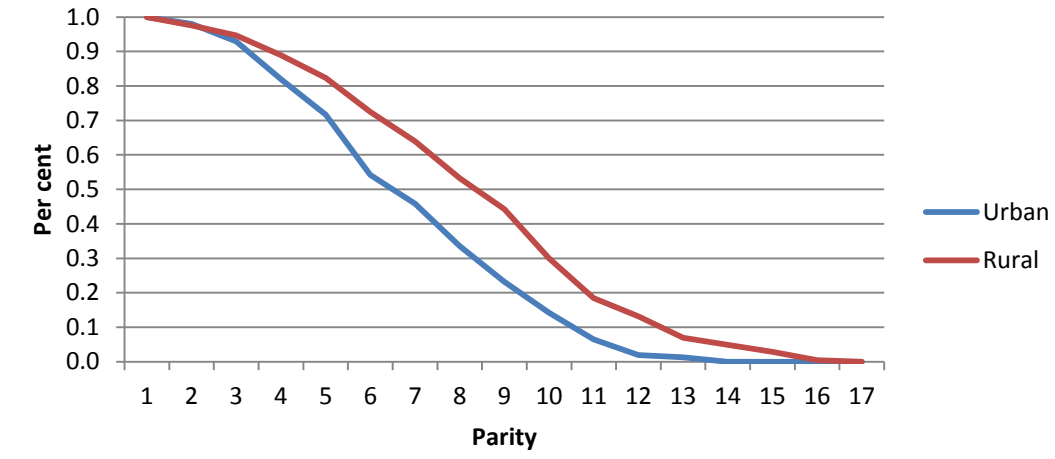
In the 1860/70 cohorts the proportions of women reaching each parity were lower for those living in urban areas than for those in rural areas at every parity after parity one, with the differences being greater at higher parities (Figure 6.11). The proportion of women in rural areas with four or more children was 90.7 per cent compared with 79.4 per cent for women in urban areas, while the proportions with nine or more were 56.2 per cent and 33.7 per cent respectively. Urban women had a maximum of 15 children compared with 16 for rural women.

Figure 6.11 Proportion of women reaching each parity by urban/rural location, complete group: 1860/70 marriage cohorts, Tasmania



The fertility of urban women was also substantially lower than that of rural women in the 1880 cohort, although the proportions reaching each parity were similar up to parity three (Figure 6.12). As with the 1860/70 cohort, the differences between urban and rural women's fertility were larger at higher parities. The proportion of rural women with four or more children was 88.9 per cent compared with 81.9 per cent for urban women, but the corresponding proportions for women with eight or more children were 53.3 per cent and 33.5 per cent. The maximum number of children fell to 13 for urban women but remained at 16 for rural women.

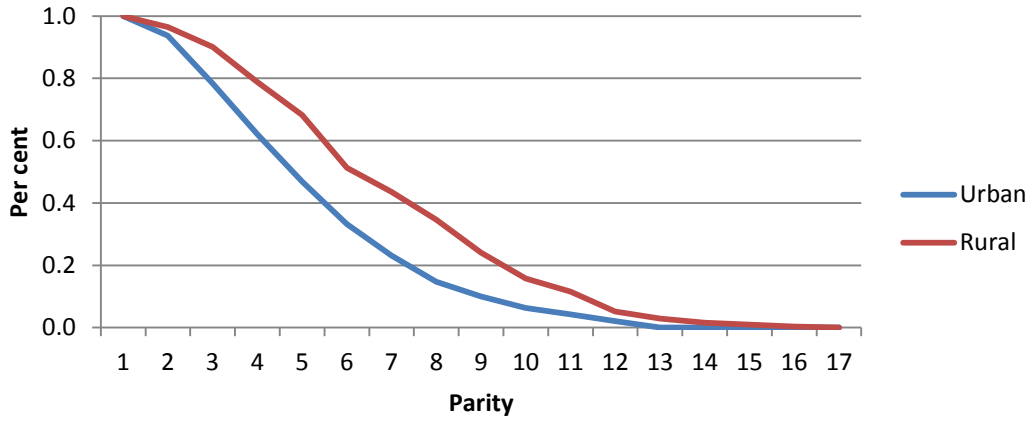
Figure 6.12 Proportion of women reaching each parity by urban/rural location, complete group: 1880 marriage cohort, Tasmania



These trends continued in the 1890 cohort, with the proportions reaching each parity being lower for urban women than rural women at every parity after parity one (Figure 6.13). In this cohort,

however, the differences between the two groups were substantial at both low and high parities. For example, 90.6 per cent of rural women had three or more children compared with 79.4 per cent of urban women, while 24.4 per cent of rural women had nine or more compared with 10.0 per cent of urban women. The maximum number of children for rural woman remained at 16, while the maximum for urban women fell to 12.

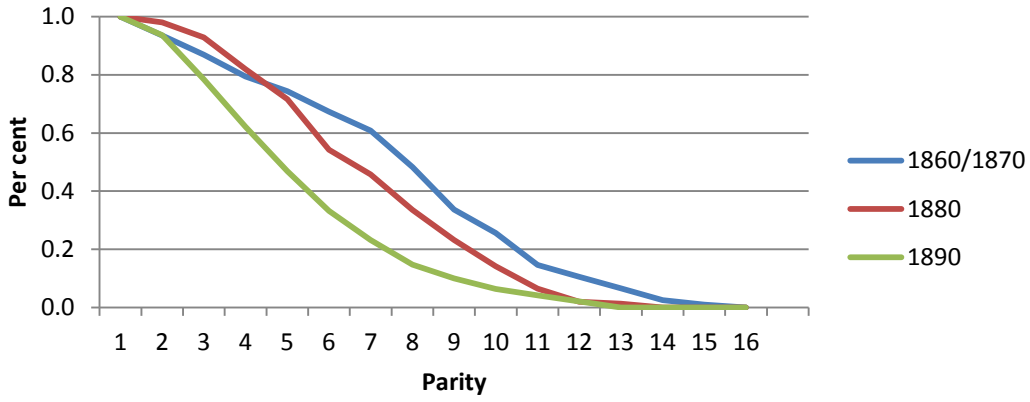
Figure 6.13 Proportion of women reaching each parity by urban/rural location, complete group: 1890 marriage cohort, Tasmania



Fertility fell for urban women between the 1860/70 cohorts and the 1880 cohort (Figure 6.14). The proportions of women reaching each parity were slightly higher at low parities for the 1880 cohort compared with the 1860/70 cohort, but they began to fall steadily after the parity four. Among women in the 1860/70 cohort, 67.3 per cent had seven or more children compared with 54.2 per cent in the 1880 cohort, while 25.6 per cent had 10 or more compared with 14.2 per cent in the 1880 cohort.

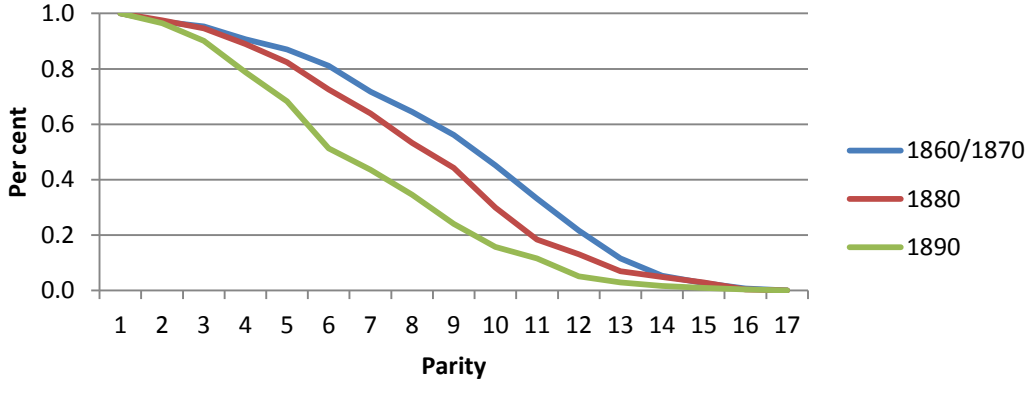
There was a larger fall in fertility for urban women from the 1880 to the 1890 cohort. Falls in the proportions of women reaching each parity were much larger between these two cohorts than the previous cohorts and occurred after parity one with a sharp fall after parity two. The proportion of women with three or more children fell from 92.9 per cent to 78.4 per cent, while the proportion having seven or more dropped from 45.8 per cent to 23.2 per cent.

Figure 6.14 Proportion of women reaching each parity for couples living in an urban area, complete group: 1860/70, 1880 & 1890 marriage cohorts Tasmania



Fertility also fell for women in rural areas from the 1860/70 cohorts to the 1880 cohort, with the proportions of women reaching each parity falling steadily after parity four (Figure 6.15). The proportion of rural women in the 1860/70 cohort having six or more children fell from 81.1 per cent to 72.5 per cent, while the proportion having 10 or more fell from 45.2 per cent to 29.2 per cent.

Table 6.15 Proportion of women reaching each parity for couples living in a rural area, complete group: 1860/70, 1880 & 1890 marriage cohorts Tasmania

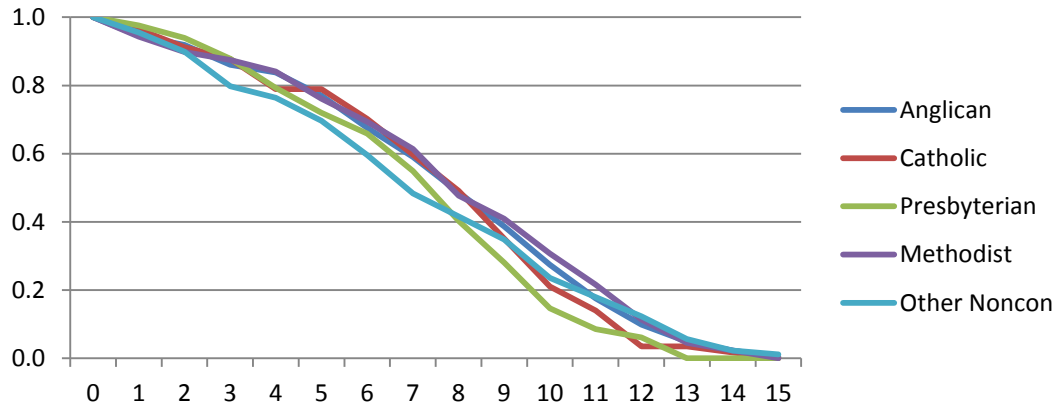


There was a more substantial fall in fertility between the 1880 and 1890 cohorts, with the proportion of rural women reaching each parity falling steadily after parity two. In the 1880 cohort, the proportion of women with four or more children was 88.9 per cent compared with 78.8 per cent in the 1890 cohort, while the proportion with eight or more was 53.5 per cent compared with 34.6 per cent in the 1890 cohort.

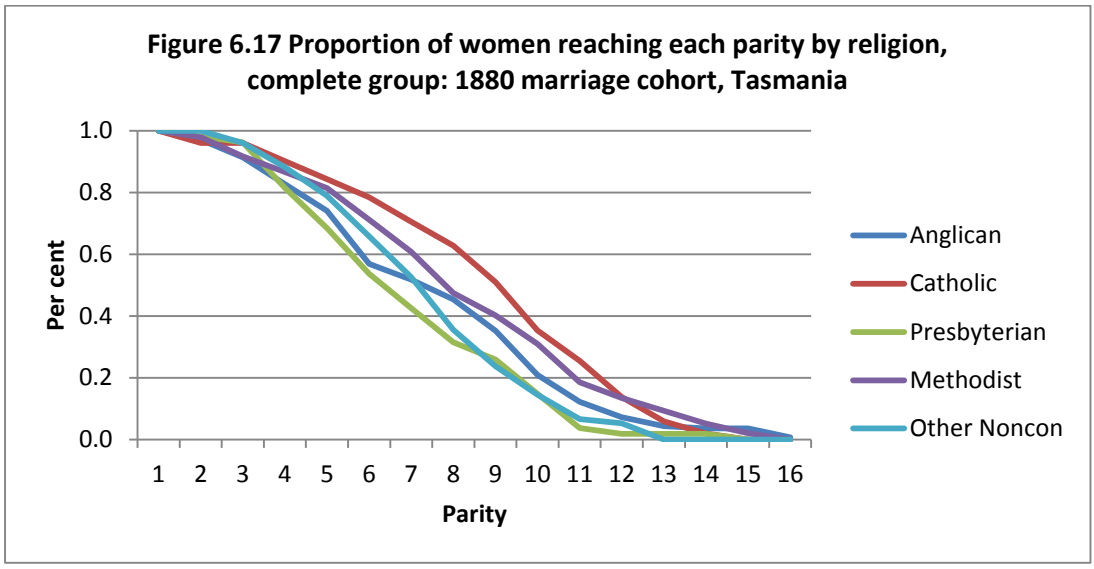
Religion

There were no clear differences in the fertility of the various religious groups in the 1860/70 cohorts, although Other Nonconformists and Presbyterians tended to have lower proportions of women reaching each parity than other groups (Figure 6.16). Among Other Nonconformists, for instance, 69.7 per cent had five or more children, compared with 71.9 per cent of Presbyterians, 76.1 per cent of Methodists, 77.0 per cent of Anglicans and 80.4 per cent of Catholics.

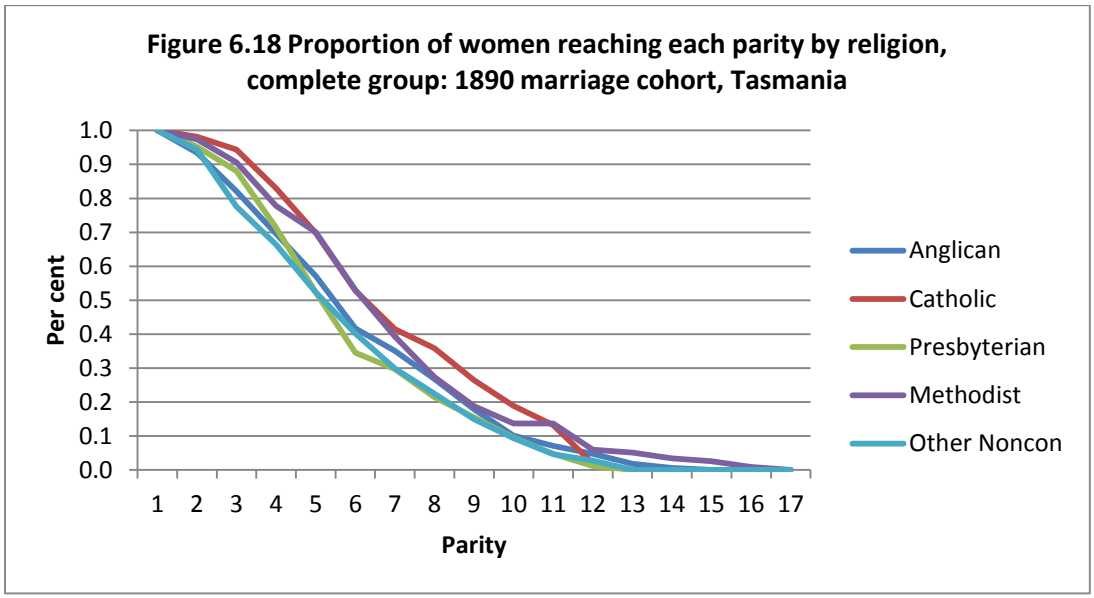
Figure 6.16 Proportion of women reaching each parity by religion, complete group: 1860/70 marriage cohorts, Tasmania



Catholic fertility was substantially higher than the other religious groups in the 1880 cohort, while Methodist fertility tended to be higher than that of other Protestant groups (Figure 6.17). Presbyterians tended to have the lowest fertility, although the proportions of women reaching higher parities were similar to Other Nonconformists. At lower parities, for instance, 78.4 per cent of Catholics had five or more children compared with 71.1 per cent of Methodists, 65.8 per cent of Other Nonconformists, 56.8 per cent of Anglicans and 53.7 per cent of Presbyterians. At higher parities, 25.5 per cent of Catholics had 10 or more children, compared with 18.6 per cent of Methodists, 12.2 per cent of Anglicans, 6.6 per cent of Other Nonconformists and 3.7 per cent of Presbyterians.



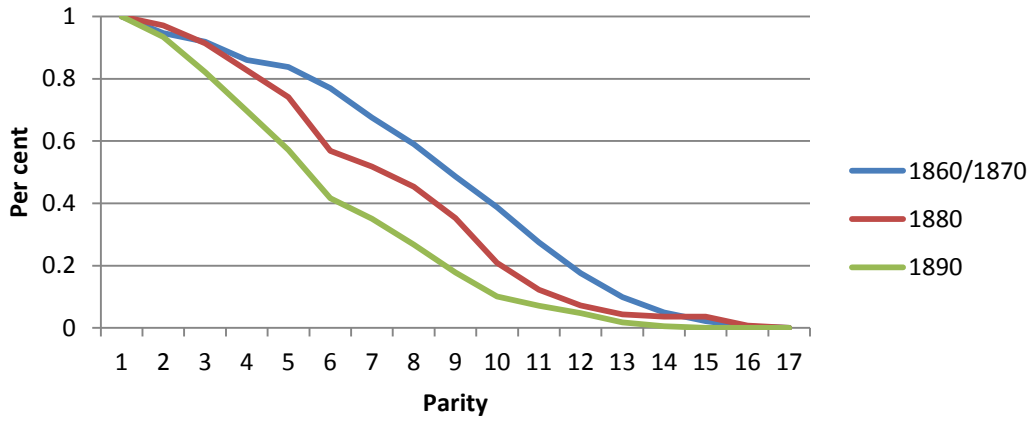
In the 1890 cohort, Catholics again had the highest fertility and Presbyterians and Other Nonconformists the lowest, with the proportions of Presbyterians and Other Nonconformists reaching each parity virtually identical at most parities (Figure 6.18). The proportions of Methodists reaching each parity were very similar to the Catholics between parities five and seven. For instance, 70.1 per cent of Methodists and 69.8 per cent of Catholics had five or more children compared with 57.1 per cent of Anglicans, 52.4 per cent of Presbyterians and 52.3 per cent of Nonconformists. However, the proportion of Catholics with 10 or more children was higher than for other groups, 18.9 per cent, compared with 13.7 per cent of Methodists, 10.1 per cent of Anglicans, 9.5 per cent of Presbyterians and 9.3 per cent of Other Nonconformists.



Fertility fell markedly for Anglicans from the 1860/70 cohorts to the 1880 cohort, with the proportion of women reaching each parity falling after parity three (Figure 6.19). The proportion of Anglican women with six or more children fell from 77.0 per cent to 56.8 per cent, while the proportion with 10 or more fell from 38.7 per cent to 20.9 per cent. The proportions of Anglican women reaching parity two were slightly higher in the 1880 cohort than in the earlier cohorts, 97.1 per cent compared with 94.6 per cent.

Fertility also fell substantially in the 1890 cohort after parity one. The percentage differences between the 1880 and 1890 cohorts were higher at lower parities and lower at higher parities, compared with the differences between the 1860/70 cohorts and the 1880 cohort. The proportion of women with four or more children fell from 86.0 per cent in the 1860/70 cohorts to 82.7 per cent in the 1880 cohort, but then to 69.6 per cent in the 1890 cohort. However, the corresponding proportions for those with nine or more children were 38.7 per cent, 20.9 per cent and 10.1 per cent respectively.

Figure 6.19 Anglicans. Proportion of women reaching each parity, complete group: 1860/70, 1880 and 1890 marriage cohorts Tasmania

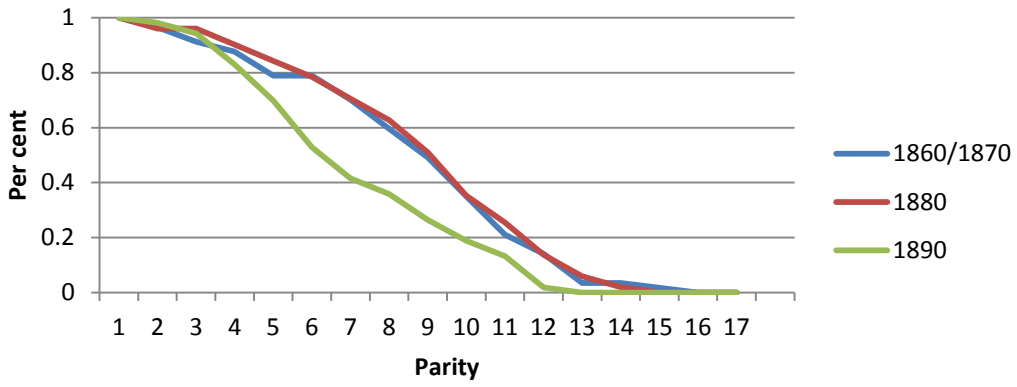


The trends in fertility across time for Anglicans were very similar to the trends for white-collar workers (Figure 6.6)

The fertility levels of Catholic women in the 1860/70 and 1880 cohorts were very similar, although the proportions of women reaching each parity were slightly higher in the 1880 cohort at some lower and some higher parities (Figure 6.20). The proportion of Catholic women with three or more children was 92.9 per cent in the 1860/70 cohorts compared with 96.1 per cent in the 1880

cohort, while the proportions with 11 or more children were 21.4 per cent and 25.5 per cent respectively.

Figure 6.20 Catholics. Proportion of women reaching each parity, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania

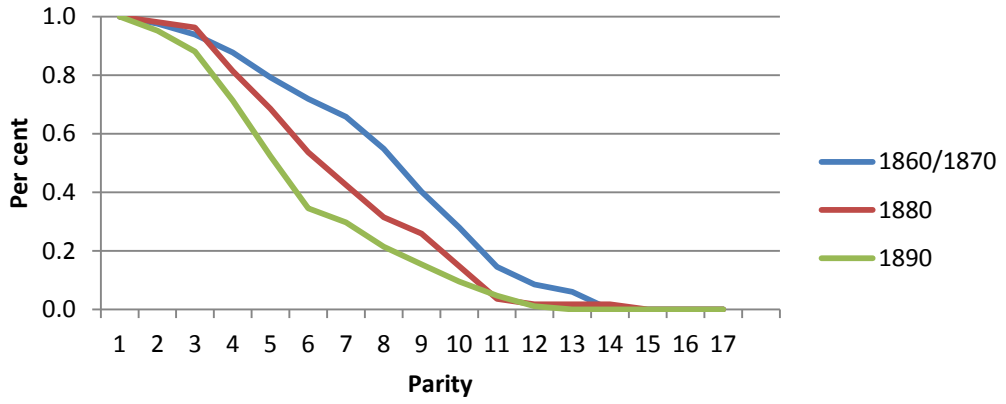


Fertility fell substantially from the 1880 to the 1890 cohort, with the proportion of Catholic women reaching each parity falling sharply after parity three. The proportion with four or more children fell from 90.2 per cent to 83.0 per cent, while the proportion with seven or more fell from 70.6 per cent to 41.5 per cent.

The pattern of fertility decline for Catholics was very similar to that for lower skilled and unskilled workers (Figures 6.9, 6.10).

Fertility fell for Presbyterians from the 1860/70 cohorts to the 1880 cohort, with the proportion of Presbyterian women reaching each parity falling sharply after parity three (Figure 6.21). The proportion with four or more children fell from 87.8 per cent to 81.5 per cent, while the proportion with eight or more fell from 54.9 per cent to 31.5 per cent.

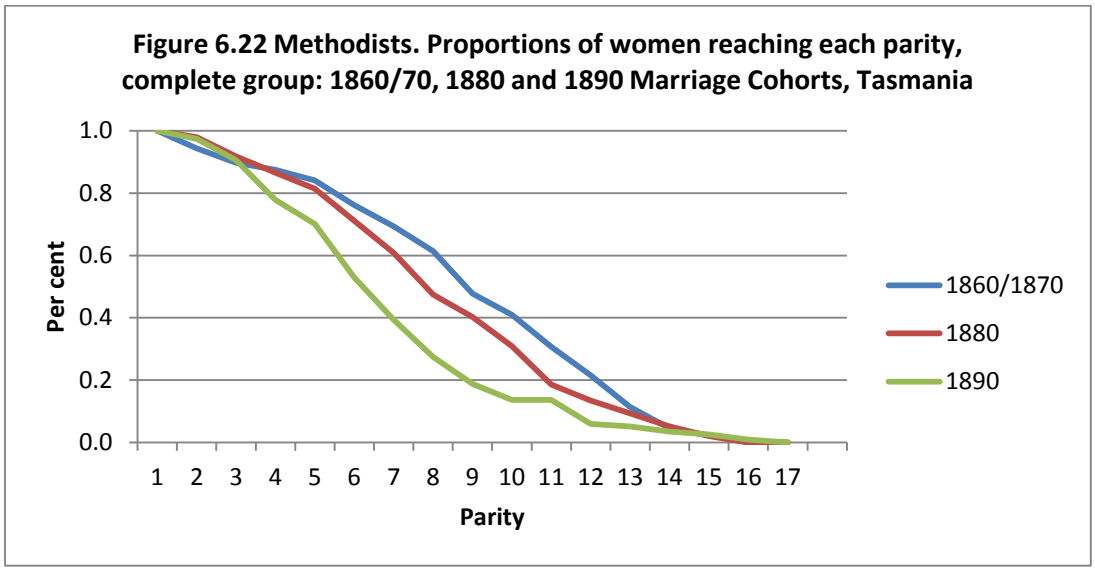
Figure 6.21 Presbyterians. Proportion of women reaching each parity, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania



The fall in fertility from the 1880 to the 1890 cohort was not as large, but occurred after parity one. The falls were steep between parities three and seven, with the proportion of Presbyterian women with five or more children falling from 68.5 per cent to 52.4 per cent and the proportion with six or more falling from 53.7 per cent to 34.5 per cent.

The pattern of fertility decline for Presbyterians was similar to that of farmers (Figures 6.8).

The fertility of Methodist women also fell from the 1860/70 cohorts to the 1880 cohort, although the falls were not as large as for Presbyterian or Anglican women (Figure 6.22). There was a steady fall in the proportion of women reaching each parity after parity four. The proportion of Methodist women with six or more children fell from 76.1 per cent to 71.1 per cent, while the proportion with eight or more fell from 61.4 per cent to 47.4 per cent.



The fall in fertility from the 1880 to the 1890 cohort was much larger and occurred after parity three. The proportion of Methodist women with six or more children fell from 76.1 per cent in the 1860/70 cohorts to 71.1 per cent in the 1880 cohort and to 53.0 per cent in the 1890 cohort. Similarly, the proportion with 10 or more fell from 40.9 per cent to 30.9 per cent to 13.7 per cent over the cohorts.

In the 1860/70 cohorts, there were slightly higher proportions of Methodist women reaching the lowest parities—parities two and three— than in the two later cohorts. The proportion of Methodist women with two or more children was 94.3 per cent in the 1860/70 cohorts, compared with 97.9 per cent in the 1880 cohort and 97.4 per cent in the 1890 cohort.

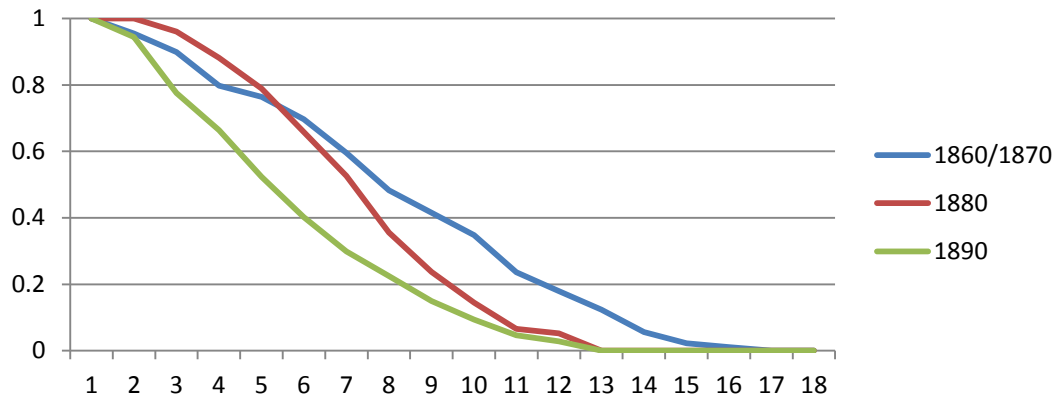
Trends in fertility across time for Methodists were similar to those for skilled workers (Figure 6.7).

Other Nonconformists' fertility also fell from the 1860/70 cohorts to the 1880 cohort with the proportion of women reaching each parity falling sharply after parity five (Figure 6.23). The proportion of women with seven or more children fell from 59.6 per cent to 52.6 per cent from the 1860/70 cohorts to the 1880 cohort, while the proportion with 10 or more fell from 34.8 per cent to 14.5 per cent. The proportions of women reaching lower parities, however, were higher in the 1880 cohort than the 1860/70 cohorts. In the 1860/70 cohorts 79.8 per cent of women had four or more children compared with 88.2 per cent in the 1880 cohort.

There was a large fall in the fertility from the 1880 to the 1890 cohort from parity two onwards (Figure 6.23). For instance, the proportion of Other Nonconformist women with four or more children fell from 88.2 per cent in the 1880 cohort to 66.4 per cent in the 1890 cohort. For

women at higher parities the falls were smaller between the 1880 and 1890 cohort than between the two earlier cohorts. For example among women with nine or more children, the proportions were 42.6 per cent, 23.7 per cent and 15.0 per cent across the cohorts.

Figure 6.23 Other Nonconformists. Proportion of women reaching each parity, complete group: 1860/70, 1880 & 1890 Marriage Cohorts, Tasmania



Trends over time for Other Nonconformists were unlike any of the socioeconomic groups.

Discussion

Bivariate analyses of the mean (median) numbers of children ever born and of parity progression ratios for the complete group in the four Tasmanian marriage cohorts provide support for some of the theories of why fertility declined in the late 19th century.

Fertility declined in Tasmania from the second half of the 1880s. Fertility began to fall from the 1860/70 cohorts to the 1880 cohort but there was a much large fall from the 1880 to the 1890 cohort. In the 1880 cohort, fertility fell steadily after parity four, while in the 1890 cohort it dropped sharply after parity two. This supports demographic transition theory, since the 1880s and 1890s were a period of social and economic change and of modernisation in Tasmania (see Chapter 3). This will be expanded on in the qualitative analysis chapter.

In all marriage cohorts, women who married a younger ages had higher fertility than other women. While fertility fell for all women across the cohorts, it fell markedly for women marrying under 25 years of age. There were no consistent differences in fertility across the marriage cohorts according to the age difference between husband and wife.

There were marked differences in the fertility decline by socioeconomic status supporting theories of diffusion and economic theories. White-collar workers had lower fertility than all other workers in the 1860/70 cohorts, well before fertility declined in general, indicating that they were the earliest group to control their fertility. The timing of the fertility decline also varied among the socioeconomic groups. For white-collar workers, fertility fell from the 1860/70 cohorts to the 1880 cohort and from the 1880 to the 1890 cohort. The fertility of skilled, lower skilled and unskilled workers was very similar in the 1860/70 and 1880 cohorts, but fertility fell from the 1880 to the 1890 cohort. The timing of the fertility decline for farmers was different, with a large fall in fertility between the 1860/70 and 1880 cohort and a much lower fall between the 1880 and 1890 cohort. The fall in fertility from the 1880 to the 1890 cohort was much larger for skilled, lower skilled workers and unskilled workers than for farmers. One reason for the large difference in fertility of farmers in the 1860/70 and the 1880 cohorts may be related to differences in the composition of the two groups, with farmers in the 1860/70 more likely to be 'selectors' many of whom failed at farming, while those in the 1880 cohort may have been more successful farmers.

As noted, the bivariate analysis of trends in fertility for different socioeconomic status groups uses husband's occupation at the birth of the first child as the measure of socioeconomic status. Since a relatively high proportion of men changed their socioeconomic status at some time during their wife's childbearing years (Table 5.11), the multivariate analysis, which measures socioeconomic status at the birth of each specific child, will provide a clearer picture of the relationship between socioeconomic status and fertility decline.

There were also marked differences in the fertility decline by urban/rural location supporting theories of diffusion. Fertility was lower for urban women than for rural women in the 1860/70 cohorts indicating that they were already controlling their fertility. Fertility fell for both urban and rural women from the 1860/70 cohorts to the 1880 cohort and then to the 1890 cohort. The fall between the 1880 and 1890 cohorts was more substantial than the fall between the 1860/70 and 1880 cohorts. This mirrors the trend in the fertility decline for the complete group as a whole.

Differences in fertility between the religious groups were not very clear and do not provide strong support for secularisation theory. Catholics tended to have higher fertility than other groups while Presbyterians and Other Nonconformists tended to have lower fertility. Methodists tended to have higher fertility than all other Protestant groups. Fertility fell later for Catholics than the other religious groups, falling from the 1880 to the 1890 cohort for Catholics and from the 1860/70 cohorts for all other groups. The patterns of fertility decline of various religious groups were

similar to those for the specific occupational groups. For instance, trends in fertility over time for Catholics very similar to those for lower skilled and unskilled workers. However, an examination of religion by socioeconomic status does not support a relationship between socioeconomic status and religion (Tables A6.6–A6.8). For instance, while the trends over time in the fertility decline for Methodists were similar to those of skilled workers, skilled workers did not account for the largest group of Methodists in any marriage cohort.

The next chapter examines starting, stopping and spacing behaviour of the complete group in the marriage cohorts using bivariate and multivariate analysis. In the multivariate analysis, I examine the association of the various family characteristics examined in this chapter with stopping and spacing behaviour.

Chapter 7

How, when and why did fertility decline?

This chapter uses both bivariate and multivariate methods of analysis to examine whether the historical fertility decline in Tasmania was due to changes in starting, stopping and/or spacing behaviours. These analyses also provide answers to the questions of when fertility fell and why it fell at this time, specifically how the findings support theories of the historical fertility decline outlined in Chapter 1. In the analysis that follows, measures of starting, stopping and spacing are based on pregnancies that resulted in a live birth rather than live births, because of the occurrence of twin births in the population.

Bivariate analysis

Starting

As discussed in Chapter 1, scholars have argued that couples did not deliberately control their fertility through marrying earlier or later, that is, starting behaviour was not an individual form of fertility control. Instead, the timing of marriage related to economic, social and psychological factors, not to fertility preferences (McDonald 1981). Aside from a recent study (Lundh and Kurosu 2014), in the past 20 years little attention has been paid in historical demography to changes in the age of marriage and/or the age at first birth.

As outlined in chapter 5, age at marriage for women in the complete group rose slightly from the 1860/70 cohorts to the 1890 cohort, from a mean of 21.8 years (median 21.2) in the 1860/70 cohorts to a mean of 23.1 years (median 22.3) in the 1890 cohort (Table 7.1). The proportion of women who married as teenagers fell steadily, from 36.7 per cent of women in the 1860/70 cohorts to 21.4 per cent in the 1890 cohort. By 1890, just over a quarter of women were aged 25 years or older when they married. As noted previously, the increase in the age at marriage for women may be partly due to the increase in the ratio of females to males of marriageable age that occurred over the period (see Chapter 3).

Table 7.1 Age at marriage for women with children in their first marriage, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania			
	1860 /1870	1880	1890
Age at marriage	Per cent		
Less than 20 years	36.7	30.5	21.4
20-<25 years	45.1	53.0	50.1
25+ years	18.2	15.8	27.6
Missing	0.0	0.7	0.9
Total (per cent)	100.0	100.0	100.0
Total (no.)	539	417	529
Mean/median	*Age at marriage*		
Mean (1)	21.8	22.0	23.1
Median (1)	21.2	21.2	22.3

(1) Excludes missing data.

Consistent with trends in age at marriage, age at first birth also increased slightly over the marriage cohorts, from a mean age of 23.2 years (median 22.3) in the 1860/70 cohorts to a mean of 24.3 years (median 23.4) in the 1890 cohort (Table 7.2). The proportion of women having their first birth as a teenager fell markedly, from 23.8 per cent in the 1860/70 cohorts to 14.6 per cent in the 1890 cohort. In all four marriage cohorts, only a small proportion of women had their first birth at 30 years or older.

Table 7.2 Age at first birth, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania			
	1860 /1870	1880	1890
Age at marriage	Per cent		
Less than 20 years	23.8	18.0	14.6
20–24 years	48.4	57.1	48.0
25–29 years	19.5	17.0	25.5
30+ years	8.3	7.2	11.0
Missing	0.0	0.7	0.9
Total (per cent)	100.0	100.0	100.0
Total (no.)	539	417	529
Mean/median	*Age at first birth*		
Mean (1)	23.2	23.1	24.3
Median (1)	22.3	22.2	23.4

(1) Excludes missing data.

Measures of Stopping and Spacing

As discussed in Chapter 1, there are differing views among scholars as to extent to which couples reduced their fertility through practising stopping and/or spacing behaviour. Part of this

controversy involves the methods that have been used to identify stopping and spacing behaviour. A critical review of these methods can be found in Van Bavel (2004a).

I did not construct age-specific marital fertility rates for the complete group in the four marriage cohorts, since these women are not representative of all currently married women in Tasmania and their age-specific fertility rates would not be comparable with the age-specific marital fertility rates of any other population. Thus methods used to identify stopping and/or spacing using fertility rates by age, such as Coale and Trussell's (1974, 1978) indices M and m and Ewbank's (1989) indices of marital fertility are not discussed here.

Mean age of mother at last birth is one of the simplest indicators of stopping behaviour (Gutmann and Alter 1993; Knodel 1987). If the mean age of the mother at the birth of the last child falls, then families are assumed to be practising stopping behaviour.

For women in the Tasmanian marriage cohorts, mean age at last birth fell steadily from the 1860/1870 cohorts to the 1890 cohort from 38.8 years (median 40.0) to 36.1 years (median 37.0) (Table 7.3). The proportion who had their last birth when they were under 30 years of age increased from 8.7 per cent to 19.7 per cent from the 1860/70 cohorts to the 1890 cohort, while the proportion who were 40 years or older fell from 51.2 per cent to 29.7 per cent.

Table 7.3 Age at last birth, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania

	1860 /1870	1880	1890
Age at last birth	Per cent		
Less than 30 years	8.7	13.9	19.7
30-34 years	11.3	13.4	16.3
35-39 years	28.8	32.1	33.5
40+ years	51.2	39.8	29.7
Missing	0.0	0.7	0.9
Total (per cent)	100.0	100.0	100.0
Total (no.)	539	417	529
Mean/median	*Age at last birth*		
Mean (1)	38.8	37.5	36.1
Median (1)	40.0	38.5	37.0

(1) Excludes missing data.

Some scholars consider that mean age at last birth is a problematic indicator, since it can be affected by spacing behaviour as well as stopping behaviour (Anderton 1989). Anderton (1989) argues that if families space their births and the onset of sterility does not change, mean age at last birth will fall, because with longer birth spacing the onset of sterility will occur before families

can have the next 'spaced' birth. Thus spacing behaviour also increases the open interval, that is, the period between the last birth and the onset of sterility. Knodel and McDonald (Knodel 1987; McDonald and Knodel 1989) acknowledge that spacing behaviour can affect the mean age at last birth in the way described, but argue that spacing has only a modest impact on this indicator. They estimated that a period of, at most, half the increase in the last closed birth interval can be attributed to spacing behaviour when analysing the fall in the mean age at last birth. Thus if the last closed interval increases by four months, only two months of the decrease in the mean age at last birth can be attributed to spacing behaviour with the rest attributed to stopping behaviour (Knodel 1987; Okun 1995).

Okun (1995) used Barrett's Monte Carlo micro-simulation model of the reproductive process to investigate the extent to which mean age at last birth was affected by stopping and spacing behaviours. She simulated the birth histories of women with various levels of fecundability, who either adopted no fertility control or practised stopping or spacing behaviours with different degrees of success. In her simulation, she found that small reductions in mean age at last birth could not necessarily be attributed to stopping behaviour, since spacing behaviour that was practised continuously through marriage had a greater impact on mean age at last birth than McDonald and Knodel (1989) claimed.

On the basis of Okun's simulation results, she concludes that examining changes in the mean age at last birth according to age at marriage is a more useful way of distinguishing 'stopping' from 'spacing' behaviour than looking at changes in mean age at last birth overall. This is because when couples do not control their fertility, age at marriage does not have any relationship with age at last birth. However, when couples practise stopping behaviour, women who marry at younger ages stop their childbearing earlier (McDonald 1984).

Examining mean age at last birth by age at marriage for the Tasmanian marriage cohorts shows that the fall in mean age at last birth was somewhat higher for women marrying under 25 years of age than for women marrying at 25 years or older (Table 7.4). For women marrying under 20 years of age, mean age at last birth was 38.3 years (median 40.4) in the 1860/70 cohorts and fell to 35.5 years (median 37.0) in the 1890 cohort. The fall in the mean age at last birth, however, was not as large for those marrying at 25 years or older with mean age at last birth falling from 39.3 years (median 39.9) to 37.7 years (median 38.0) from the 1860/70 to the 1890 cohorts. The proportion of women completing their childbearing before age 35 years increased markedly for those marrying under 25 years of age, from around 20 per cent of women in the 1860/70 cohorts to

around 40 per cent in the 1890 cohorts (Table A7.1). Corresponding proportions for those marrying at age 25 years or older were 17.4 per cent and 24.0 per cent. Therefore, in the Tasmanian marriage cohorts, age at marriage was related to age at last birth which is consistent with the practice of stopping behaviour.

Table 7.4 Mean (median) age at last birth by age at marriage, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania (1)

	1860 /1870	1880	1890
Age at marriage	*Mean age at last birth*		
Under 20 years			
Mean	38.3	36.6	35.5
Median	40.4	37.2	37
20-24 years			
Mean	38.7	37.5	35.4
Median	39.8	38.4	36.2
25+ years			
Mean	39.3	36.6	37.7
Median	39.9	39.4	38

(1) Excludes three women in the 1880 cohort and five in the 1890 cohort for whom age is missing.

Measures to detect deliberate spacing behaviour are difficult to find (Knodel 1987). In populations with natural fertility, birth intervals can vary markedly because of differences in breastfeeding practices, periodic separation of spouses or factors beyond the couple's control, such as levels of fecundity and intra-uterine mortality. Birth intervals that increase with parity do not necessarily mean that couples are practising parity-dependent birth spacing, since birth intervals may increase as women age because of decreasing fecundity or decreased sexual activity. Last birth intervals are thus longer than other birth intervals. Also, very long last birth intervals do not necessarily imply that couples are deliberately spacing their births, as they may reflect failed attempts to stop childbearing. Couples who decide to stop having children, for instance, may have another birth accidently or may have stopped childbearing but decide to have another birth after one of their children dies.

In the Tasmanian marriage cohorts, the mean (median) interval between marriage and first birth was longer for women in the 1860/70 cohorts than for women in the other two cohorts, with a mean of 17.0 months (median 11.2) for the 1860/70 cohorts compared with 12.9 months (median 10.3) for the 1880 cohort and 15.0 months (median 10.9) for the 1890 cohort (Table 7.5). This may partly reflect the higher proportion of pre-marital conceptions in the 1880 and 1890 cohorts: 22.8 per cent of women in the 1880 cohort and 22.1 per cent in the 1890 cohort conceived their first

child prior to their marriage compared with 14.8 per cent of women in the 1860/1870 cohorts. The increase in the proportion of couples with premarital conceptions may be related to the increase in the age at marriage, in particular, the fall in the proportion of women who were teenagers where they married. As Carmichael (1996) has noted, when the age at marriage increases, the period of exposure to the risk of premarital pregnancy increases and thus the likelihood of couples marrying in order to legitimise their first child.

Table 7.5 Interval between marriage and first birth, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania

	1860 /1870	1880	1890
Age at marriage	Per cent		
Premarital conception	14.8	22.8	22.1
8 –<12 months	43.2	42.2	38.4
12 –<24 months	28.6	26.6	29.3
24 –< 36months	6.5	4.6	5.3
36 months	6.9	3.8	4.9
Total (per cent)	100.0	100.0	100.0
Total (no.)	539	417	529
Mean/median	Months		
Mean	17.0	12.9	15.0
Median	11.2	10.3	10.9

As outlined in Chapter 1, those who argue that couples controlled their fertility by deliberate spacing behaviour consider that these couples spaced their births from the earliest birth intervals. In the Tasmanian marriage cohorts, first inter-birth intervals were much longer on average than the interval between marriage and the first birth, but increased only slightly between the 1860/70 and 1890 cohorts, from a mean of 23.0 months (median 21.4) to a mean of 24.4 months (median 22.0) (Table 7.6). The proportion of couples with a first inter-birth interval of 36 months or more also increased slightly, from 7.1 per cent to 10.7 per cent.

Table 7.6 First inter-birth interval, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania			
	1860 /1870	1880	1890
Age at marriage	Per cent		
<18 months	29.0	32.5	29.2
18 –<24 months	34.1	35.1	33.0
24 – <30 months	21.9	16.5	21.4
30 – <36 months	7.9	7.2	5.8
36 + months	7.1	8.8	10.7
Total (per cent)	100.0	100.0	100.0
Total (no.)	493	388	449
Mean/median	*Months*		
Mean	23.0	23.3	24.4
Median	21.4	20.9	22.0

Note: excludes couples where the second birth is the last

There was little change in the length of the second inter-birth interval from the 1860/70 to the 1890 cohorts, with the mean birth interval remaining at around 26 months (median 23.4–23.7 months) (Table 7.7). As with the first inter-birth interval, the proportion of couples with a second inter-birth interval of 36 months or more increased slightly from 11.0 per cent to 14.4 per cent.

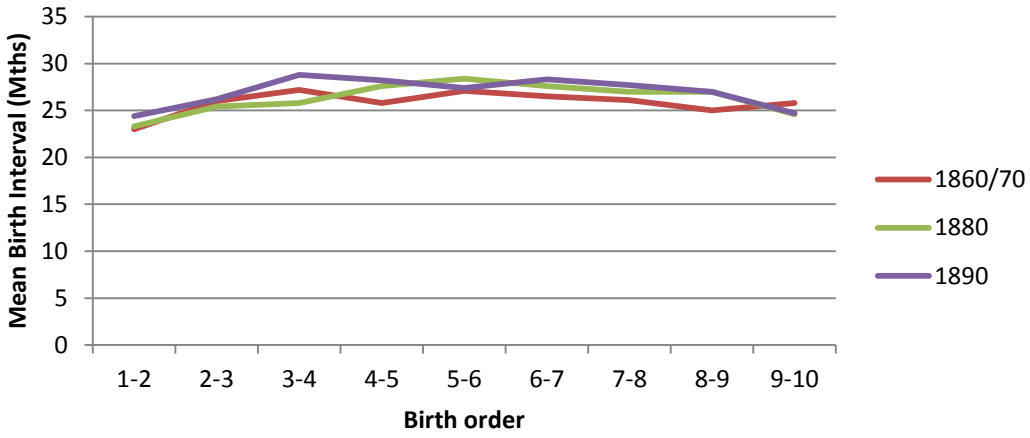
Table 7.7 Second inter-birth interval, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania			
	1860 /1870	1880	1890
Age at marriage	Per cent		
<18 months	15.2	21.3	21.9
18 –<24 months	36.6	34.0	29.5
24 – <30 months	28.1	23.0	25.1
30 – <36 months	9.1	11.8	9.1
36 + months	11.0	9.8	14.4
Total (per cent)	100.0	100.0	100.0
Total (no.)	462	356	383
Mean/median	*Months*		
Mean	26.0	25.4	26.1
Median	23.7	23.4	23.6

Note: excludes couples where the third birth is the last

For all inter-birth intervals up to parity 10, mean birth intervals were generally longest for the 1890 cohort, but they were longer for the 1860/70 cohorts than the 1880 cohort at lower parities and shorter at higher parities (Figure 7.1). These differences were not large, mainly in the order of 1–2 months. In the 1860/70 cohorts, mean birth intervals were around 2 years at every parity indicating the effect of breast feeding practices on amenorrhea (Tsuya et al. 2010). While there are no data on the extent of breastfeeding in the Australian colonies, a review of infant feeding in

19th century Australia indicates that experts advocated breastfeeding for between 9 and 18 months and concludes that 'mothers expected to breastfeed their infants, and most probably did so' (Hitchcock 1990: 21).

Figure 7.1 Mean birth intervals by birth order (excluding last), complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania



Source: Table A7.2

Last birth intervals were considerably longer than other birth intervals and increased across the cohorts, from a mean of 38.4 months (median 32.1) for the 1860/70 cohorts to a mean of 46.2 months (median 36.0) for the 1890 cohort (Table 7.8). This was due to the increase in very long last birth intervals, with the proportion of last birth intervals that were 72 months or longer increasing from 7.0 per cent in the 1860/70 cohorts to 16.5 per cent in the 1890 cohort.

Table 7.8 Last inter-birth intervals, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania (1)

	1860 /1870	1880	1890
Birth interval	Per cent		
<18 months	8.2	7.6	6.8
18 –<24 months	15.6	14.2	13.7
24 –<30 months	20.6	16.4	17.3
30 –<36 months	13.2	14.2	11.7
36 months –<72 months	35.4	36.0	34.1
72 + months	7.0	11.5	16.5
Total (per cent)	100.0	100.0	100.0
Total (no.)	514	408	504
Mean/median	Months		
Mean	38.4	42.3	46.2
Median	32.1	34.5	36.0

(1) *Includes couples with two or more births*.

Some authors argue that examining birth intervals by final parity provides a better indication of whether families are practising stopping or spacing behaviour. It is generally agreed that in populations of natural fertility and those that control their fertility, the length of mean birth intervals is inversely related to final parity with families with large numbers of children having the shortest mean birth intervals (Anderton and Bean 1985; Knodel 1987). With the practice of stopping, birth intervals may reduce for couples with moderate numbers of children, because they behave like those who have large families under conditions of natural fertility (have shorter birth intervals) but decide to stop at much lower parities.

During the fertility transition in late 19th century Utah, mean birth intervals by completed family size remained relatively unchanged (Anderton and Bean 1985). Anderton and Bean (1995) argue that this is because families were practising both stopping and spacing behaviour to control their fertility. They claim that under conditions of natural fertility, having a small completed family size (with relatively long birth intervals) was not due to problems with fecundity, but reflected the fact that a small proportion of couples were deliberately both stopping and spacing their births. They consider that the fall in fertility over the 19th century reflects an increasing proportion of couples both spacing and stopping their births to achieve these same birth patterns.

Okun (1995) used the simulation model, outlined above, to investigate whether an analysis of birth intervals stratified by birth order and final parity could distinguish between stopping and spacing behaviours. In her model, she examined the last birth interval separately from the preceding intervals, because of the effects of failed stopping in increasing this interval. Okun's simulation showed that mean birth intervals prior to the last decreased with stopping behaviour and increased with spacing behaviour. She concludes that examining changes in mean birth intervals stratified by final parity, excluding the last, is a good method for identifying whether couples are stopping or spacing their births. However, she argues that it is not possible to distinguish stopping from spacing behaviour by examining changes in the last birth interval, since the last birth interval increases with both stopping and spacing behaviour. It is worth noting that Okun's analysis involves modelling stopping or spacing behaviour, but not a combination of both, as argued by Anderton and Bean (1985).

Hionidou (1998) termed the interval between the first birth and the last but one birth, the 'overall' interval. In the Tasmanian marriage cohorts the mean overall birth interval was inversely related to parity in every marriage cohort, for example, decreasing from 30.4 months for couples with 3–4 children to 22.9 months for couples with 11–16 children in the 1880 cohort (Table 7.9). There was,

however, no consistent pattern in the change in the mean overall birth interval from the 1860/70 to the 1890 cohort for families of different parities. The mean overall birth interval decreased for couples with three or four children from 33.7 to 29.6 months, fell only slightly for couples with seven or more children and increased slightly for couples with five or six children. Overall, changes in the mean overall birth intervals were small providing little evidence of increased spacing.

Table 7.9 Mean overall birth interval by number of children complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

	1860/1870	1880	1890
Number of children	Mean overall birth interval (months)		
3–4 children	33.7	30.4	29.6
5–6 children	27.6	28.2	29.2
7–8 children	26.8	26.5	25.8
9–10 children	25.1	24.1	24.5
11–16 children (1)	23.7	22.9	22.3

(1) Mean for 1890 is illustrative only because of small numbers

Some scholars have put forward the view that age at marriage may affect birth spacing (Bumpass et al. 1978), since it is generally agreed that birth intervals are shorter when women marry at very young ages (Finnas and Hoem 1980). Anderton and Bean (1985), however, were surprised to find that birth intervals were shorter in the Utah population for those marrying after age 25 years compared with those marrying between the ages of 21 and 25 years. They argue that women who marry at older ages have shorter birth intervals because they aim to have a specific number of children but have less time to achieve this than those who marry at younger ages.

Some demographers who consider that both spacing and stopping played a role in the fertility transition argue that there are other questions about the fertility decline that need to be addressed, for instance, what proportion of couples in a marriage cohort were effective in controlling their fertility and how many children they had on average (David et al 1988; David and Sanderson 1988). They developed a method called Cohort Parity Analysis (CPA) to enable such questions to be answered in historical populations that practice both stopping and spacing. CPA derives lower and upper bound estimates for the proportion of a population adopting fertility control by comparing the parity progression ratios of women in the population of interest—the 'target' population—by age at marriage and duration of marriage, with the parity progression ratios of women in a population that is similar, but where there is no fertility control —the 'model' population (David and Sanderson 1988). The average final parity of women controlling their fertility can also be calculated within the CPA framework. Women in both the target and model populations are in their first marriage.

Okun (1994) evaluated this method using her simulation model and concluded that CPA is not a useful method of identifying fertility control practices in the early stages of a fertility transition. This was mainly because of her concerns about the large biases in CPA bounds introduced by even small differences between the target and the model populations in relation to 'length of the post-partum non-susceptible period, fecundability and pre-marital exposure to pregnancy' (Okun 1994: 222).

Failed stopping

It is clear that there is considerable disagreement among demographers as to the extent to which long last birth intervals are due to failed stopping, spacing or decreasing fecundity. An analysis of long birth intervals in the Tasmanian marriage cohorts, that is intervals of six years or more, may inform this debate. While six years is taken as the minimum length of a long birth interval, some last birth intervals were considerably longer. In the 1890 cohort, for instance, 18.0 per cent of long birth intervals were 10 years or more.

Where last birth intervals were long, there was variation between the marriage cohorts in the parity of the last birth (Table 7.10). In the 1860/70 cohort, long last birth intervals were fairly evenly spread among the parities, with the highest proportion of intervals, 16.7 per cent, between parities seven and eight. Long last birth intervals were more concentrated at specific parities in the other two cohorts. In the 1880 cohort, 21.3 per cent of long last birth intervals were between parities four and five, while in the 1890 cohort, 27.7 per cent were between parities three and four and 19.3 per cent between four and five. This shows that a substantial proportion of couples in the 1880 cohort were trying to stop after parity four and of those in the 1890 cohort after parities three and four.

Table 7.10 Parity of last birth, where last birth interval is six years or more, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania (1)			
	1860/70	1880	1890
Parity	Per cent		
Two	8.3	6.4	10.8
Three	2.8	10.6	8.4
Four	8.3	10.6	27.7
Five	8.3	21.3	19.3
Six	8.3	14.9	9.6
Seven	13.9	8.5	8.4
Eight	16.7	10.6	4.8
Nine	8.3	8.5	3.6
Ten	13.9	6.4	2.4
Eleven	8.3	2.1	4.8
Twelve	2.8	0.0	0.0
Total (per cent)	100.0	100.0	100.0
Total (no.)	36	47	83

(1) Includes couples with two or more births

It is interesting to examine the length of the interval preceding the long last birth interval, since if long last birth intervals are due to spacing behaviour, the last but one birth interval should also be relatively long. The majority of couples with a long last birth interval, however, had a relatively short penultimate birth interval (Table 7.11). More than half of couples in the 1880 cohort and three-quarters of couples in the 1860/70 and 1890 cohorts had penultimate birth intervals of less than three years. It seems highly unlikely that this pattern of birth intervals represents spacing behaviour.

Table 7.11 Length of the penultimate interval, where last birth interval is six years or more, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania (1)			
	1860 /1870	1880	1890
Birth interval	Per cent		
<24 months	36.4	36.4	37.8
24–<36months	39.4	22.7	39.2
36–<54 months	15.2	29.5	12.2
54 –<72 months	3.0	9.1	9.5
72 + months	6.1	2.3	1.4
Total (per cent)	100.0	100.0	100.0
Total (no.)	33	44	74

(1) Includes couples with three or more births

As noted above, last birth intervals tend to be longer than other birth intervals because of the decline in fecundity that women experience as they age. It has been shown, however, that in populations where families practise little or no fertility control, women's fecundity does not

decline to any great extent until after age 35 years, and only declines sharply after age 39 years (Menken et al. 1986). Half of the women in the 1890 cohort with long last birth intervals and 42 per cent in the 1880 cohort were under 30 years of age at the last but one birth (Table 7.12). It seems very unlikely that these long birth intervals were due to declining fecundity and more likely that they were due to failed stopping. Given that 'fertility, compared with that of women 20 to 24, is reduced on average by…14 per cent for those aged 30 to 34' (Menken et al. 1986: 1389), it is also unlikely that women who were aged 30 to 34 at their penultimate birth, had such long birth intervals due to reduced fecundity.

Table 7.12 Age of mother at the penultimate birth, where last birth interval is six years or more, complete group: 1860/70, 1880 and 1890 cohorts, Tasmania (1)

	1860 /1870	1880	1890
Age of mother	Per cent		
<25 years	8.3	2.1	14.5
25–29 years	8.3	40.4	34.9
30–34 years	41.7	27.7	30.1
35 –39 years	41.7	29.8	18.1
40 + years	0.0	0.0	1.2
Missing	0.0	0.0	1.2
Total (per cent)	100.0	100.0	100.0
Total (no.)	36	47	83

(1) Includes couples with two or more births

As noted above, long last birth intervals have also been attributed to couples having stopped childbearing, but changing their minds because one of their children died (Knodel 1987). Only a small proportion of families with long last birth intervals had a child die during the interval: seven in the 1860/70 cohort, four in the 1880 cohort and 12 in the 1890 cohort. For 16 of these couples, the interval between the death of a child and the birth of the last child was six years or longer. Of the seven families where the time between the child's death and the last birth was shorter than six years, only three couples had a gap of less than four years (Table 7.13). This shows that most of the couples who experienced a child's death during the long last birth interval did not have their last birth in response to this death.

Table 7.13 Families with long last birth intervals where the gap between death of a child and last birth was less than six years (seven families), complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania.

	1860/70	1860/70	1860/70	1880	1880	1890	1890
Last birth interval (mths)	73.4	115.7	87.1	73.7	80.4	120.2	115.7
Time between death & last birth interval (mths)	53.0	36.0	38.6	10.9	67.3	50.0	49.0
Age at death (years)	1.7	10.9	6.9	5.3	2.6	5.8	11.6

Stopping, Starting and Spacing: McDonald's formula

McDonald (1984) developed a decomposition technique to identify the extent to which changes in final parity can be attributed to stopping, starting or spacing behaviour. A modified version of McDonald's formula was used by Knodel (1987) in his analysis of the marital fertility of the German village populations in the 18th and 19th centuries. The McDonald method has been used in many analyses of the fertility decline in countries of Western Europe (e.g. Derosas 2006; Reher and Sanz-Gimeno 2007; Van Bavel and Kok 2005; van Poppel et al 2012).

As modified by Knodel, the formula is $CEB = 1 + (L-F)/I$, where *CEB* is mean number of children ever born, *F* is mean age at first birth, *L* is mean age at last birth and *I* is mean birth interval. Using decomposition analysis, the contribution of mean age at first birth, mean age at last birth and inter-birth intervals to changes in the number of children ever born can be assessed by substituting the relevant indicator into the equation for the base year and estimating its impact on the number of children ever born. Although McDonald (1984) originally advocated using a stepwise standardization approach, Knodel (1987) presented the changes attributable to each factor separately. Because the different factors interact with one another, the sum of the changes attributed to each component (*F, L, I*) do not necessarily add to the difference in the number of children ever born (*CEB*) (Knodel 1987). The difference between the two, however, is generally small and the interaction effects can be ignored.

The components used in the formula are presented in Table 7.14. Note that the data for the 1880 and 1890 cohorts on mean numbers of children ever born and mean birth interval are slightly different from those presented elsewhere, because these data exclude couples where women's age is missing.

Table 7.14 Mean children ever born, mean age of mother at first birth, mean age of mother at last birth and mean birth interval, complete group: 1860/70 , 1880, 1890 marriage cohorts, Tasmania (1)			
Component of change	1860 /1870	1880	1890
Mean children ever born	7.91	7.07	5.64
Mean age of mother at 1st birth (years)	23.2	23.1	24.3
Mean age of mother at last birth (years)	38.8	37.5	36.1
Mean birth interval (years)	2.27	2.37	2.54
Total (no.) (1)	539	414	524

(1) Excludes couples where mother's age is missing

Using the McDonald formula, comparing the 1860/70 and 1880 cohorts, the drop in the mean number of children ever born (–0.84) was mainly due to the fall in the mean age at last birth (–0.59) and an increase in the length of the mean birth interval (–0.30) (Table 7.15). The very small decrease in the mean age at first birth had an almost negligible effect (+0.01). Comparing the 1860/70 and 1890 cohorts, the fall in the mean number of children ever born (–2.27) was primarily due to the fall in the mean age at last birth (–1.22), while the increase in the length of the mean birth interval and in the mean age of the mother at the first birth also made substantial contributions (–0.74 and –0.51 respectively).

Table 7.15 Impact of age at first birth, age at last birth and birth intervals on children ever born, McDonald method, complete group : 1860/70 , 1880, 1890 marriage cohorts, Tasmania (1)		
Component of change	1860/1870 compared with 1880	1860/1870 compared with 1890
Mean age of mother at 1st birth	+0.01	–0.51
Mean age of mother at last birth	–0.59	–1.22
Mean birth interval	–0.30	–0.74
Children ever born	–0.84	–2.27

(1) Excludes couples where mother's age is missing

Both Knodel and McDonald (Knodel 1987; McDonald and Knodel 1989) agree that the formula cannot 'capture all of the subtleties and complexities involved in changes in stopping and spacing behaviour' (McDonald and Knodel 1989: 472). For instance, they acknowledge that a fall in the mean age at last birth, (*L*), which the formula attributes to stopping, can in some part be attributed to spacing, but as discussed above, argue that the effect is very small. Knodel (1987) also acknowledges that while increases in the mean birth interval (*I*) are attributed to spacing, this measure includes the last birth interval, changes in which may be due to 'failed' stopping. Both authors argue that despite these limitations, the formula can be used with confidence to distinguish the broad effects of the different practices. When McDonald developed the formula

originally, he advocated its use as a tool for 'first-stage analysis' and saw it as being followed by a 'second-stage analysis', in which findings would be examined at the individual level (McDonald 1984: 27).

Okun (1995) used her simulation model to look at the accuracy of McDonald's formula in distinguishing between stopping and spacing practices. She concluded that, since the effects of stopping behaviour are primarily shown through changes in the mean age at last birth and spacing behaviour through increases in the mean birth intervals, the McDonald formula 'provides a convenient device for roughly apportioning changes in CEB into its components' (Okun 1995: 92).

Van Bavel (2004a), however, argues that McDonald's technique can only differentiate between stopping and spacing when the population practising fertility control adopts either stopping or spacing behaviour, but not both. He claims that when one section of the population is practising stopping and another spacing behaviour, the McDonald method will disguise the effects of stopping behaviour on both mean age at last birth and mean birth intervals.

Multivariate analysis

Bivariate analysis, while being an important first step in any analysis of the fertility transition, is limited in its explanatory power. In the past twenty years or so, multivariate methods have become commonly used by historical demographers to examine the fertility decline (Gutmann and Alter 1993; Van Bavel 2004a). Van Bavel (2004a) proposes two multivariate analysis methods for investigating stopping and spacing behaviour: logistic regression and event history analysis (or survival analysis). Survival analysis is useful in analysing data sets where we do not have complete birth histories (Gutmann and Alter 1993). However, survival analysis does not allow us to distinguish spacing from stopping behaviour, since it models the risk of having the next birth, which can reflect either the length of the next birth interval or whether the woman stops having children (Berger et. al 2009; Gray et al. 2010). Since my data set includes only couples who have completed their childbearing, I use logistic regression to examine stopping behaviour and survival analysis on closed birth intervals to examine spacing behaviour. I was unable to fit a logistic regression model to examine parity progression, so I used survival analysis to examine the risks of a woman at a specific parity proceeding to the next parity.

Stopping behaviour

In this section, I investigate stopping behaviour using logistic regression to examine the determinants of any given birth being the last (Berger et al. 2009; Van Bavel 2004a). All families with one child or more are included in the analysis.

The dependent variable is whether or not a birth is the last birth (with '1' =last birth and '0'= not last birth).

Many of the following covariates included in the logistic regression model have been examined in the bivariate analysis in Chapter 6. The covariates used in the model relate to the theories of fertility decline discussed in Chapter 1 or are associated with a woman's fecundity:

- Age of wife at marriage
- Difference in age between husband and wife
- Husband's socio-economic status
- Type of geographic location
- Religion
- Literacy status of husband and wife.
- Whether a pregnancy resulted in the birth of twins.
- Whether the child died in infancy when the wife was not pregnant with another child
- The number of children alive at the beginning of the birth interval, that is, the number of children born to the couple less the number of children who had died under the age of 15 years.
- The number of children who had died (under the age of 15 years) at the beginning of the birth interval.
- The sex composition of the surviving children at the beginning of the birth interval.

In this analysis of Tasmanian marriage cohorts, the sex composition of the family is divided into three categories: more surviving girls than boys; more surviving boys than girls; and equal numbers of surviving boys and girls. I chose this categorization, rather than a categorization based on whether there were any boys or any girls in the family, because of the very small number of families in the Tasmanian marriage cohorts above parity four that had surviving children of one sex only.

Testing for multi-collinearity of the covariates (using 'collin' in STATA) showed that the covariates in the model are not highly correlated. Descriptive statistics of the covariates used in the logistic regression model are shown in Table A7.3.

The model shows that there are many covariates that are significantly associated with stopping behaviour (Table 7.16). Mother's age at the birth of a child and her age at marriage were important determinants of whether a mother stopped childbearing. The older a mother was at the birth of a child, the more likely she was to stop childbearing. The odds of stopping for a mother who had a birth at 30 years or older were 4.22 times the odds for women who had a birth under 20 years of age (p=0.000). Similarly, the older a woman was at marriage, the more likely that the birth would be her last. The odds of stopping childbearing for a woman who married at 25 years or older were 2.22 times (p=0.000) the odds for a woman who married under 20 years of age.

Controlling for all other factors, marriage cohort was a significant determinant of stopping childbearing. The odds of stopping childbearing for a woman in the 1880 cohort were 1.42 times and the odds for a woman in the 1890 cohort 2.22 times the odds for a woman in the 1860/70 cohorts(p=0.000).

In relation to occupational status, farmers and unskilled workers were significantly less likely to stop childbearing than white-collar workers (odds= 0.63 and 0.65 respectively, p=0.000) as were skilled workers (odds=0.81, $p<0.05$). Couples living in rural areas were significantly less likely to stop childbearing than those in urban areas (odds=0.69, p=0.000). No significant differences were found between religious groups or between couples according to their literacy status.

Having a twin birth was not a significant determinant of stopping. Having a child die as an infant while the mother was not pregnant with another was also not significant, but the more infant and/or child deaths the family had experienced at the birth of a child, the more likely they were to stop childbearing (odds=1.28, p=0.000). The number of surviving children had an effect on the likelihood of stopping, with the odds of stopping increasing by 24 per cent for each additional surviving child (p=0.000). However, the sex composition of the surviving children was not significantly associated with stopping.

Table 7.16 Logistic regression of the probability that a birth is the last, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania				
Covariate	*Odds ratio*	*Standard error*	*Significance (p)*	
Intercept	0.01	0.003	0.000	**
Mother's age at the birth				
<30 years (ref.)	1.00	–	–	
30-<35 years	1.44	0.237	0.027	*
35+ years	4.22	0.700	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.51	0.120	0.000	**
25+ years	2.22	0.259	0.000	**
Age difference between couple				
Same age or husband up to 5 years older (Ref.)	1.00	–	–	
Wife older	0.94	0.088	0.544	
Husband 5+ years older	1.07	0.074	0.352	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	1.42	0.111	0.000	**
1890 cohort	2.20	0.172	0.000	**
Socioeconomic status				
White-collar (ref.)	1.00			
Skilled	0.81	0.085	0.041	*
Farmers	0.62	0.059	0.000	**
Lower skilled	0.86	0.098	0.201	
Unskilled	0.65	0.062	0.000	**
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	0.69	0.053	0.000	**
Another colony	1.06	0.116	0.567	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	0.85	0.089	0.119	
Presbyterian	1.05	0.104	0.601	
Methodist	0.88	0.077	0.157	
Other Nonconformist	1.01	0.093	0.901	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.96	0.092	0.667	
Twin birth	1.60	0.407	0.063	
Child dies as infant before conception of another	0.88	0.115	0.324	
Number of child deaths	1.28	0.045	0.000	**
Number of surviving children	1.24	0.019	0.000	**
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	0.96	0.065	0.586	
Equals numbers of surviving boys and girls	0.98	0.090	0.798	
No. of births=9923				
Hosmer-Lemeshow chi2(8)=4.91 Prob>chi2=0.7673				

* P<0.05 ** P<0.01

Van Poppel et al (2012) argue that actual family size is the most important variable for understanding the fertility decline, not the number of children born to the family. I was unable to include all three covariates—number of children born to the family, number of surviving children and number of infant and child deaths—in my model because of multicollinearity. However, when

I ran the model substituting the covariate 'number of children' for the covariate 'number of infant and child deaths', I found that the number of surviving children was no longer significantly associated with stopping (odds ratio=0.97, p=0.452), but that the 'number of children' was a significant determinant of stopping (odds ratio=1.28, p=0.000).

Szreter's (1996) analysis of fertility in 19th century England and Wales shows that mining families had very high fertility. As outlined in Chapter 3, mining was a very important industry in late 19th century Tasmania. In the logistic regression model presented above, 'miners' were classified as 'lower skilled' workers. No significant differences were found between lower skilled workers and white-collar workers in the likelihood of stopping childbearing (odds ratio=0.86, p=0.201). I ran the same model for the 1890 marriage cohort only, classifying 'miners' separately and including the other lower skilled workers in the skilled category. Using this classification, while farmers and unskilled workers were significantly less likely to stop childbearing than white-collar workers, there were no significant differences between skilled workers and white-collar workers or between miners and white-collar workers. For skilled workers the odds ratio was 0.83 (p=0.264) and for miners it was 1.18 (p=0.554).

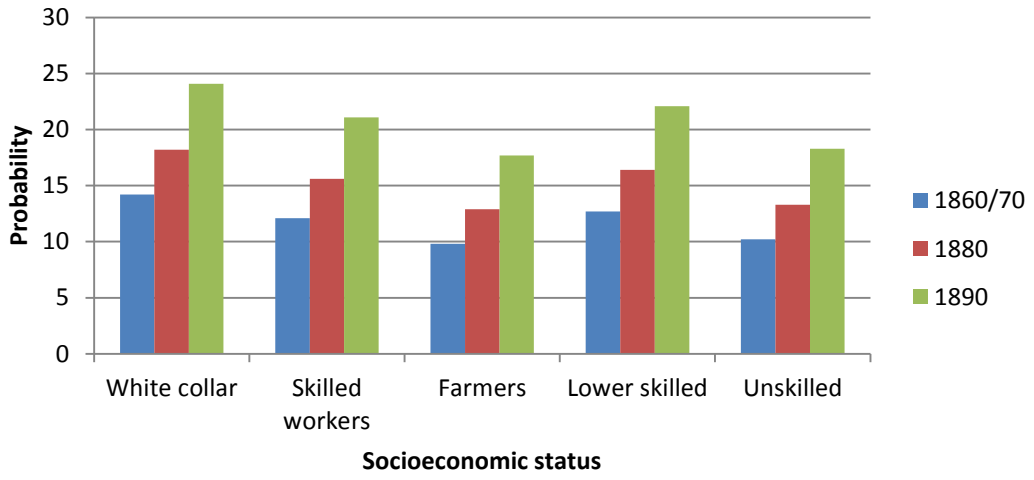
In summary, the logistic regression shows that the older a woman was at the birth of her child, the more likely she was to stop childbearing. Similarly, the older a woman was at marriage, the more likely she was to stop. Women in the 1880 cohort were more likely to stop childbearing than those in the 1860/70 cohort while women in the 1890 cohort were even more likely to stop. Farmers, unskilled workers and skilled workers were less likely to stop than white-collar workers and people living in rural areas of Tasmania were less likely to stop than those living in urban areas. The age difference between husband and wife, religion, literacy, and giving birth to twins had no significant association with stopping. However, the more surviving children the couple had the more likely they were to stop, but the sex of these children had no significant association with stopping. Having an infant die while the mother was not pregnant had no significant association with stopping, but the more infant and child deaths the couple experienced the more likely they were to stop.

In order to ascertain whether these findings were affected by couples who had all their births outside the colony, I ran the same model only for couples who had at least one birth in Tasmania. The results were almost identical, except that for those with at least one birth in Tasmania skilled workers were not significantly less likely to stop childbearing than white-collar workers (odds ratio=0.83, p=0.076).

I also ran the model with interaction effects to see if the relationships within the socioeconomic groups, religious groups and groups living in different geographic areas were consistent across cohorts. I found that the interaction effects were not significant, so that there was no evidence that there were differences in the relationships within the groups in the different marriage cohorts.

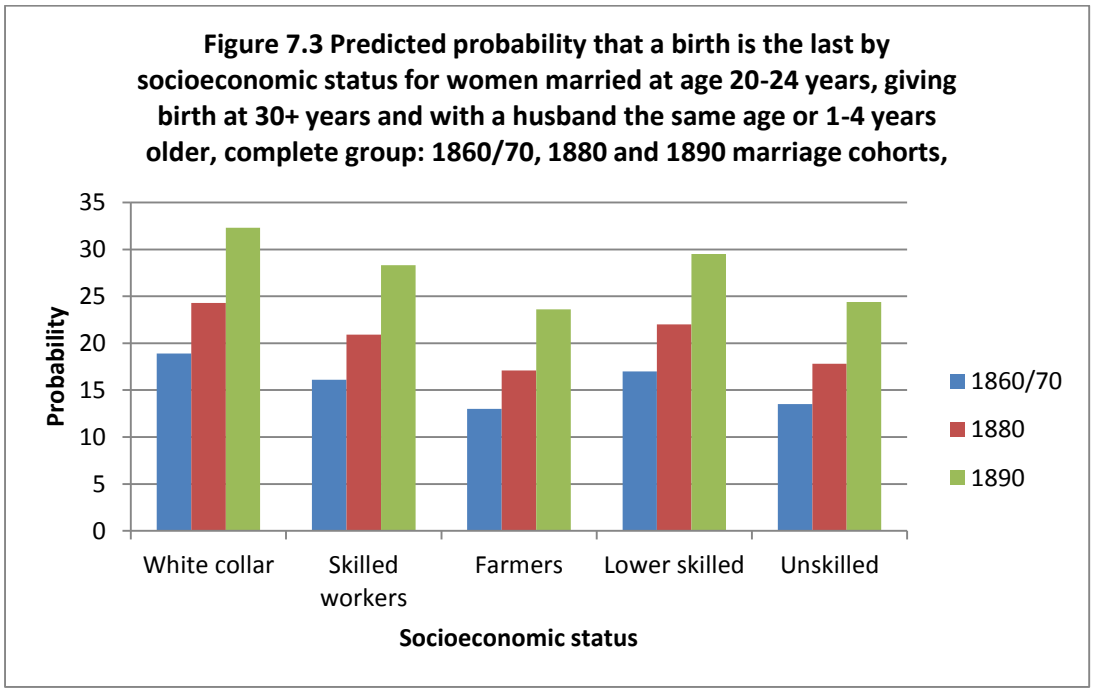
The predicted probability of a birth being the last (calculated from the logistic regression model) also showed the same patterns across cohorts. While the predicted probability of stopping increased over the marriage cohorts, it was highest for white-collar workers in every cohort and lowest for farmers and unskilled workers (Figure 7.2). The predicted probability of stopping for white-collar workers was 0.14 in the 1860/70 cohort compared with 0.10 for farmers. By the 1890 cohort, the predicted probability of stopping had increased to 0.24 for white-collar workers and 0.18 for farmers.

Figure 7.2 Predicted probability that a birth is the last by socioeconomic status, complete group: 1860/70, 1880 and 1890 marriage cohorts Tasmania



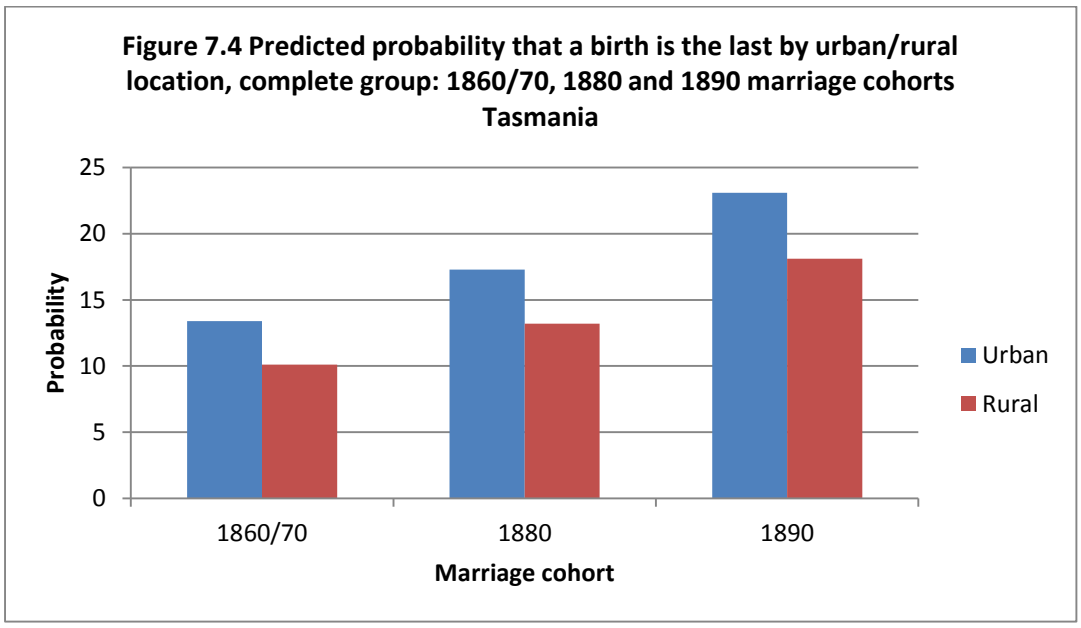
Source: Table A7.4

Women who married at age 20–24 years, gave birth at 30 years or older and had a husband who was the same age or 1–4 years older were the most common group in every cohort. The predicted probability of stopping was higher for this group of women than for women as a whole (Figure 7.3). However, the pattern by socioeconomic status was the same as in Figure7.2. For white-collar workers the predicted probability of stopping was 0.19 in the 1860/70 cohorts and had risen to 0.32 in the 1890 cohort. The comparable probabilities for farmers were 0.13 and 0.24.



Source: Table A7.5

The predicted probability that a birth was the last increased over the cohorts both for couples living in urban areas and for those in rural areas and was higher for couples in urban areas in every marriage cohort (Figure 7.4). It increased from 0.13 to 0.23 across the marriage cohorts for those living in urban areas and from 0.10 to 0.18 for those living in rural areas.

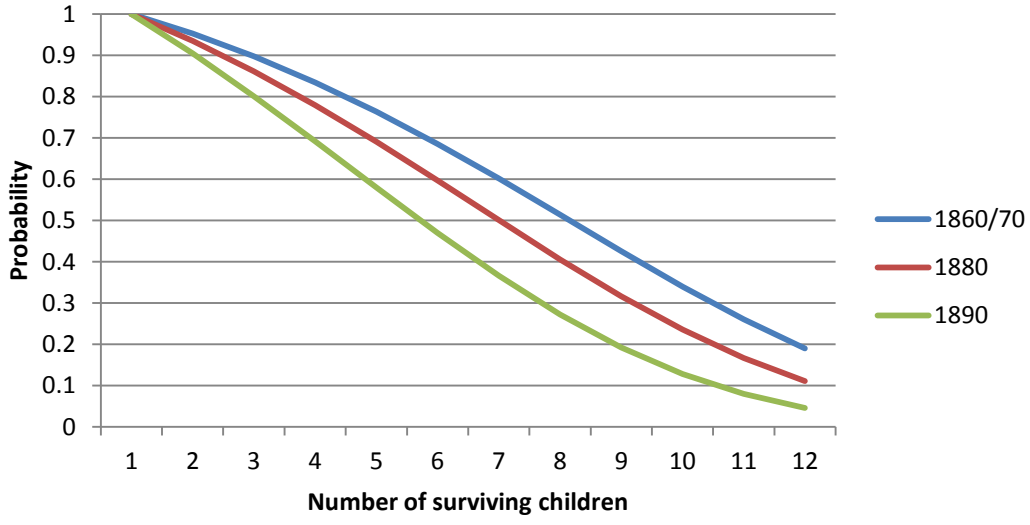


Source: Table A7.6

Similarly to socioeconomic status, although predicted probabilities of stopping were higher for women married at ages 20–24 years, giving birth at 30 years or older with a husband the same age or 1–4 years older, the pattern by urban/rural location was the same (Table A7.7). For women living in urban areas, the predicted probability of stopping having children increased from 0.18 to 0.31 from the 1860/70 to the 1890 cohorts and for those living in rural areas from 0.13 to 0.24. The predicted probability increased from 0.22 to 0.37 across the cohorts for this group of women who lived in urban areas and whose husband was a white-collar worker.

The predicted probabilities of stopping with each surviving child can be used in the same way as parity progression ratios (see Chapter 6) to calculate the proportion of women in each cohort predicted to have at least a specific number of surviving children (Figure 7.5). This shows that the predicted probability of women in each marriage cohort having a specific number of surviving children dropped steadily across the marriage cohorts. For instance, the predicted probability of women having four or more surviving children dropped from 0.84 in the 1860/70 cohorts to 0.78 in the 1880 cohort and then to 0.69 in the 1890 cohort. Similarly, the predicted probability of women having ten or more surviving children dropped from 0.34 in the 1860/70 cohorts to 0.24 in the 1880 cohort and to 0.13 in the 1890 cohort. This shows that couples in the 1880 and 1890 cohorts but had different preferences as to stopping childbearing.

Figure 7.5 Predicted probability of women having at least a specific number of surviving children, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania



Source: Table A7.8

Birth spacing

I originally intended to use Cox regression to analyse the determinants of the length of birth intervals. However, when I undertook the 'ph test' and examined the survival curves, I found that my data violated the proportional hazards assumption (Cleves et al. 2010: 208–9). I therefore used a piecewise exponential regression model for my analysis of birth spacing (Cleves et al. 2010: 329).

I did not include the interval between marriage and the first birth in the model, since the marriage cohorts varied markedly in the proportion of first births that were conceived before marriage (see Table 7.2). Many other studies of spacing behaviour have concentrated on inter-birth intervals for this reason (Van Bavel and Kok 2004; Tsuya et al 2010). Thus the spacing analysis includes only couples with two or more children.

The dependent variable was the length of a birth interval in months (rounded to one decimal place).

I used the same covariates as in the logistic regression with the following exceptions:

- I used the crude parity at the beginning of the birth interval to control for fecundity, since women with higher parities tend to have shorter birth intervals (Van Bavel and Kok 2004, 2010).
- I excluded number of deaths of infants and young children because of multicollinearity as discussed above.
- I included a dummy variable that indicates whether the birth interval was the last, to account for the fact that last birth intervals are generally longer than other birth intervals even in circumstances where there is no fertility control (Van Bavel and Kok 2004).

Descriptive statistics of the covariates used in this model are shown in Table A7.9.

The model shows that there are many covariates that are significantly associated with the length of birth intervals. (Table 7.17).

Birth spacing was associated with the mother's age at birth, with birth intervals being significantly longer for women who gave birth when they were older. When women gave birth at age 30 years or older, for instance, their birth intervals were longer than when they gave birth under 25 years of age (relative risk=0.65, p=0.000). In contrast, birth intervals were significantly shorter for women who married at older ages, with women marrying at 25 years or older having much shorter

birth intervals than women who married under 20 years of age (relative risk=1.55, p=0.000). The age difference between the husband and wife had no significant association with the length of the birth interval.

Table 7.17 Estimated effects (relative risks) of various characteristics on the time to the next birth (closed birth intervals), complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard Error*	*Significance (p)*	
Constant	0.07	0.005	0.000	**
Mother's age at birth of a child				
<25 years (ref.)	1.00	–	–	
25-29 years	0.75	0.025	0.000	**
30+ years	0.65	0.029	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-24 years	1.13	0.031	0.000	**
25+ years	1.55	0.073	0.000	**
Age difference between couple				
Same age/ husband up to 5 years older (ref.)	1.00	–	–	
Wife older	1.05	0.037	0.214	
Husband 5+ years older	1.01	0.025	0.645	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.95	0.026	0.070	
1890 cohort	0.86	0.024	0.000	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.00	0.040	0.859	
Farmers	1.06	0.037	0.071	
Lower skilled	0.99	0.044	0.917	
Unskilled	1.04	0.037	0.186	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.07	0.030	0.014	*
Another colony	1.05	0.046	0.309	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.04	0.038	0.288	
Presbyterian	1.00	0.036	0.992	
Methodist	1.05	0.032	0.093	
Other Nonconformist	0.93	0.031	0.036	*
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.96	0.031	0.224	
Twin birth	1.05	0.127	0.669	
Number of children (crude parity)	1.05	0.018	0.008	**
Number of surviving children	0.99	0.018	0.766	
Child dies as infant before conception of another	1.45	0.067	0.000	**
Ultimate birth interval	0.42	0.014	0.000	**
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	1.01	0.024	0.640	
Equal numbers of surviving boys and girls	0.96	0.030	0.237	
No. of birth intervals=8,466				

*p<0.05, **p<0.01

Marriage cohort was significantly associated with the length of the birth interval, with intervals being significantly longer for women in the 1890 marriage cohort compared with the 1860/70 cohorts (relative risk=0.86, p=0.000). Women in rural areas of Tasmania had significantly shorter birth intervals than those in urban areas (relative risk=1.07, p<0.05), while Other Nonconformists had significantly longer birth intervals than Anglicans (relative risk=0.93, p<0.05). Socioeconomic status and literacy status of the husband and wife had no significant association with the length of the birth interval.

The higher the parity, the shorter the birth interval (relative risk=1.05, p<0.01). Having a child die in infancy while the woman was not pregnant with another significantly reduced the time to the next birth (relative risk=1.45, p=0.000). The last birth interval was significantly longer than the other birth intervals (relative risk=0.42, p<0.01).

However, the number of surviving children was not significantly related to the length of the birth interval, nor was their sex composition. Giving birth to twins also had no significant association with the length of the next birth interval.

I was unable to run my model to estimate shared frailty in order to look at the correlation between birth intervals within marriages (Cleves 2010: 157–159; Van Bavel and Kok 2004), since I did not have the computational power to undertake this analysis.

In order to ascertain whether these findings were affected by couples who had all their births outside the colony, I ran the same model for couples who had at least one birth in Tasmania, with similar results, except that the parity of the birth was only significant at the p<0.05 level.

I ran the model with interaction effects to see if there were differences in spacing within socioeconomic status, geographic location and religious groups across the cohorts. I found significant differences in the birth spacing of farmers and unskilled workers compared with white-collar workers in the 1890 cohort compared with the 1860/70 cohorts (Table A7.10). Farmers (relative risks=1.26, p<0.05) and unskilled workers (relative risks=1.19, p<0.05) had significantly shorter birth intervals than white-collars workers in the 1890 cohort compared with the 1860/70 cohorts. This shows that white-collar workers were spacing their births in the 1890 cohort compared with other cohorts. Methodists (relative risk=1.32, p<0.05) also had significantly shorter birth intervals than Anglicans in the 1880 cohort compared with the 1860/70 cohorts. This finding is not explained by any differences in the composition of the Methodist group in the three cohorts,

since the proportions of Wesleyan Methodists, Primitive Methodists and United Free Methodists in the 'Methodist' group did not change between the cohorts.

Parity progression.

In order to investigate the timing of the fertility decline, I used multivariate analysis to look at the determinants of parity progression. I wanted to see if there were specific parities at which the 1880 and 1890 cohorts were likely to stop childbearing compared with the 1860/70 cohorts. As noted above, my data did not fit a logistic regression model, so that I had to use a survival analysis model. As with the spacing analysis, I used a piecewise exponential regression model since my initial analysis showed that the data violated the proportional hazards assumption. I did not estimate the effects of various characteristics on parity progression from parities above parity nine, because of the smaller numbers at these higher parities.

As noted above, differences in the relative risk of having another birth can indicate either differences in spacing or in stopping behaviour.

I used the same covariates as in the logistic regression with some exceptions.

- I excluded the covariate 'number of children dead' at the parity since this was the obverse of the 'number of surviving children' at any parity.
- I excluded the covariate 'twin birth', because of the small number of twin births at each parity.
- I used a different categorization for 'mother's age at the birth' at low and high parities because of the different numbers in the various categories as women aged. 'Mother's age at birth' was divided into three categories: <25 years, 25-<30 years and 30+ years for parities one to four; and <30 years, 30-<35 years and 35+ years for parities five and over.

The survival analysis models show that covariates which consistently had significant effects on the risk of progressing from one parity to another were: mother's age at the birth of a child; mother's age at marriage; marriage cohort; and whether the child died as an infant while the mother was not pregnant with another child (Tables 7.18, A7.11–7.19).

At every parity except parity nine, the oldest mothers had a significantly lower risk of having another birth than the youngest mothers. For instance, among those with four children, mothers who were 30 years or older had a significantly lower risk of having another birth than those who were under 25 years of age (relative risk=0.41, p=0.000). Similarly, among those with seven

children, mothers who were 35 years or older had a significantly lower risk of having another birth than those who were under 30 years (relative risk=0.20, p=0.000).

Women's age at marriage, however, had the opposite effect with mothers marrying at older ages having a significantly higher risk of having another birth at parities one, three, five and six. Among women with five children, for instance, women who married between 20 and 24 years and those who married at age 25 years and over had a significantly higher risk of having another birth than those who married under 20 years of age (relative risks=1.28 and 2.60 respectively, $p<0.01$).

Women in the 1890 marriage cohort had a significantly lower risk of having another birth than women in the 1860/70 cohorts at all parities except parities one and nine, and even at parity one, the risk was almost significant (relative risk=0.88, p=0.051). For those in the 1890 cohort, the relative risks of having another birth compared with those in the 1860/70 cohorts ranged from 0.77 at parity two to 0.58 at parity four ($p<0.01$). Women in the 1880 cohort also had a significantly lower risk of having another birth compared with those in the 1860/70 marriage cohort at parities four and five (relative risks=0.72 and 0.73 respectively, p=0.000).

Women with a child dying as an infant while they were not pregnant with another had a significantly higher risk of having another birth than other mothers at all parities except four and eight, with the relative risks ranging from 1.40 at parity one to 1.65 at parity nine ($p<0.01$ except at parity seven where $p<0.05$).

Wives of farmers and unskilled workers had a significantly higher risk of having the next birth than white-collar workers at parities two and three ($p<0.01$). For farmers' wives the relative risks were 1.31 at parity two and 1.43 at parity three, while for the wives of unskilled workers they were 1.30 and 1.32 respectively. Farmers also had a significantly higher risk of having the next birth than white-collar workers at parities one and six ($p<0.05$).

Women living in a rural area of Tasmania had a significantly higher risk of having another birth compared with women living in an urban area of Tasmania at parities two, four and seven, with a relative risk at parity four, for instance, of 1.23 ($p<0.01$).

Some of the other covariates were significantly associated with the risk of having another child at a couple of parities. These were the age difference between couples, religion, number of surviving children and the sex composition of the surviving children.

Table 7.18 Estimated (significant) effects (relative risks) of various characteristics on parity progression from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania (Tables A7.11–A7.19)

	Parity progression								
	1 to 2		2 to 3		3 to 4		4 to 5		
	Rel. risks		Rel. risks		Rel. risks		Rel. risks		
Mother's age at the birth									
<25 years (ref.)	1.00		1.00		1.00		1.00		
25-<30 years	0.78	*	0.82	*	0.67	**			
30+ years	0.41	**	0.50	**	0.37	**	0.41	**	
Mother's age at marriage									
<20 years (ref.)	1.00				1.00				
20-<25 years					1.25	*			
25+ years	1.32	*			1.63	**			
Age difference between couple									
Same age/husband up to 4 years older (Ref.)			1.00						
Wife older			1.25	**					
Husband 5 or more years older					0.87	*			
Marriage cohort									
1860/70 cohorts (ref.)			1.00		1.00				
1880 cohort							0.72	**	
1890 cohort			0.77	**	0.67	**	0.58	**	
Socioeconomic status									
White-collar (ref.)	1.00		1.00						
Farmers	1.24	*	1.31	**	1.43	**			
Unskilled			1.30	**	1.32	**			
Type of geographic location									
Urban area in Tasmania (ref.)									
Rural area in Tasmania			1.21	**			1.23	*	
Child dies as infant before conception of another	1.40	**	1.54	**	1.62	**			
Sex composition of surviving children	n.a.								
More surviving girls than boys (ref.)							1.00		
Equal numbers of surviving boys and girls							0.82	*	

Table 7.18 Estimated (significant) effects (relative risks) of various characteristics on parity progression from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania (Tables A7.11–7.19) (cont.)

	Parity progression				
	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10
	Rel. risks	Rel. risks	Rel. risks	Rel. risks	Rel. risks
Mother's age at the birth					
<30 years (ref.)	1.00	1.00	1.00	1.00	
30-<35 years	0.61 **	0.81 *	0.53 **		
35+ years	0.15 **	0.29 **	0.20 **	0.32 **	
Mother's age at marriage					
<20 years (ref.)	1.00	1.00			
20-<25 years	1.28 **				
25+ years	2.60 **	1.42 *			
Age difference between couple					
Same age/husband up to 4 yrs older (Ref.)		1.00			
Husband 5+ years older		0.83 *			
Marriage cohort					
1860/70 cohorts (ref.)	1.00	1.00	1.00	1.00	
1880 cohort	0.73 **				
1890 cohort	0.68 **	0.73 **	0.72 **	0.68 **	
Socioeconomic status					
White-collar (ref.)		1.00			
Farmers		1.34 *			
Type of geographic location					
Urban area in Tasmania (ref.)			1.00		
Rural area in Tasmania			1.24 *		
Religion					
Anglican (ref.)			1.00		1.00
Methodist			0.76 *		1.39 *
Child dies as infant before conception of another	1.50 *	1.60 **	1.43 *		1.65 *
Number of surviving children	1.13 *		1.11 *		

In summary, women giving birth at older ages had a significantly lower risk of having another birth at most parities. In contrast, women marrying at older ages, had a significantly higher risk of having another birth at some low parities. Women in the 1890 cohort had a significantly lower risk of having another birth than women in the 1860/70 cohorts at most parities, while women in the 1890 cohort had a significantly lower risk at parities four and five. Women with a child dying as an infant while they were not pregnant had a significantly higher risk of having the next birth at most parities. Wives of farmers and unskilled workers had a significantly higher risk of having another birth than wives of white-collar workers at some low parities. Women living in a rural area of Tasmania had a significantly higher risk of having another birth than women in urban areas at some low to medium parities.

Summary

Bivariate and multivariate analyses of the fertility decline for the complete group in the four Tasmanian marriage cohorts indicate when fertility started to decline and provide support for some of the theories of how and why fertility declined in the late 19th and early 20th centuries.

Fertility declined in Tasmania from the second half of the 1880s and the fall was well established during the 1890s. Fertility began to fall from the 1860/70 cohorts to the 1880 cohort but there was a much larger fall from the 1880 to the 1890 cohort. Compared with women in the 1860/70 cohorts, women in the 1880 cohort had a significantly lower risk of having another birth at parities four and five while women in the 1890 cohort had a significantly lower risk of having another birth at almost all parities from parity two onwards. The timing of the fertility decline supports demographic transition theory, since this was a period of social and economic change and modernisation in Tasmania (see Chapter 3).

Analyses of stopping and spacing behaviour provide support for both demographic transition theory (adjustment) and diffusion theory (innovation). The fall in fertility in late 19th century Tasmania was primarily due to the practice of stopping behaviour in the 1880 and 1890 cohorts, while the practice of spacing behaviour in the 1890 cohort also contributed to the fertility decline. In all marriage cohorts, some groups had longer birth intervals than others suggesting that these groups were deliberately spacing their births before the fertility decline. However, the extent of the spacing was small and this may have been counter-balanced by shorter birth intervals of couples marrying at later ages or those with large families, having little effect on fertility levels in the earliest cohorts. Changes in starting behaviour made a small contribution to the fertility

decline, due to a slight increase in the age at marriage. As discussed in Chapter 1, it is unlikely that a change in the age at marriage is related to fertility preferences.

The practice of stopping and spacing behaviours varied by different family characteristics, lending support to some of the theories of why fertility declined at this time.

Socioeconomic status was significantly associated with both stopping and spacing supporting both diffusion and economic theories of fertility decline. In every marriage cohort, white-collar workers were significantly more likely to stop childbearing than skilled workers, farmers and unskilled workers. This indicates that white-collar workers were controlling their fertility before the fertility decline. In the 1890 cohort, white-collar workers were also spacing their births, compared with farmers and unskilled workers. White-collar workers in the 1890 cohort may have been spacing their births for economic reasons at this time.

Geographic location was also significantly associated with stopping and spacing behaviours, supporting theories of diffusion. In every marriage cohort, people living in urban areas were more likely to stop having children and more likely to space their births than people living in rural areas. This indicates that people in urban areas were controlling their fertility before the fertility decline.

The findings relating to religion provide mixed support for theories of secularisation. Although there were no significant differences between religious groups in stopping behaviour, there were some differences in spacing behaviour. Other Nonconformists were more likely to space their births than Anglicans in every marriage cohort, indicating that they were deliberately spacing their births before the fertility decline. This may also support theories of diffusion, since Other Nonconformists—Congregationalists/Independents and Baptists—may have had higher literacy than Anglicans because of their emphasis on reading the scriptures (see Chapter 1). Methodists had significantly shorter birth intervals than Anglicans in the 1880 marriage cohort, but this is difficult to explain. It is important to note that the measure of religion used here is a measure of religious affiliation not of religiosity. Additionally, some couples may have changed their religious affiliation at some time during their childbearing years (see Chapter 3).

In Tasmania, literacy levels of husband and wife were not significantly associated with fertility control practices providing no support for theories of diffusion or gender equity. However, whether or not the husband and wife signed the marriage register is a weak measure of literacy.

The analyses of stopping and spacing behaviour do not support the 'replacement' or 'insurance' effects of infant and child mortality on fertility. Having a child die in infancy while a mother was not pregnant was not a significant determinant of stopping. However, the more infant and child deaths the family experienced, the more likely they were to stop childbearing. The number of surviving children also had no significant association with the time to the next birth indicating that couples were not adjusting their birth spacing in relation to deaths of infants or children.

The analysis of spacing behaviour supports the 'physiological' relationship between infant mortality and fertility. Having a child die as an infant when the woman was not pregnant with another child significantly reduced the time to the next birth. This was because with the death of an infant the woman stopped breastfeeding and started to ovulate. The survival analysis of parity progression shows that women who had a child die as an infant had a significantly higher risk of having another birth than other women at most parities, but this may reflect the length of time to the last birth rather than having another birth.

Chapter 8 Why did fertility fall in Tasmania during this period? Qualitative insights

Some scholars have used contemporary literature to 'shed light on the extent of knowledge of birth control and attitudes toward reproduction and children in the past and help place the newly emerging quantitative results in their social, psychological and cultural context' (Knodel and van de Walle 1979: 219). This chapter examines how the historical context of Australia, and of Tasmania specifically, and the historical sources of the period provide support for theories of the historical fertility decline discussed in Chapter 1: demographic transition theory; infant and child mortality; the greater accessibility of artificial methods of birth control; diffusion theory; economic theories; secularisation; and changes in women's roles and status in society and in the family.

The qualitative analysis in this chapter was undertaken after the quantitative analysis was completed and its purpose is to answer questions that the quantitative analysis could not answer. As noted in the summary to Chapter 1, there has been little research undertaken into three main areas of the historical fertility decline: how ideas and values about fertility control and knowledge of methods were diffused; what methods of contraception were used during the fertility decline; and what was the role of women in the decline. These questions could not be answered by the quantitative analysis presented in this thesis. My findings in relation to secularisation were also not definitive. The qualitative findings presented in this chapter address these questions and complement the quantitative findings presented in the previous chapters.

Much of the information in this chapter comes from witness statements and other published material from the 1903 NSW Royal Commission into the Decline of the Birth Rate (NSW 1904a, 1904b). The Royal Commission was set up in 1903 to 'make a diligent and full Inquiry into the Causes which have contributed to the Decline in the Birth-rate of NSW and the Effects of the Restriction of Child-bearing upon the well-being of the community' (NSW 1904a: 1). The Commissioners quickly came to the conclusion that the decline in the birth rate was due to deliberate efforts by parents to restrict their fertility. While the Commissioners were vehemently opposed to fertility control and asked very leading questions of the witnesses (Hicks 1978), the published accounts provide valuable information about the historical fertility decline from people living at the time.

The Tasmanian birth rate fell around the same time as the New South Wales birth rate and given the similarities between the two states, there is no doubt that the qualitative evidence regarding fertility control presented here for New South Wales applied also to Tasmania. The Commissioners confirm this in their report, stating “We have spoken thus far in this chapter in reference solely to the State whose population is the immediate subject of our inquiry; but what applies to NSW is obviously no less applicable to the whole of Australasia” (NSW 1904a: 172). At this time, Tasmanian society was very similar to that of New South Wales. The states had the same culture, similar socio-economic systems, education systems and legal systems. These states were similar in terms of religion, although New South Wales was more Catholic than Tasmania (See Chapter 3). New South Wales and Tasmania were the earliest settled colonies of Australia and their settlers had similar British cultural origins. As discussed in Chapter 3 and below, communication between Tasmania and the other states, including New South Wales, was very good. News from the mainland states was reported daily in the Tasmanian newspapers. Ships carrying goods and people travelled several times a week between Sydney and Tasmanian ports. People moved between New South Wales and Tasmania both temporarily and permanently. Several of the couples in the marriage cohorts had births in Sydney or in other parts of New South Wales, with some remaining in New South Wales and others returning to Tasmania.

Some information about life in 19th and early 20th century Tasmania comes from the diaries of two women—Amy Walker (1851–1940) who was in the 1870 marriage cohort and Ida McAulay (1858–1949) who was a prominent feminist in late 19th and early 20th century Hobart (McAulay 1889–90, 1890, 1897, 1898, 1899, 1900, 1903, 1904, 1905; Walker 1869, 1879, 1880, 1881, 1882, 1888, 1898) (Appendix D: Stories 5 and 6). While these women did not write about family limitation or the fall in the birth rate, their diaries provide an insight into the lives of upper class women in Tasmania in the last two decades of the 19th and first decade of the 20th century and into the social and economic conditions of the time. Pregnancy was not a subject that was discussed by these women in their diaries. On 22 April 1888, Amy Walker said that she ‘drove to Parsonage to see Fanny who is ill’, but it is not until 3 December 1888 when she ‘heard that Fanny’s little daughter was born last night’ that it is clear that the illness was related to pregnancy (Fanny was her sister) (Walker 1888). Similarly, Ida McAulay wrote in her diary daily during 1898, but it is not until 8 September that we learn that ‘twins born. Ida: 5 lb 3 oz. Mollie 5 lbs 10 ozs’ (McAulay 1898).

Other historical sources used in this chapter are articles or items from late 19th and early 20th century newspapers of Tasmania and other colonies and stories about people in the Tasmanian marriage cohorts.

Demographic transition theory

The social and economic conditions of Tasmania at the time of the historical fertility decline provide some support for demographic transition theory. Tasmania became more urbanised and industrialised in the late 19th century and there was marked social and economic development.

The colony became more industrialised in the last two decades of the 19th century with the growth of the mining industry, which overtook agriculture in terms of its importance to Tasmania's economy (see Chapter 3). The proportion of the population employed in agriculture fell steadily from 1871. By the beginning of the 1880s, the income from mining exports was greater than that from wool and by the end of the century, more than half the value of Tasmanian exports was derived from minerals. The colony also became more urbanised, so that by 1901 half the population were living in an urban setting, that is, in Hobart, Launceston and their suburbs, or in towns with populations of 500 or more that were located in close proximity to one another and to the larger cities of Hobart and Launceston.

The 1870s, 1880s and 1890s were a time of 'modernisation' and economic and social development in Tasmania (See Chapter 3). The railways came to Tasmania from the early 1870s and spread throughout the 1880s and 1890s, the electric telegraph link between Tasmania and Europe was established in 1872 and Hobart and Launceston were both connected with electric lighting in the 1890s. Agriculture became more mechanised in the 1890s and early 1900s. The Education Act of 1868 introduced compulsory education for children aged 7–12 years and the 1873 Amendment Act extended this to 14 years. The proportion of the population who could both read and write improved markedly between 1861 and 1901. There was a rapid growth in 'modern' occupations, particularly white-collar occupations, such as 'Accountant', 'Bank clerk', 'Insurance agent', 'School teacher' and 'Railway porter'. Some of the new occupations were within the growing transport and communications sector.

Amy Walker's diaries mention many of the innovations of the time, as do Ida McAulay's diaries written at a later date (McAulay 1889–90, 1890, 1897, 1898, 1899, 1900, 1903, 1904, 1905; Walker 1869, 1879, 1880, 1881, 1882, 1888, 1898)

Both women's diary entries illustrate changes in methods of transportation that occurred in the last two decades of the 19th century. To get from their estate 'Clarendon' near Gretna to Hobart, in 1879 the Walkers had to drive in a horse and carriage down to Bridgewater to get the train to Hobart, in 1888 they drove to New Norfolk (closer to Gretna) to take the train to Hobart, while in 1898 'Captain H. came to dinner also Edgar and Marie David, riding their bicycles from the train' (Walker 1879, 1888, 1898). Both Amy and Ida took the train from Hobart to Launceston on a number of occasions (Walker 1879, 1880, 1882, 1888; McAulay 1899). Ida McAulay also regularly took the electric tram from Hobart to Sandy Bay (McAulay 1904). Ida bought a bicycle in May 1897 and learned to ride it, going on bicycling expeditions in later years (McAulay 1897, 1904).

Although Amy Walker and Ida McAulay wrote countless letters to friends and family, telegrams played an important part in their lives. On January 15 1879, for instance, Amy Walker wrote 'received a telegram from Mama' (who lived in Hobart) and on 18 January 1879, she 'sent a telegram to Mama asking for extended leave for Arthur' (her younger brother who was staying with her) (Walker 1879). Ida McAulay often sent telegrams from her home in Bellerive to people living across the Derwent River in Hobart (McAulay 1897). As noted in Chapter 3, few people had telephones at this time, but in April 1904, Ida wrote that a friend 'received a telephone call' (McAulay 1904).

Amy Walker's diary entries mention some of the industrial and agricultural innovations of the time. In March 1882, when visiting Launceston, 'John, Leslie and I went to see the Bischoff Smelting works in the evening after dinner' (Walker 1882). On 17 January 1888 she wrote that 'John, Violet and Maudie went over to French's Forest to see a reaping machine at work on the plains' and on 9 May of that year 'Our threshing machine arrived in the afternoon' (Walker 1888).

Ida McAulay's diaries talk about the movement of people out of Hobart to the mining towns in the far west of the colony in the last decade of the 19th century. In August 1899 she wrote 'I went to town to try to get a girl for a fortnight. Impossible to hear of one. Everyone wanting servants and no one can get them. They all go to the West Coast' (McAulay 1899).

The 1880s and 1890s were a time of new ideas for Tasmania and improvements in education opened up people's minds to these ideas—'reform and progressive legislation characterized the period' (Robson and Roe 1997: 50). For example, the Women's and Children's Employment (Factories) Act of 1884 specified that women could not be employed for more than 10 hours a day and children for more than eight (Sprod 1984). A Public Health Act came into effect throughout

the colony in 1885, which set up local boards of health, closed down cesspits and eradicated typhoid within a short period (Robson and Roe 1997). The 1885 Education Act tried to rectify some of the problems of poor school attendance albeit with limited success. There was also pressure to reform laws related to women, including changing the age at which women could marry from 12 to 16 years (Robson and Roe 1997). In 1896, a bill for female suffrage was passed in the House of Assembly with a large majority but was rejected in the Legislative Assembly (Reynolds 2010). However, women were finally given the right to vote in 1902–1903 (See Chapter 3).

As members of the upper class, Amy Walker and Ida McAulay were highly educated women and were interested in life outside the home. Both women went to Parliament in Hobart to listen to debates about a number of matters (Walker 1898; McAulay 1897). Ida McAulay in particular was very interested in and receptive to new ideas. She belonged to a reading group and a discussion group. In January 1897 the group discussed 'the nationalization of land', in July 1897 there was a 'discussion of Australia separating from England and becoming a nation itself' and in October 1899 she took part in a debate on 'woman's suffrage' speaking in favour of the proposal (McAulay 1897, 1899). Before she was married, Ida read Darwin's 'The Origin of Species' and 'The Descent of Man' (McAulay 1889).

Infant and child mortality

One element of demographic theory is not supported by the situation in Tasmania, that is, that a decline in infant mortality is a necessary condition for fertility to decline (see Chapter 1). There is no evidence from sources of the period to support the theories about the relationship between infant mortality and fertility control. As noted in Chapter 6, the infant mortality rate for Tasmania was relatively flat between 1860 and 1899, despite large annual fluctuations (Kippen 2002a). Infant mortality only began to decline in Australia at the turn of the century, well after fertility had started to decline (McDonald et al. 1997). In Tasmania, infant mortality rates fell from around 100 infant deaths per 1,000 live births in the 1890s to around 55 infant deaths per 1,000 live births in the 1920s.

The 1903 NSW Royal Commission on the Fall in the Birth Rate investigated the causes of the fall in the birth rate and the high rates of infant mortality, but concluded that the two were not linked. 'The decrease in infant mortality may be a consequence of the decline in the birth rate, but the converse is not true…..there may be a high infant death-rate together with a low birth-rate' (NSW 1904a: 13).

I have not found any historical sources that discuss any link between the fall in child mortality and the fertility decline in Australia. In Tasmania, the mortality of children aged 1–14 years started to decline several years before the decline in infant mortality. 'Male and female child mortality fell by half from 1860–64 to 1895–99' (Kippen 2002a: 239). For both boys and girls, the decline was mainly due to a fall in deaths from epidemic diseases followed by a fall in deaths from accidents. The 'clear downward trend' in the child mortality rate was interrupted in the second half of the 1870s by two epidemics, a measles epidemic and a scarlet fever epidemic (Kippen 2002a:66). John and Sarah Chick, a couple in the 1870 marriage cohort, lost their four children aged 1–6 years to scarlet fever in the five days between 30 September 1876 and the 4 October 1876.

It is probable that most women in 19th century Tasmania knew someone who had a child die in infancy. In almost all of Amy Walker's diaries she mentioned the death of a baby of a friend or family member. On 30 May 1880 Amy 'wrote to Mrs Milne who has just lost her little baby', while on the 23 April 1888 she wrote 'heard the sad new of Arthur's little daughter's death this morning at 5 o'clock' and on 27 July 1898 'Miss Collier came to see me telling me of the death of Mrs Widdicourse's baby' (Walker 1880, 1888, 1898). Amy's diaries written during her married life do not mention deaths of small children, but her diary written the year before she was married notes on 29 July 1869 'Yesterday, poor little Archie was run over in the street and killed' (Walker 1869).

Methods of contraception

Historical sources indicate that in Australia, the availability and use of artificial methods of contraception increased markedly in the late 19th and early 20th centuries, that is, during the period in which marital fertility started to decline. Methods which were probably used prior to the decline, such as 'withdrawal' and abortion also became more common.

Although they could not be specific about timing, many witnesses to the NSW 1903 Royal Commission testified that the purchase and use of artificial methods of contraception had greatly increased in the preceding 20 years, as had the practice of 'withdrawal' and abortion. Other evidence shows that in the late 19th and early 20th centuries, wholesale drug companies imported French letters (condoms), the India rubber 'Pessaire Preventif', Rendell's soluble pessaries and safety sponges into NSW (NSW 1904b: 13,15). Some wholesale druggists and pharmacists also made their own soluble pessaries (NSW 1904b: 15, 20). Enemas, douches and syringes sold by pharmacist were also used for contraceptive purposes.

Witnesses to the Royal Commission agreed that almost all pharmacists in Sydney stocked contraceptive devices, but this was not the case in the country[2]. Dr. Cosby Morton, a general practitioner who had practised in several country areas, said 'Many country chemists sell them; I would not say all' [3] (NSW 1904b: 27). Preventives were also sold by hawkers, including women, in both the city and the country (NSW 1904b: 18, 24, 27). Some Sydney drug companies and pharmacists sold preventives to country people by mail (NSW 1904b: 21, 44).

Testimony from pharmacists to the Royal Commission indicates that the demand for artificial contraceptives was high, despite the reluctance on the part of a few pharmacists to sell them. Thomas Loney, a pharmacist in William St, Sydney, said 'For a great many years, I have absolutely refused to sell those articles at all, but during the last year or two the demand for them has become so imperative that I have been obliged to keep them' (NSW 1904b: 35). William Park, a pharmacist in Pitt St, Sydney, was one of the very few pharmacists who refused to stock preventives. 'I don't sell preventives. I don't believe in them. I am asked for these articles every day. The day before yesterday I had four people within an hour ask for these quinine pessaries' (NSW 1904b: 40). The demand for female preventives was so high that in the late 1890s, Washington Soul, the largest pharmacy in Sydney, established a 'nurse' in a kiosk in its city store solely for the purpose of selling articles to women. Nurse B. told the Commissioners: 'My particular duties are to attend to ladies with articles that are kept in my room – such as enemas, douches, elastic goods, belts, accouchement sheets, sanitary towels, breast pumps, tresses and such articles as those…. I have sold women rubber pessaries or medicated pessaries and safety sponges' (NSW 1904b: 57).

It is not possible to obtain information on the total number of artificial contraceptives sold in NSW during this period. However, data provided to the Commission from the Customs Department show that the number of preventives imported into the state in three sample months in 1903 and 1904 was not large. The October 1903 return shows the highest number of imports: 100 gross of French letters (14,400), 212 dozen boxes of Rendell's pessaries, 22 dozen pessaries, 20 gross Pessaire Preservatif and 10 gross Bandruche Skins (NSW 1904b: 311).

Most artificial contraceptives were relatively expensive in relation to the average wages of working-class and even some middle-class men. Wages of working men ranged from around 30s to

[2] 'Country' in this Australian context refers to all areas outside the major cities. The 'country' was also referred to as the 'bush'.
[3] A 'chemist' was a pharmacist.

£2 8s per week while lower white-collar workers generally earned from around £2 to £3 a week (NSW 1904b: 29, 45, 106, 264–5). India rubber pessaries cost from 8s 6d to £2 2s each, soluble pessaries from 3s a dozen and French letters from 6s a dozen (NSW 1904b: 363–5, 383, 385). Many witnesses told the Royal Commission that it was common for women to use less expensive methods of prevention or to make their own preventives.

Several witnesses testified that the use of syringes, douches and enemas was common practice. William Sharland, representative of the Parke Davis Drug Company, said 'I think that the latter are the growing class of preventives—that is the douching of the canal with enemas and douches with antiseptic solutions (NSW 1904b: 24). J.A. Masterton, a pharmacist in Market St, Sydney, said 'Others will not go to the expense of anything; they simply use their syringe with an astringent lotion straight away, and that answers the purpose just the same' (NSW 1904b: 30). Dr. Robert Scot-Skirving, a physician and surgeon at two major Sydney hospitals, reported that 'In the bush, and among the lower classes generally, the preventive as a rule, is syringing immediately after connection either with hot or cold water' (NSW 1904b: 101).

Many witnesses told the Commissioners that women made their own soluble pessaries. J.A. Masterton said 'Referring to these soluble pessaries, they are made of cocoa butter, which is the vehicle to carry the quinine that is in them, and is the sterilising agent. Now a great number of people buy cocoa butter by itself, and they buy quinine by itself' (NSW 1904b: 30). George Stevens, a pharmacist in a working class inner city area of Sydney reported 'They come and buy 3d worth of cocoa butter and some quinine and they mix it up themselves' (NSW 1904b: 43). Dr. John Harris, who had been a general practitioner in Newcastle, NSW for 30 years said 'There are a larger percentage of women now who know how to prepare their own pessaries. They use quinine and sulphate of zinc and make them up with cocoa butter themselves. It is common for women to make their own pessaries and introduce them into the vagina and leave them there' (NSW 1904b: 125).

Several witnesses testified that it was common for women to use sponges for preventive purposes, with many women making their own contraceptive sponges. Sir James Graham who was an Honorary Surgeon to two major Sydney hospitals said 'One frequently finds, in the ordinary outdoor clinic[4] of a woman's hospital, evidence of sponges and the like' (NSW 1904b:

[4] An 'outdoor clinic' was an outpatients clinic at a public hospital for poor and working class women

114). J.A. Masterton reported that 'There are sponges used – small sponges. Now these sponges are designed for the same thing. Well, a great number of people will not go the trouble of buying a sponge. They buy the ordinary toilet sponge and cut it into pieces and they tie a tape to them, and they use them themselves' (NSW 1904b: 30).

Several doctors gave evidence to the Royal Commission that 'withdrawal' was used to prevent conception. Dr. Scot-Skirving said, 'I think that withdrawal is practised to a considerable extent' (NSW 1904b: 101). Dr. William McKay, Medical Officer at a suburban Sydney hospital told the Commissioners that 'The main method is the withdrawal of the male organ before the act is completed' (NSW 1904b:105). Dr Worrall, Senior Visiting Surgeon to the Sydney Women's Hospital also thought that withdrawal was very common (NSW 1904b: 88).

Some scholars have used this testimony to conclude that withdrawal was the most common method used to prevent conception during the Australian historical fertility decline (Bongiorno 2012; Pringle 1973; Quiggin 1988), but evidence from other witnesses to the NSW Royal Commission, as outlined above, does not support this view. Additionally, when McKay's statement is examined in more detail it appears that he is primarily talking about the use of withdrawal by the middle classes. 'Prevention is more common in the middle classes. I mean men earning say £2 a week in offices …. it is not so common among the working classes, because the man will not submit to it. The woman might be quite willing, but the man will not submit' (NSW 1904b: 105).

Overall, witnesses to the Royal Commission indicated that female-controlled preventives, that is, soluble pessaries, syringes, douches, enemas and sponges, were commonly used by women of all classes to prevent pregnancy. Soluble pessaries were more popular than French letters which were used to prevent disease as well as conception (NSW 1904b:16, 29). Most pharmacists reported that the sale of pessaries had overtaken that of French letters in recent years. George Stevens said 'There is not much sale for the French letters since the pessaries have come into vogue' (NSW 1904b: 43).

Abortion was another method used to limit family size in Australia in the late 19th and early 20th centuries, despite being a criminal offence. Until Federation in 1901, the Australian colonies were subject to the UK *Offences Against the Person Act* of 1861, which made abortion illegal under any circumstances. After Federation, abortion remained a criminal offence under different State legislation.

Most witnesses to the NSW Royal Commission attributed the decline in the birth rate to both prevention and abortion, with many saying that prevention was more commonly used by the middle class to limit family size and abortion by the working class (NSW 1904b). Almost all the witnesses—doctors, pharmacists, clergymen, police officers and others—reported that induced abortion was a common practice among both married and unmarried women. Most pharmacists reported a demand for pills which were used by women to try to procure abortions, such as 'Towle's Pennyroyal and Steel Pills' and 'Dr Boxwell's Silent Pills' (NSW 1904b: 357). Abortifacient pills were sold throughout Sydney and in all the country areas (NSW 1904b:28). They were also available by mail through advertisements in the newspapers (NSW 1904b: 30, see below).

Witnesses to the Royal Commission reported that there were many abortionists operating in Sydney and some in country areas. These were mainly nurses (qualified or unqualified) and a very small number of doctors in Sydney, and unqualified midwives in the country areas. James Sawtell, Senior Sergeant of Police in Sydney, thought that the procuring of abortions was very prevalent in Sydney: 'I know of 36–38 reputed abortionists, mostly women in my own district. I also know of five legally qualified medical men' (NSW 1904b: 52). Dr Joseph Foreman, senior gynaecological surgeon to the Prince Alfred Hospital said 'The prevalence of abortion is almost incredible. The cases that are always coming in and taking up the beds in the hospitals are quite sufficient to show to what extent it prevails' (NSW 1904b: 229). Most of the witnesses agreed that women of all classes used abortion to limit their families, but thought that the practice was more common among the working class. Arthur Glover, a general practitioner in a poor working class district of Sydney told the Commissioners of the desperation of some of his married women patients: 'They are aware that abortion is a criminal act….and several of them, if you tell them how dangerous it is, say they will die before they will have another child' (NSW 1904b: 110). Many witnesses reported that it was common for country women to come down to Sydney to procure an abortion.

McCalman's (1988) study of female patients at a large public hospital in Melbourne shows that abortion was common in Melbourne in the late 19th century. In Adelaide also, a number of cases of abortion by a well-known abortionist, Madame Harper, were reported in the local newspapers in the late 19th and early 20th centuries (Anderson and McKinnon 2015).

No data are available on the extent of induced abortion during the fertility decline. Some NSW hospitals provided data to the Royal Commission on cases of 'abortion or miscarriage' treated at the hospitals in the preceding five years but it is impossible to separate out the two (NSW 1904b:297–8, 312–313). In Tasmania, 27 women were recorded as dying from 'abortion' or

'miscarriage' between 1860 and 1899, almost all of them married, with 17 of all deaths occurring in the 1890s (Tasdeaths). Louisa Collings, in the 1890 marriage cohort died from an abortion in May 1901 at the age of 31 years—18 months after she had her fifth child. The Tasmanian newspapers in the late 19th and early 20th centuries contained several accounts of women dying from illegal abortions in Tasmania performed by midwives, doctors and other persons (*Daily Telegraph* [Launceston], 18 January 1890, 5 June 1894, *The Mercury*, 12 March 1879, 26 August 1910, *The Examiner* 4 November 1891, *The North Western Advocate and the Emu Bay Times*, 19 August 1901).

Almost all the clergymen testifying to the Royal Commission thought that sexual abstinence was the only method that people should use to limit their families if this became absolutely necessary, for instance, if the wife's life became endangered by pregnancy (NSW 1904b: 202–26, 275–77). However, none of the evidence to the Commission mentioned the use of abstinence as a preventive measure.

Diffusion theory

There is considerable evidence to support diffusion theory as one of the explanations for the historical fertility decline in Australia. Ideas and values about fertility control as well as the knowledge of the methods used to limit fertility clearly spread through Australian society in the late 19th and early 20th centuries.

As outlined in Chapter 3, Tasmania was not an isolated place in the second half of the 19th century. Communication between Tasmania and the mainland colonies and between Tasmania and the English-speaking countries and Western Europe was very good.

Amy Walker's diaries indicate that the upper classes in Tasmania were in constant communication with people living outside Tasmania and regularly travelled to other colonies and on some occasions to different parts of the world. The Walkers often had visitors from Melbourne, Sydney, New Zealand, England and other countries and had friends and family who travelled to these places. Several of Amy Walker's friends, neighbours and family went to stay in England and her brother Arthur went to study medicine in Edinburgh (Walker 1879, 1880). For example, on 12 December 1879, Amy 'wrote to Maria Parsons who has just returned from England with her husband and children', on 25 May 1881 she went to a reception at Government House and met some of the officers from the Japanese War ship "Gingo" and on 15 April 1882, she received 'letters from mother and Lilian posted at Honolulu' (Walker 1879, 1870, 1882). Ida McAulay went

to Europe in 1889–90 before she was married, visiting cities such as Naples, Paris, Brussels and London (McAulay 1889, 1890). In 1897 Ida wrote about friends who were travelling to Sydney, Melbourne, USA, England and South Africa (McAulay 1897).

Lower class people were also in contact with others outside Australia. On 18 May 1881, Amy Walker wrote that, 'Minnie heard of her sister's death in New Zealand and decided to go there' (Minnie was her cook) and on February 13 1882 'Clara went to town for a holiday and to see about some money sent her from England' (Clara was one of the servants) (Walker 1881, 1882). Several families in the four marriage cohorts of all classes left Tasmania for other colonies or New Zealand and later returned to Tasmania (see Chapter 5).

As outlined in Chapter 3, communication between Tasmania and the rest of the world was improved dramatically in the 1870s with the establishment of an electric telegraph cable between Tasmania and London. English news could now reach Tasmania in several hours rather than months (Cox 2012) and Tasmanian newspapers could publish news and articles shortly after they appeared in the English newspapers. Some of these articles concerned the trials of people for distributing information about birth control as discussed below.

The 1903 NSW Royal Commissioners considered that the spread of values regarding fertility limitation and information about fertility control methods was one of the main reasons for the fall in the birth rate from the mid-1880s (NSW 1904a). They reported that in the last quarter of the 19th century values about fertility control had spread throughout the 'civilised world' and there was a 'general diffusion of the knowledge of methods by which restriction might be accomplished which was previously wanting' (NSW 1904a: 17).

Some witnesses to the Commission reported that the use of prevention first started with the upper classes. Dr. Stanley McCulloch, Honorary Surgeon to the Sydney Women's Hospital, said that family limitation was 'first observed by the well to do (I mean the comfortable class). I think it is spreading to the working classes' (NSW 1904b: 71). Most witnesses to the Commission agreed that by 1903 measures to limit the size of their families, either prevention or abortion, were used by people in all classes in NSW and by those in the country as well as the towns. However, they thought that people in the country were less likely to use these measures. Dr Ralph Worrall reported 'I have observed this tendency… (to limit their families)… in every class in the community, but the higher classes resort to prevention of conception more frequently and the lower classes to the induction of abortion. I have noticed it with my patients from the country. They are just as

familiar with the methods adopted as the people in the town, but do not practise it as frequently as town folk' (NSW 1904b: 89).

Birth control literature from overseas became available in Australia from about the 1880s onwards. Books and pamphlets about birth control such as 'The Fruits of Philosophy' by Charles Knowlton and 'The Law of Population' by Annie Besant were available in Sydney and Melbourne bookshops and lectures on 'Family Limitation' were given in Melbourne and Sydney (Bongiorno 2012; Quiggin 1988; NSW 1904b). Many witnesses to the NSW Royal Commission mentioned 'The Fruits of Philosophy' and several of them had read it. The Commission also heard evidence that pamphlets advertising preventives were in circulation in Sydney. James Mitchell, Sub-Inspector of the Police, said of a handbill advertising the French 'Pessaire Preventif', 'Many complaints have been received from citizens that handbills of this character have been left at their houses with their female relatives. They are left door to door and we have had complaints of their being sent to people by post or other means' (NSW 1903b: 51). It is not clear whether these books and pamphlets were available to the same extent in the country as in the city. The Reverend John Howell Price, a Church of England clergyman from Richmond, a country area outside Sydney, said that 'Bradlaugh's books and Mrs Besant's books and other books which are freely obtainable in Sydney are largely read in country places' but thought that leaflets and pamphlets were not generally distributed in country areas (NSW 1904b: 214).

Amy Walker and Ida McAulay both read for pleasure and for self-edification and they exchanged books of interest with other upper class women. Neither of them mentioned books about fertility limitation, but on 21 January 1898 Ida wrote in her diary 'Evening went round to the Victoria Club to take Miss Martin Annie Besant's autobiography to read' (McAulay 1898).

Advertisements in newspapers and journals were a major source of information about fertility control in late 19th and early 20th century Australia (Bongiorno 2012; Quiggin 1988). The 1903 NSW Royal Commission found that the newspapers in metropolitan, suburban and country NSW regularly contained advertisements for books and pamphlets providing information about methods of prevention and for the sale of preventives and abortifacients (NSW 1904: 30, 39, 50, 87, 95, 271–2). Dr. Edward Thring, gynaecologist at a large Sydney hospital, thought that 'The general public are familiarised very much more now than they used to be with the methods by which prevention of pregnancy can be made to take place…and I think that one reason for that is the free advertising – I mean to say, the extensive advertising – the various preventive methods which has taken place during the last, say, 20 years – the knowledge that there are various

mechanical means which can be obtained by purchase for the prevention of impregnation' (NSW 1904b: 93).

Tasmanian newspapers —*The Examiner*, *The Clipper* (Hobart) and *The Mercury*—regularly included these types of advertisements:

> '*Women's Salvation—The wife's welfare within her control. Treatise posted free, sealed. Write to Professor Herman, French Specialist, 41 Collins Place, Melbourne. This treatise will teach you more about prevention in ten minutes than all the years you've lived*' (*The Examiner* 20 September 1894, *The Clipper* 20 April 1895).

> '*A Blessing to Womankind, Pessaire Preventif: every mother delicate or otherwise should write for particulars to Dr A.K. Desjardien, Post Office Hobart*" (*The Examiner*, 27 September 1885).

> '*Gents' latest American preventives, simple effective, last for years. 2s 6d posted. Write W.H. GARFIELD, Collins St, Melbourne'* (*The Clipper*, 20 July 1895)

> '*Gents' best made French preventives. 6s per dozen, posted. Write R.R.HERMANN, Collins Place, Melbourne*' (*The Clipper*, 20 July 1895)

> '*Alfaline Quinine Pessaries— A guaranteed harmless Preventative. Posted*..(*from Sydney)… 5/6*' (*The Clipper*, 19 August 1902).

> '*Towle's Pennyroyal and Steele Pills for Females. Quickly correct all irregularities and relieve the distressing symptoms so prevalent with this sex. Boxes 1s 1/2d and 2s 9d of all chemists and patent medicine vendors'* (*The Mercury*, 17 March 1888)

> '*Oriental Female Pills. Triple Power. Restore regularity without fail. Any cause. Sure and Safe. Box posted 5s and 6d. Write, M. Garfield, Agent, West Collins St, Melbourne*' (*The Clipper*, 20 April 1895).

Police officers appearing before the NSW Royal Commission reported that advertisements from well-known abortionists regularly appeared in the newspapers (NSW 1904: 51–2,183). However, these advertisements were written in such a general way that it was difficult to detect their true purpose:

> *'Nurse P. attends ladies during accouchement. Registered lying in home, 550 Cleveland St. Moore Park'* (*Sydney Morning Herald*, 24 October 1902 cited in NSW 1904b: 186)

Similar advertisements for 'lying in homes' appeared in the Tasmanian newspapers in the late 19th and early 20th centuries, and it is likely that some of these establishments were also used to procure abortions.

In the last decades of the 19th century, a number of prominent people were tried for obscenity in England and Sydney because they were publishing and/or distributing information about methods of birth control (Bongiorno 2012; Hacker and Kippen 2007, Caldwell 1999). The Bradlaugh-Besant trial, which Caldwell argues was a catalyst for the adoption of birth control (see Chapter 1), was reported in all the Australian newspapers, including *The Mercury* and *The Examiner*. *The Mercury* reported on 13 August 1877:

> '*The trial of Mr Bradlaugh and Mrs Besant, before the Lord Chief Justice and a special jury, lasted five days and in their verdict the jury found the defendants guilty of publishing a work calculated to debase public morals, but exonerated them from all corrupt motives. A new trial will be applied for, and Mr Bradlaugh intends to carry the case to the House of Lords'*

The book 'The Fruits of Philosophy' was again referred to in an article in *The Mercury* on 25 August 1877 reporting proceedings in the British House of Commons, quoted verbatim from the London Times. Another article in *The Mercury* of 26 February 1878 compared an obscene pamphlet published in Melbourne to:

> '*that notorious work "Fruits of Philosophy' published by Mr Bradlaugh and Mrs Besant, and for which they were deservedly convicted and sentenced to be fined and confined, though the conviction has since been upset in the Supreme Court*'

Collins booksellers were tried for obscenity in Sydney in 1888 for selling Annie Besant's book 'The Law of Population', but Judge Windeyer ruled that the book was not obscene and that Collins had a right to sell it. This judgement was reported in newspapers in all the Australian colonies, including Tasmania:

> *'In the Banoo Court this morning, before the Chief Justice, Mr Justice Windeyer and Mr Justice Stephen judgment was delivered in the appeal of William*

> *Whitehouse Collins against his conviction by Mr. Addison, P.M. for offering for sale a certain indecent and obscene book entitled "The Law of Population". The Chief Justice reviewed the arguments in connection with the work entitled "Fruits of Philosophy" …. Justice Windeyer delivered a lengthy opinion and said that it had been admitted that an abstract discussion on the law of population was a fitting one for the philosopher and the student of sociology; His Honor gave it as his opinion that the prohibition should go, as the book did not come under the designation of obscene. Justice Stephen concurred that the prohibition should be ordered to go and the conviction was quashed' (The Mercury*, 19 December 1888*).*

The NSW Royal Commissioners considered that Justice Windeyer's judgment legitimised the practice of fertility control and blamed the judgment for the 'sudden fall in the birth rate' that occurred in NSW in 1889 (NSW 1904: 18). This was disputed by a witness to the Commission, Sydney Maxted, who was Chief Boarding Officer for the State Children's Relief Department and also a 'newspaper man'. He thought that the Windeyer judgment 'at the time created a sensation, but I think it was less than a 9-days wonder and if you were to ask almost anybody in the street if those remarks were made I do not think you would get an affirmative answer, except from someone who takes a special interest in the question' (NSW 1904b: 96). He argued instead that midwives read these books and pamphlets and then provided the information to their patients: 'The midwives tell them how to do it. Years ago, they did not know, but of course by the dissemination of this literature that you have just spoken about, the knowledge gets into the minds of the midwives; they study it, and then they tell the people. A woman will attend another woman, and she will say …"Now, I will tell you how to stop having any more children" and she does' (NSW 1904b: 97).

Many witnesses told the Commissioners that information about prevention was spread by word of mouth among women. Women discussed ideas and values about prevention with other women and gave them information as to how to limit their births. The Reverend Howell Price said 'One of the most intelligent ladies that we have in the district is a very keen advocate of prevention, alleging various reasons why prevention should be practised….This information is communicated to the unmarried and to married persons' (NSW 1904b: 214). George Stephens, a pharmacist reported 'There is a peculiar thing about women; they will tell one another and they simply come along and ask for them….(quinine pessaries)…..they spread the information amongst other

women…Knowledge travels from one woman to another in the country' (NSW 1904b: 44). One of the few female witnesses, Witness E, a woman aged 47 who had borne 16 children, said 'Ever since my early married life, some of my friends have spoken to me about prevention. They have advocated it...People seem to be well acquainted with the methods of preventing impregnation. I have been spoken to myself by different people about all sorts of ways. They discuss the different methods among themselves openly among women of every class' (NSW 1904b: 189). Dr Joseph Foreman added 'They acquire the knowledge from the propagandists amongst themselves… there is one woman … who goes about telling other women; at all the tea meetings, at all the drawing rooms, it is the subject of conversation. There is not a woman scarcely who comes to me who does not know what to do to prevent conception' (NSW 1904b: 228). The Rev. Nicholas Hennessy, a Congregationalist clergyman, thought that 'Women themselves have helped to spread the evil….they are very free (those of them who have either one child or very small families) to tell a woman who has many children the means by which she can prevent the birth of more' (NSW 1904b: 207).

None of the doctors who gave evidence to the Commission reported giving information about preventive methods to their patients. However, some doctors were involved in giving their patients access to preventives. Alfred Silly, managing director of The Australian Drug Company, sold preventives to doctors (NSW 1904b: 20), while Louis Pattison, a Sydney pharmacist, told the Commission that women fairly frequently brought in doctors' prescriptions for preventives: 'I got one this morning from a doctor of good repute – for a box of Rendell's soluble pessaries. He is a leading doctor in Sydney' (NSW 1904b: 37). Nurse B from Washington Souls pharmacy in the city reported that 'Medical men of the highest standing have advised women to come to me' (NSW 1904b: 58).

The question of family limitation had become a legitimised topic for public discussion in Australia by the beginning of the 20th century. George Mullins, a Sydney general practitioner, told the Commissioners: 'One hears so much about the limiting of families, and the various ailments to which men and women are liable which one did not hear some years ago; these are subjects of ordinary conversation at the present day which were not 10 or 12 years ago' (NSW 1904b: 66). An analysis by Hicks (1978) of Australian newspapers of the period shows that discussion about the birth rate and family limitation was much more open in the early 1900s than in the 1870s or 1880s. In the early years of the 20th century, there were numerous editorials, articles and letters in the main Sydney, Melbourne and Adelaide newspapers about the fall in the birth rate and the

reasons for the decline. During the same period, the Hobart and Launceston newspapers and some country newspapers all contained articles and letters about the fall in the birth rate and family limitation in Australia and overseas. The Tasmanian newspapers reported on the NSW Royal Commission findings in some detail (e.g. *Daily Telegraph*, 7 March 1904, *The Mercury*, 7 June 1904). Two country newspapers published articles on a deputation to the Premier of Victoria on 'Race Suicide' reporting on 'preventives articles' sold by most Victorian pharmacists and 'a wicked and growing traffic in appliances for bringing about abortion' (*The North Western Advocate and the Emu Bay Times*, 27 September 1909; *Zeehan and Dundas Herald*, 25 July 1909).

Economic theories

There is considerable evidence to support economic theories of why fertility declined during this period. While it appears that some people were restricting their fertility before the economic depression of the early 1890s, the increase in unemployment and the drop in wages that occurred in Tasmania (see Chapter 3) provided a great incentive for couples to adopt fertility control measures. Although conditions had improved by the end of the 19th century, for some groups of workers, wages were not as high as they had been in the 1880s.

Letters published by Sydney, Melbourne and Adelaide newspapers in the first decade of the 20th century show that economic reasons were seen as important in the fertility decline. At least half of those writing to the Sydney, Melbourne and Adelaide newspapers about the declining birth rate gave economic factors as the main reason for limiting family size, complaining of unemployment, a lack of regular employment and increases in the costs of living (Hicks 1978).

Australia offered many opportunities for social mobility and this may have encouraged the practice of fertility control. Australian society was less rigid than English society and many people were able to realise their social and economic aspirations sometimes within one generation (Breward 1988). 'While many of Australia's early migrants were from humble origins, they included many with great natural ability, who were able to use their gifts in the more open-textured Australian communities to achieve a degree of wealth, position and responsibility which would never have been possible in Britain' (Breward 1988: 24).

There are many examples of social mobility in the four marriage cohorts. For example, Samuel Sutton (1860 cohort) who was a baker during the 1860s became a member of the Tasmanian Parliament in 1886 (Appendix D: Story 7); David Dally (1870 cohort) was a lime dealer in the early 1870s, but became rich when he and his brothers discovered the famous Tasmanian gold reef in

1877 (Appendix D: Story 8); and Joseph Lyons, the son of Michael Lyons (1870 cohort) a farmer and a butcher, became Premier of Tasmania in 1923 and Prime Minister of Australia in 1932 (Appendix D: Story 9).

In NSW in the early 1900s, many witnesses to the Royal commission gave economic reasons as one of the main reasons why couples wanted to limit their families (NSW 1904b). Several witnesses regarded this as 'selfishness' on the part of these couples.

A continual theme of witness' statements to the Commission was that couples wanted to limit their families because of the costs of children, that is, the cost of another child outweighed the benefits of having that child. Implicit in these statements was the view that people in all classes wanted a better future for their children, that is, they had social and material aspirations for their children.

Edmund Fuss, a pharmacist in a working class area of Sydney said of the middle and working classes: 'People are trying to acquire knowledge, in my opinion to get means to prevent having large families, for the simple reason that they have not means to support their children or to educate them' (NSW 1904b: 29). Dr Ralph Worrall reported that 'I ask them over and over again and they say they cannot afford to rear and educate their children' (NSW 1904b: 89). Dr Scot-Skirving added 'A good many of them say "Well I can afford to educate and take care of two or three children, but I cannot give six a good education": so they say "Well, I will not have any more than three"' (NSW 1904b: 97).

Many witnesses thought that couples in all classes used prevention because they wanted to maintain their standard of living or aspired to a higher standard of living for themselves and/or their children. Dr Mullins reported '….(they)… say it is too expensive…in many cases they can afford it, but they want the money for other purposes' (NSW 1904b: 66). Dr McKay said 'In the majority of cases the reason given is that they have not got the money to support them….If these people have only £2 a week and have good clothes and live in a better class of house, they cannot support a large family' (NSW 1904b: 106). John West, a master plumber and Secretary of the Trades Hall Council exemplified the situation of a working man with aspirations for his children: 'A working man with 4 or 5 children on £2 per week would exist and manage to get through it very well, but of course he would have to debar himself from luxuries. When I was earning less money I managed to save a little and when I got more my family wanted more. When I was on wages I

could not get my daughters taught music. As soon as I was able to get in a bigger way, I let my girls learn the piano'. (NSW 1904b: 200).

The aspiration to own their own home became part of the desire for a higher standard of living for working class and middle class families in Australia in the last two decades of the 19th century. 'The level of owner-occupation …was unquestionably very high by world standards' (Davison 2004: 219). Between a third and a half of homes in Melbourne, Sydney and Adelaide were owned or being bought by their residents in the late 19th and early 20th centuries. Although we do not have Tasmanian data on home ownership in the late 19th century, the 1911 Australian Census shows that 44.7 per cent of private dwellings in Tasmania were occupied by people who owned or were purchasing their home (Commonwealth of Australia 1914d: 419).

Several witnesses to the Royal Commission labelled the desire for a better standard of living as 'pleasure seeking'. Edmund Fuss thought that wealthy people purchased preventives because of the 'desire … to follow their social and pleasurable inclinations' (NSW 1904b: 30). A witness from the Salvation Army said that middle class couples 'desire not to have children in order to have more social pleasure' (NSW 1904b: 187). Some witnesses thought that working class people did not want large families because they wanted to go out dancing, to the theatre and to picnics. John West, said that 'Among the working class, the object of lessening their births is very often the fear of poverty, and in others it is on account of curtailing their pleasures and enjoyments' (NSW 1904b: 199). Edmund Riley, plasterer, and President of the Sydney Labour Council argued that education had increased working class people's aspirations: 'If you want people to remain still in their social state you must not give them free education. When people's minds are educated they crave for enjoyments and pleasures….The industrial classes….have as much right to their enjoyment and pleasure as any other class' (NSW 1904b: 196).

Witness statements to the NSW Royal Commission (outlined above) clearly show a concern for the 'quality' of children rather than 'quantity'. Dr Grace Russell, from the Sydney Women's Hospital considered that 'With a good many of the thinking women, it is a very strong reason for limitation – the anxiety for the well-being of those children that are born' (1904b: 110). Books and magazine articles of the time support the view that parents were concerned about the 'quality' of their children. 'The Dawn', a women's journal published monthly in Sydney between May 1888 to July 1905, contained many articles about bringing up children, for instance 'Sleep' (November 1889), 'About babies' (February 1891) and 'Shall All Children Learn Music' (March 1894) (Lawson 1990). This journal had subscribers across eastern Australia, including Tasmania. Parents not only

focused on their children's health and education, but also on their behaviour. A history of manners in colonial Australia cites several magazine articles published in the late 1880s on the need for teaching children good manners and two books on etiquette published at the turn of the century that included chapters on children's manners (Russell 2010). Ida McAulay's diaries indicate that theories about child development were in circulation in the late 1890s. On 20 January 1897 she wrote about her young son, 'I almost agree with J.P. Richter that the most important time for training in a child's life is the first year' (McAulay 1897).

We do not know whether the 'opportunity costs' for women of having children were a consideration in family limitation during the historical fertility decline in Tasmania. As noted in Chapter 3, there is no information as to whether married women with dependent children worked outside the home other than in the family business or farm. One of the witnesses to the 1903 Royal Commission Annie Duncan, an Inspector of Factories and Shops, reporting the situation in Sydney said 'I think the proportion of women with very young children is very small. I think the married women who are employed in factories are mostly women whose children are out of hand' (NSW 1904b: 130).

The evidence to support Caldwell's 'wealth flows' theory is not strong, but is supportive. As outlined in Chapter 3, although education became compulsory in Tasmania in 1868, average attendance at government schools was around 70 to 75 per cent throughout the last quarter of the 19th century. Children who were absent regularly from government schools were the children of the urban and rural working class and of smaller farmers. These children helped in the home or on the family farm, or were working in paid employment outside the family home to supplement the family income. These families would have been more likely to regard children as 'workers' rather than 'dependants'.

Most witnesses to the NSW Royal Commission discussed children in terms of their economic dependency on their parents (as outlined above) although some said that the situation was different in the country. Dr. Ralph Worrall when asked why women in the country districts had more children than those in the towns replied: 'It is because they are more useful in the country; the children are more useful on the farms…they are equally poor but the children are really a source of wealth to them' (NSW 1904b: 92).

Secularisation

The history of religion in Tasmania and in Australia generally and the historical sources of the time support theories of secularisation and fertility decline. Religion did not have a major effect on people's lives in Australia and did not affect the adoption of ideas and values about fertility control and its practice.

Although many religious denominations became established in Tasmania in the early decades of the colony, as outlined in Chapter 3, Tasmania appears to have been a relatively secular society throughout the 19th and early 20th centuries. Tasmanians generally married in church, had their children baptised and were buried according to religious rites, but in most cases the church did not have a major influence over their lives.

Amy Walker and Ida McAulay were the antithesis of one another in regard to religious practices. Amy Walker, the daughter of an Anglican clergyman, participated very actively in the life of St Mary's Gretna, attending church every Sunday, playing the harmonium in church, taught Sunday school and was a member of the church society (Walker 1880, 1881, 1882, 1898). Ida McAulay on the other hand had no religious beliefs. In 1900 she discussed evolution with her five year old son, gave him a lecture on agnosticism and told him that 'father and I do not believe in God' (McAulay 1900).

Historians generally agree that in the early decades of the colony, the majority of the Tasmanian population did not have a strong religious affiliation (Boyce 2010; Breward 1988, 1993; Reynolds 2012; Robson and Roe 1997). Religion was generally not as important to people in Australia as in Britain or the United States (Breward 1988). By the 1850s and 1860s, religious groups in Australia did not have a strong influence on people's political and social attitudes and values. The Anglicans like other religious groups reflected 'the political and social realities of its community rather than shaping the community' (Breward 1993: 45).

During the 1880s, there were calls for social reform in several areas of Australia life, such as the widening of the grounds for divorce (Breward 1993). This resulted in a further weakening of the control of the religious groups and indicated that 'secular considerations were, by the 1880s, receiving more weight than historic theological ones' (Breward 1993: 83). Testimonies of clergymen of all the main religious denominations to the 1903 NSW Royal Commission show that the church was very much opposed to the use of birth control (NSW 1904b), but this had little effect on its practice.

Many witnesses to the Commission testified that a weakening of 'religious feeling' was one of the main factors responsible for the adoption of preventives and the subsequent decline in the birth rate (NSW 1904: 17). Cardinal Moran, the Catholic Archbishop of Sydney, thought that 'In relation to my own religious people, there has been a marvelous development of respect for religion and devotion to all exercises of religion…But speaking of the community in general…there is a great decay of religious sentiment and what I would call manifest indifference to religion on the part of a great number of the citizens of New South Wales' (NSW 1904b: 210). Dr. Cosby William Morgan, a general practitioner who had worked in both the country and the city thought that 'The decay of the religious sense in the people ….has conduced (sic) to the causes which bring about the decline in the birth rate. I think that their moral sense is blunted and that they do not care very much about religion at all' (NSW 1904b: 26). Similarly, Police Sergeant Sawtell attributed the fall in the birth rate to 'the bad home training of children; both education and religious…..On Sundays you will see our young people in the parks and down the harbour engaged in all kinds of outdoor amusements, instead of being at Sunday school or attending religious instruction of some sort' (NSW 1904b: 136). Dr Scot-Skirving said 'The whole of this community, from the highest to the lowest are prone to use preventives. They are simply ordinary worldly people in whom religious sentiment has no very active measure of importance in their daily life and thought' (NSW 1904b: 100).

Even where people had religious views and were regular church goers, they often made their own decisions about what they believed was right rather than taking the churches' views. John West told the Commissioners that he did not think that 'religious sentiment has much effect….I know persons who are very strong attendants at their church who are equally as bad as those who do not go… My knowledge of the world is that the pocket plays the more important part than religious sentiment with most people in the community' (NSW 1904b: 199–200). A witness from the Salvation Army testified that 'Some people who profess to have strong religious views still carry on these practices' (NSW 1904b: 187), while the Reverend Howell Price said 'They only admit the religious sense in as far as it may touch them in other directions— absolutely not in this' (NSW 1904b: 215).

While the clergymen appearing before the Commission were very much opposed to fertility control, several of them thought it too sensitive a subject to bring up in the pulpit. Dr William Macky, a Presbyterian Minister, said 'There is a natural shrinking from treating of such subjects; and although we clergymen know that such things have been going on yet, either out of a fear of

bringing subjects before the young people that should not be brought before them or out of natural delicacy, the matter has been tabooed and not treated from the pulpit' (NSW 1904b: 204).

Other clergymen were afraid to preach against fertility control publicly because they thought they would alienate some of their parishioners, which would reduce their stipend. Dr Howell Price said 'I have spoken to the clergy about it and they have given me the answer back that they are afraid to speak of it from the pulpit…. lest they should give offence and thus cause the offenders to withdraw their contributions from the churches' (NSW 1904b: 215–6). The Reverend Price reported that when he himself preached against birth control from the pulpit 'I know it injured myself for awhile' (NSW 1904b: 217). The Reverend Patrick Stephen, a Methodist clergyman, added 'I have scarcely preached to my congregation upon that subject. I touched upon it in a general way… It is a most difficult thing to handle a delicate subject in public ….Sometimes when a clergyman preaches to his congregation on this subject he is called to account by some members of his church……and in consequence of that and of circumstance that he may incur the ill will of his parishioners, he refrains from alluding to it at all' (NSW 1904b: 276). Dr Howell Price reported that clergymen who preached against prevention had been ridiculed publicly: 'Canon Potter, of Melbourne was the first, I think in Australia to introduce the matter into the pulpit and he was lampooned afterwards in one of the illustrated papers in Victoria' (NSW 1904b: 215).

Changes in women's roles and status

Historical sources of the time show that women played a major role in the historical fertility decline in all the Australian colonies, due to changes in women's roles in the family and in society that were occurring at this time. A recent article on women's role in Australia's fertility transition also reached this conclusion (Anderson and MacKinnon 2015).

The fertility decline in Australia took place during a period in which ideas about women's rights began to spread throughout the colonies (Anderson 1999; Quiggin 1988). Books and pamphlets about women's rights began to circulate from the 1860s onwards. This was followed by various feminist campaigns in the 1880s and 1890s on matters relating to property and child custody reform, public health and universal suffrage (Anderson 1999).

Several laws were enacted in Australia in the late 19th and early 20th centuries relating to women's rights.

- Divorce was first made legal in all colonies except NSW between 1858 and 1864, with Tasmania enacting Divorce Laws in 1860 (Finlay 2001). NSW enacted a similar Divorce Law in 1873. Adultery was the only ground for divorce in the first Divorce Acts, but there was a double standard in that a husband could divorce his wife for adultery, but a wife could only divorce her husband for adultery under limited circumstances. NSW although late to enact the first divorce laws, amended the Act in 1881 to treat husband and wife equally regarding adultery. Desertion, drunkenness and imprisonment were introduced as grounds for divorce in Victoria in 1889 and in NSW in 1892, but not until 1919 in Tasmania. The 1919 Tasmanian Act also abolished the double standard in adultery.
- The *Married Women's Property Act,* which gave women the right to own and control property was passed in 1884 in Victoria, in NSW in 1889, and in the other colonies in the early 1890s, including Tasmania in 1893 (Cowie 2009).
- Australia was one of the earliest of the English-speaking and European countries to give women the vote. South Australia and Western Australia gave women the right to vote shortly before Federation in 1901 and the other four colonies shortly after, with women in Tasmania given the right to vote in 1902–3 (see Chapter 3).

The feminist reform movement in Australia in the second half of the 19th century was to a large extent the province of elite and middle class women (Anderson 1999; Quiggin 1988). Feminist writings were read mainly by these women and reformers involved in the various campaigns were also middle class. However, feminist ideas gradually spread throughout the other strata of society. The introduction of compulsory primary education in the colonies, from the late 1860s onwards, improved both men's and women's literacy, their access to information and their openness to new ideas. Women also began to participate in higher education in the late 1890s and early 1900s (McAulay 1898, 1899, 1904). From the late 1890s women began to participate in many other areas of society that had formerly been closed to them. For instance, in Tasmania women rode bicycles and participated in sporting teams, some of these teams being for women only.

Feminist organizations did not openly support the use of artificial means of birth control although some individual feminists advocated the use of contraception and a few, such as Bettina Smyth in Melbourne, sold contraceptives (Bongiorno 2012; Quiggin 1988). Feminists were divided in their views about contraception, with some feminists opposing birth control because they thought it would encourage excessive male sexuality (Bongiorno 2012). The efforts of the feminists, however, led to a society in which all women were increasingly being acknowledged as individuals

with rights and this began to change the concepts of marriage, the family and relations between the sexes (Anderson 1999). Feminism started to change women's position in the domestic sphere and husbands became more concerned about their wives' situation in regard to childbirth and childbearing (Quiggin 1988). Upper class women were the first to achieve rights within the domestic sphere, as is evident from the diaries of Amy Walker and Ida McAulay.

In the late 19th century, Tasmanian upper class women ran their own households and led independent lives outside the home. Amy Walker and Ida McAulay chose all the furnishings of their homes and hired and managed the servants (McAulay 1899; Walker 1879). Both women also travelled without their husbands. Amy Walker often travelled on her own or with her small daughter to visit her parents and siblings in Hobart (Walker 1879), while Ida McAulay often travelled on her own within Tasmania and to other colonies (McAulay 1897, 1898, 1899). Both women had extensive social lives. Amy Walker went to cricket matches, the theatre, the opera, concerts and balls and 'at homes' at Government House (Walker 1879, 1880), while Ida McAulay went to the theatre, attended lectures and, as noted, took part in debating and reading groups (McAulay 1897, 1899, 1903). Ida McAulay had her own private income which she controlled herself. On 30 June 1897 she wrote 'Got my first quarterly dividend from the Mt Lyell mine' and on 26 May 1900 she bought '33 shares in the Sawpit Gully Gold and Silver Mining Company at 6/- per share' (McAulay 1897, 1900).

Both Amy and Ida were interested in issues outside the home. Amy's diaries refer to the capture of the Kelly bushrangers in 1880, the taking of the Tasmanian Census in 1881 and the Polling for Federation in 1898 (Walker 1880, 1881, 1898). Ida's diaries for 1899 have comments on the progress of the Dreyfus trial in France and, from October, on the war in Transvaal (McAulay 1899). Amy showed a keen interest in her husband's farming of the estate and took over the management of the estate when he died in 1906. Ida was a declared feminist, was active in women's clubs and discussion groups and President of the Tasmanian Women's Suffrage Association (later the Tasmanian Women's Political Organisation) from 1903 to 1905.

The 1903 NSW Royal Commission on the Decline in the Birth Rate was evidence of a resistance to the changes that had and were occurring in women's lives (NSW 1904a, 1904b). For women, there was nothing more fundamental than having control over their fertility. The Commission was overwhelmingly male. All the 13 Commissioners were well-established professional men and of the 92 witnesses who were not Commissioners, only nine were women. Feminists boycotted the Commission. A noted feminist, Rose Scott, refused her invitation to appear before the Commission

and gave speeches to women's organisations attacking the Commissioners for conducting this type of inquiry into women's affairs (Allen 1990).

The Commission concluded that women had played a crucial role in the 19th century fertility decline in New South Wales. They viewed women's 'selfishness' in adopting birth control practices as primarily responsible for the fall of the birth rate in that colony since the 1880s (NSW 1904a: 17). Despite the Commissioners' vehement opposition to prevention and to the changes in women's behaviour, attitudes and lives, the Commission made very few recommendations to remedy 'the various evils which are indicated by the evidence as the causes of the decline in the birth-rate' (NSW 1904a: 2). While they recommended changes to the sale of abortifacients and to the registration of lying-in homes to prevent them being used by abortionists, it appeared that they felt powerless to stop the sale and/or use of preventives and to halt or reverse the changes that had and were occurring in women's lives.

Witness statements to the Royal Commission show that women had a very active role in determining the size of their families.

Evidence outlined above shows that many of the artificial contraceptives used were female-controlled and that the sale of female-controlled preventives had overtaken the sale of male-controlled preventives in the late 19th and early 20th centuries. A study of birth control practices in Australia from the 1930s until the 1960s similarly found that the use of female-controlled methods of contraception was considerably higher than the use of the male-controlled methods of withdrawal and the condom (Cook 2000). The study also found that the use of female-controlled methods was markedly higher in Australia than in England over the same period.

Methods of prevention such as withdrawal required husbands to cooperate with their wives, while female-controlled preventives could be used without a husband's knowledge. Witnesses to the Royal Commission indicated that some husbands and wives were in agreement about the use of prevention, whereas others were not. Dr. Ralph Worrall reported that there was an 'inclination of both husband and wife to limit their families. They generally discuss the matter and make up their minds' (NSW 1904b: 89). Similarly, Witness E talking about the use of prevention thought: 'The women are not always the ones to blame, in fact it is sometimes made a sort of agreement on marrying' (NSW 1904b: 189). John West, however, said of the working classes 'My experience has taught me that there is a great deal of difference between the two parties and very often the husband is opposed to the wife doing this sort of thing and it has caused disagreements' (NSW

1904b: 199). Abortion was clearly a female-controlled method of limiting family size and one which some women employed without their husband's knowledge and/or consent (Allen 1990).

Many witnesses to the Royal Commission reported that women were proactive in purchasing preventives and in seeking out ways to procure an abortion. Pharmacists in Sydney said that both men and women came into their shops to purchase preventives or to ask for abortifacients. William Park, a pharmacist in Pitt St, said that 'all classes of people, gentlemen, ladies, wives of working men' came in to buy these goods (NSW 1904b: 40). George Stevens, a pharmacist in a working class district of Sydney, reported that 'Married women come in and ask for them over the counter….Sometimes they ask me for means to procure abortion'(NSW 1904b : 44). As noted above, one of the Sydney city pharmacies had set up a special kiosk staffed by a 'nurse' where women could buy female goods, including preventives.

Several witnesses expressed dismay at the ease with which women publicly spoke about family limitation. Dr Watson-Munro, a surgeon at two large Sydney hospitals, said 'Many classes of women are pretty free in expressing the desire to evade the pregnant condition' (NSW 1904b: 48). Dr Scot-Skirving reported that he was 'sometimes a little surprised at the casual way in which a woman, practically a stranger, will talk to me of the most inner sexual relations with as much *sang froid* as if she were talking about having lunch' (NSW 1904b: 98). As outlined above, women were an important source of information for other women on the ideas and values about family limitation and knowledge about methods of prevention

One reason put forward by witnesses for the reluctance of women to have large families was women's concerns about the pains and the risks of childbirth. Dr Scot-Skirving thought that 'There are a good number of women who have a weak shrinkage from the pains of maternity and they hate the disagreeables of gestation' (NSW 1904b: 98). Some doctors, however, thought that these fears were not justified. Dr Watson-Monro said 'They may talk about the trouble of the act of parturition of the pain of it, but I do not think that that is a very dreadful thing any more now than at any other time in the history of the world' (NSW 1904b: 80). At the same time, however, the Commissioners expressed grave concerns about 'unduly numerous' deaths of women in childbirth and the effects of childbirth on women's health and subsequent fertility (NSW 1904a: 31). Two witnesses to the Commission, Edward Fuss, a pharmacist, and John Hume, a newsagent, spoke about the ill-effects of continuous child-bearing on women's health, while the Rev. William Rutledge, a Methodist minister, commented that 'Some women have been worn out, almost done to death, by over-bearing of children' (NSW 1904b: 226).

Women's concerns about the risks of childbirth were clearly based in reality. 'In 19th century Tasmania, causes of death connected with maternity were the second most common, after tuberculosis, for women of childbearing age' (Kippen 2002a: 173). Using the WHO definition of maternal death (WHO 1992 cited in Kippen 2002a), the maternal mortality rate ranged from 3.4 to 7.9 deaths per 1,000 live births over the period 1860-1899 (Kippen 2002a: 180). There was a large increase in maternal mortality in the early 1870s, a decline from the late 1870s to the late 1880s and then an increase in the 1890s. The maternal death rate ranged from 0.6 to 1.2 deaths per 1,000 population between 1860 and 1899 and followed the trend in the maternal mortality rate until the 1890s when it began to fall in relation to the maternal mortality rate. This is undoubtedly due to the fall in fertility during this period. Kippen also found a large number of 'hidden maternal deaths' in the period 1880–1899, with more than one-third of maternal deaths not registered as such (Kippen 2002a: 188–190). Given these rates it is highly likely that most women in Tasmania of childbearing age would have been acquainted with or have heard of someone who had died in childbirth.

A letter to a newspaper cited in the Royal Commission Report (NSW 1904b: 282) suggested that couples were limiting their fertility because of their concerns about the husband's survival. A male breadwinner's death would leave his wife with the sole responsibility of supporting her dependent children and in many circumstances facing poverty. These concerns had a basis in reality given that in the four marriage cohorts in this study the number of husbands who died during their wives' childbearing years was around the same as the number of wives (Table A5.5).

Several witnesses to the Commission considered that one of the main reasons that women did not want many children was because of their love of 'pleasure'. Women of all classes wanted a life outside the domestic sphere and did not want to be burdened with a large family. Witness E thought that 'The practice of preventing conception is followed because of the desire of women to have social pleasures' (NSW 1904b: 180), while Dr Creed, a Sydney General Practitioner, and Dr Harris, a Newcastle General Practitioner, both said that women did not want to be 'bothered with children' (NSW 1904b: 124, 138). The Reverend Howell Price thought that the reason women wanted to limit the size of their family was that 'the children tied them too much to the home and they did not wish to become slaves…they want to be free, free from home ties and home duties as far as possible…they desire to have more leisure, apparently for the pursuit of their own pleasure' (NSW 1904b: 214–5).

Although he did not express it in this way, the Reverend Howell Price thought that women's aversion to having a large family was due to the influence of feminism. 'This desire to prevent the birth of children can undoubtedly be taken as a particular instance of a general relaxation of control over women, which has become the general sentiment during the last 30 or 40 years….That relaxation of all control has led them into this particular desire to be free from restriction in that way too' (NSW 1904b: 216).

Women of all classes were expressing feminist sentiments at the turn of the 20th century and standing up for what they perceived as their rights.

Ida McAulay in her diary, talked about how a working class woman had confronted her, an upper class woman, to stand up for her daughter's rights. On 14 November 1899, Ida McAulay wrote that the mother of one of her servants had objected to Ida's treatment of her daughter, 'I got a most impertinent card from Alice's mother saying she would not allow her to come back as this was the second time she had come home ill' (McAulay 1899). On 17 November 1899 Ida wrote that when Alice and her mother came to get Alice's box, 'strong words were exchanged and she was violent and abusive' (McAulay 1899).

The Mercury on 31 December 1900 reported an argument between Emma Dixon and her husband John (1870 cohort) in which Emma asserted her rights in relation to her husband:

> *'John Dixon, milkman, residing at the retreat farm, Lower Sandy Bay, deposed that deceased, who was his wife, left home at 6.20 in a cart to accompany him on his rounds. When about 100 yards from the farm she said she was going to have a new set of harness for the horse they were driving. He replied that they must pay a certain account first. She then said she had earned the money as well as he, that she was going to do as she liked and she would not go with him'.*

Emma subsequently jumped down from the cart, was run over by the wheels and died later that day. The death was ruled 'accidental' by the coroner.

Conclusion

Overall, the historical sources quoted in this chapter provide support for most theories of why marital fertility declined in the late 19th and early 20th centuries. In the conclusion to this thesis I summarise how the quantitative findings from chapters 6 and 7 and the qualitative findings from this chapter answer the questions of when, how and why fertility declined in Tasmania at this

time. I also examine how these findings compare with those from studies of the fertility decline in other English-speaking countries and in Western Europe, discussed in Chapter 1, and from other studies of the historical fertility decline in Australia, discussed in Chapter 2.

Chapter 9

Conclusion

The quantitative and qualitative evidence presented in this thesis shows that the fertility decline took place in Tasmania at around the same time as in the other Australian colonies, in Western Europe and other English-speaking countries (Caldwell 1999; Cleland 2001; Bengtsson and Dribe 2014; Gauvreau and Gossage 2001; Jones 1971; Hacker 2003; Woods 1987). Fertility started to decline in the late 1880s and the fertility decline became well established during the 1890s. The fertility decline was so entrenched by the early 1900s that people who were opposed to it, such as clergymen and the NSW Commissioners into the Decline in the Birth Rate in 1903 knew they were unable to halt or reverse it.

Quantitative evidence on how fertility declined supports both 'innovation' and 'adjustment' theories, with 'stopping' being an 'innovative' form of behaviour and 'spacing' being an 'adjustment' or 'adaptation' to new social and economic circumstances. The fall in fertility in late 19th century Tasmania was primarily due to the practice of stopping behaviour in the 1880 and 1890 cohorts, as argued by many demographers (Henry 1961; Coale 1986; Knodel and van de Walle 1979). However, as in 19th century Utah (Anderton and Bean 1985; Bean et al 1990), birth spacing was also used as a strategy to limit fertility by the 1890 cohort. In all marriage cohorts, some groups had longer birth intervals than others, suggesting that as in parts of Western Europe (Dribe and Scalone 2010; Kolk 2011; Tsuya et al 2010; Van Bavel 2004c; Van Bavel and Kok 2010), these groups were deliberately spacing their births before the fertility decline. Changes in starting behaviour made a small contribution to the fertility decline, due to an increase in the age at marriage. The change in the age at marriage is probably related to a change in social values, rather than a change in fertility preferences.

Quantitative and qualitative evidence shown here support all the individual theories of why fertility fell, apart from many of the theories related to infant and child mortality. Similarly to a recent study of the fertility transition in five North-American and European countries (Dribe et al 2014), I found that both 'innovation' and 'adjustment' factors played a role in the fertility decline (see Chapter 1). Rather than 'blending' the two sets of theories (Cleland 2001), however, I consider that the fertility decline needs to be viewed in a much broader context. The fertility transition occurred during the broad social and economic revolution that occurred in Tasmania in

the last two decades of the 19th century, with an important part of this revolution being changes in the role and status of women. The adoption of ideas and values about fertility limitation and of methods of fertility control can be seen as one of the many social changes that occurred at this time.

Few studies of the historical fertility decline have had access to contemporary literature of the period. Thus, there is little evidence as to how ideas and values about fertility control were diffused (Casterline 2001), on what types of contraceptives were used (see Chapter 1), or on the role that women played in the fertility decline (McDonald 2000). The historical sources used in this thesis provide valuable information in all these areas.

In Tasmania, the last three decades of the 19th century were a time of economic and social transformation, conditions under which fertility would fall, according to demographic transition theory (Notestein 1945). The colony became more industrialised and urbanised. Agriculture became progressively less important both in terms of employment and in its contribution to the colony's economy. Methods of transportation improved with the spread of the railways and in the last decade of the 19th century, the bicycle became a form of transport for both men and women. Inventions such as the electric telegraph, electric lighting, electric trams and even the telephone were well established in Tasmania by the end of the 19th century and farming became more mechanised. From the late 1860s, schooling became compulsory for both boys and girls, new schools were established across the colony during the last three decades of the 19th century and rates of literacy improved dramatically. In the 1880s and 1890s a number of significant public health measures were put into place throughout the colony. Studies of the fertility transition in Western European and other English-speaking countries have shown that many of these indicators of social and economic development are associated with the fertility decline (e.g. Dribe et al 2014; Lee et al. 1994; Schellekens and van Poppel 2012).

Although there was a marked improvement in literacy in the late 19th century, similarly to Alter's (1988) study of the historical fertility decline in Verviers, Belgium, I did not find any relationship between husbands' and wives' levels of literacy and their fertility in my quantitative analysis. This is possibly because my measure of literacy, that is, whether the husband and/or wife signed the marriage certificate, is a weak measure of literacy levels.

Social and economic development brought new ideas to Tasmania. Improvements in education opened up people's minds to these new ideas and allowed them to access information (Cleland

2001). Tasmania was not an isolated place in the second half of the 19th century. There was considerable communication and movement of people between Tasmania and other colonies and countries. Communication within Tasmania, with other colonies and with other countries improved markedly from the 1870s onwards. Written material about fertility limitation became available in the Australian colonies from the 1880s. Books and pamphlets were available in city bookshops and were advertised for sale by mail in the newspapers, lectures were given on 'Family Limitation' and pamphlets were circulated in some cities. Newspapers also published articles about the trials of people charged with selling 'obscene' literature pertaining to fertility control. While most of the witnesses to the Royal Commission were upper and middle class, many of them spoke about the books' authors and the trial judges with great familiarity.

Unlike in Britain and Western Europe (Seccombe 1994), the NSW 1903 Royal Commission on the Fall in the Birth Rate indicates that some doctors were a source of information on fertility control for their patients. However, informal sources were much more important in spreading ideas and values about fertility limitation and information about methods of fertility control. Information about prevention was spread by word of mouth among women, including from midwives to their patients. In the Australian colonies, informal sources appear to have been an important source of information for women of all classes. In contrast, for England, evidence of the importance of informal sources mainly relates to the working classes (Llewellyn Davies 1978; Seccombe 1993).

By the beginning of the 20th century, family limitation had become a legitimised topic for public discussion in Australia. People spoke freely about the subject in ordinary conversation and newspapers contained many editorials, articles and letters about the subject.

As argued by Caldwell (1999), the availability and use of artificial methods of contraception increased markedly from the 1880s onwards as did the use of methods such as 'withdrawal' and abortion which had been practised before the fertility decline. A variety of artificial methods of contraception were used in the late 19th and early 20th centuries: French letters, the India rubber 'Pessaire Preventif', soluble pessaries, sponges, syringes, douches and enemas. Artificial contraceptives and pills to procure abortions were sold by pharmacies, hawkers and by mail through advertisements in the newspapers. Some abortionists also advertised discretely through the newspapers. Most artificial methods of contraception were relatively expensive in relation to middle class and working men's wages, so that many women made their own contraceptives. This possibility does not seem to have been investigated for other countries (Seccombe 1993). 'Withdrawal' appears to have been used as a method of prevention mainly by the middle class.

Abortion was used to limit family size by married and unmarried women of all classes, but particularly by working class women. There is no evidence that abstinence was the main method of reducing marital fertility, as argued by Szreter (1996) for England and Wales.

The quantitative analysis in this thesis shows that in Tasmania, as in other Australian colonies, parts of Western Europe, Canada and the United States, the upper and middle classes were the first to limit their fertility followed by the other classes, with unskilled workers and farmers being the last to adopt fertility control (Anderson 1999; Bengtsson and Dribe 2014; Breschi et al 2014; Dribe et al 2014; Jones 1971; Livi-Bacci 1986; Schellekens and van Poppel 2012; Vézina et al 2014). In the 1890 cohort, white-collar workers also spaced their births, compared with farmers and unskilled workers, possibly for economic reasons. These findings are similar to Larson's (1994) for Melbourne (Victoria) in the late 19th century.

The quantitative data show that couples in urban areas of Tasmania had significantly lower fertility than couples in rural areas, even before the fertility transition. This was similar to the other Australian colonies, parts of Western Europe and Canada (Anderson 1999; Gauvreau and Gossage 2001, Jones 1971; Larson 1984; Livi-Bacci 1986, Sharlin 1986; Vézina et al 2014). In Tasmania, couples in urban areas were more likely to stop having children and to space their births than couples in rural areas even in the 1860/70 marriage cohorts. The qualitative data indicate that the people in urban areas had better access to artificial methods of contraception than those in rural areas at the time of the fertility decline.

Mining grew in importance as an occupation in late 19th century Tasmania. However, unlike 19th century England and Wales (Szreter 1996), the quantitative analysis shows that Tasmanian miners did not have very high fertility. Miners in Tasmania were very different from those in England. English miners tended to be born in a mining location and work there as miners all their lives. Tasmanian miners, on the other hand, were highly mobile both occupationally and geographically. In Tasmania, men often worked in other occupations in non-mining areas before they moved to mining localities and took up mining. In later life, they often took up other occupations, either in the mining area or moved elsewhere.

Opportunities for social mobility were an important feature of the late 19th and early 20th century social and economic transformation. Australian society was less rigid than English society and there were many opportunities for social mobility, particularly with the growth of more 'modern' occupations. The qualitative evidence shows that many middle and working class people had high

aspirations for themselves and their children and this probably encouraged the practice of fertility control, as argued by some scholars (Banks 1954; Lesthaeghe and Wilson 1986). These couples often aspired to a higher standard of living for themselves, including the opportunity to purchase their own home. As in Britain and Western Europe, a continual theme of witness' statements to the 1903 NSW Royal Commission on the Fall in the Birth Rate was that couples wanted to limit their families because they could not afford to have large numbers of children. Parents had high aspirations for their children and were concerned with the 'quality' of their children, rather than 'quantity'. They wanted their children to have a good education and to have other opportunities that people of higher socioeconomic status took for granted, such as learning to play the piano. In these circumstances, the demand for children fell because the cost of having another child was greater than the benefit of having that child (Becker 1981; Becker et al. 1990; Easterlin 1975).

Children were generally viewed as 'dependants' rather than 'workers', except in rural areas where farmers relied to some extent on their children's labour. While education became compulsory in the late 1860s, children of the urban and rural working class and of smaller farmers were regularly absent from school to help in the home or the family farm or to go out to work to supplement the family income. The quantitative analysis shows that these families had the highest fertility, supporting Caldwell's wealth flow theories (Caldwell 1976; Caldwell and Ruzicka 1978). This is consistent with Canadian findings that families in Ontario whose children attended school all year had significantly lower fertility than other families (Gauvreau and Gossage 2001).

While Tasmania was undergoing remarkable social and economic change in the last two decades of the 19th century, there was an economic depression in the early 1890s which brought an increase in unemployment and a drop in wages. This probably provided an additional incentive for couples to adopt fertility control measures and may explain why couples in the 1890 cohort were significantly more likely to space their births than those in the 1860/70 cohorts.

Tasmania was a relatively secular society from its earliest days. Religion was generally not as important to people in Australia as in Britain or the United States. By the 1880s, religious groups had little influence on political and social attitudes and values. In general, people did not view religion as having importance in their daily lives. Even where people had religious beliefs and went to church regularly, they often made their own decisions about what was right rather than taking the church's views. Even though clergymen were opposed to fertility control, they were unwilling to speak about it publicly for fear of being ridiculed, or worse, of losing some of their stipend through their parishioners leaving the church.

The adoption of fertility control in a secular society such as Tasmania is consistent with the argument that in late 19th and early 20th century Western Europe, secularisation was a necessary condition for the spread of fertility control, with the EFP finding that communities that were secularised tended to adopt fertility control early (Lesthaeghe and Wilson 1986). Other studies have found that in Western Europe and Canada, 'traditional' religious groups, such as Catholics and orthodox Protestants, had significantly higher fertility than the other more liberal religious groups (Gauvreau and Gossage 2001; Van Bavel and Kok 2005; van Poppel and Derosas 2006). Van Poppel et al. (2010) also suggest that some of the Protestant groups had high levels of literacy because of their emphasis on reading the scriptures. Education gave them access to ideas and information about fertility control and encouraged them to take control over this aspect of their lives.

Consistent with previous Australian analyses outlined in Chapter 2, in Tasmania the relationship between religious affiliation and fertility was not straightforward. There were no significant differences between religious groups in stopping behaviour, with Catholics no less likely to stop having children than Anglicans. There were, however, significant differences in spacing behaviour with Other Nonconformists (mainly Baptists and Congregationalists) significantly more likely to space their births than Anglicans in every marriage cohort, indicating that they were deliberately spacing their births before the fertility decline. Congregationalists and Baptists may have had high levels of literacy from the earliest years because of their religion's emphasis on reading the scriptures. Methodists also had significantly shorter birth intervals than Anglicans in the 1880 marriage cohort, but this is difficult to explain. In trying to interpret these quantitative results it is important to note that the measure of religion used in the analysis, that is, the religious rites according to which the couple were married, is a measure of religious affiliation not of religiosity. Additionally, some Tasmanians may have changed their religious affiliation during their lifetime.

As noted, one of the major social changes in Tasmania in the late 19th century and early 20th centuries was a change in the role and status of women. From the 1880s onwards, women achieved important rights, their position in the family and in the wider society started to change and they began to participate in areas of society that had formerly been closed to them. For women, there was no more fundamental right than controlling their fertility.

Qualitative evidence in this thesis supports Seccombe's view that 'women were the driving force' behind the fertility decline (Seccombe 1993: 168). The 1903 NSW Royal Commission on the Decline in the Birth Rate viewed women as primarily responsible for the fall in the birth rate in the

late 19th century and this applied to women of all classes. Women played a very active role in determining the size of their families. Many of the artificial contraceptives used were female-controlled, some of them made by women themselves. Specialist women's sections were established in some retail pharmacies, selling female goods, including preventives. While some husbands and wives were in agreement about the use of prevention, some methods of family limitation, such as abortion, could be used without a husband's knowledge and/or consent. Women were proactive in purchasing preventives and in seeking out ways to procure an abortion. They also spoke freely in public about their desire to avoid having large families. Women were an important source of information for other women on the ideas and values about family limitation and knowledge about methods of prevention. Although feminism was originally a movement for elite and middle class women, feminist ideas gradually spread throughout other strata of society. By the turn of the century, women of all classes were expressing feminist sentiments and standing up for what they perceived as their rights.

The quantitative and qualitative analyses in this thesis do not provide support for many theories of the relationship between infant and child mortality and fertility decline. Infant mortality in Tasmania was relatively flat between 1860 and 1899 and only started to decline at the turn of the century, well after fertility had begun to decline. Child mortality began to decline from the 1860s, with the decline interrupted by a couple of major epidemics in the 1870s.

Unlike Western Europe and the USA (Alter 1988; Alter et al. 2010; Breschi et al 2014; Haines 1998; Knodel 1978; Schellekens and van Poppel 2010; Vézina et al 2014), the quantitative analysis does not support the 'replacement' theory of infant mortality. In Tasmania, couples who had a child die in infancy while a mother was not pregnant with another were as likely to stop having children as other couples. Also unlike Germany and the USA (Knodel 1978; Haines 1988), the quantitative evidence does not support the 'insurance' theory of infant mortality for Tasmania. Rather than child mortality deterring couples from efforts to limit their fertility, similarly to the Netherlands (Schellekens and van Poppel 2010), the more infant and child deaths the family experienced, the more likely they were to stop childbearing.

Unlike the Netherlands and Spain (Reher and Sanz-Gimeno 2007; van Poppel et al 2012, the number of surviving children had no significant association with the time to the next birth indicating that couples were not adjusting their birth spacing in relation to deaths of infants or children. Unlike Utah and Germany (Bohnert et al 2012; Sandström and Vikström 2013), but

similarly to Belgium (Alter et. al 2010; Sandström and Vikström 2013), the sex composition of the family also had no significant association with stopping or spacing practices.

However, in Tasmania there was a 'physiological' relationship between infant mortality and fertility found in England and many parts of Western Europe (Knodel 1978, 1982; Wrigley et al 1997). Having a child die as an infant when a woman was not pregnant with another significantly reduced the time to the next birth, because of the effect of stopping breastfeeding on amenorrhea. The survival analysis of parity progression shows that women who had a child die as an infant had a significantly higher risk of having another birth than other women at most parities, but this probably reflects the length of time to the next birth rather than having another birth.

In conclusion, the evidence from historical sources of the period has allowed me to put the quantitative evidence in context and to view the various theories of why fertility declined in a coherent framework. Fertility declined in Tasmania in a period of remarkable social and economic transformation. Tasmania became more industrialised and urbanised, there was a growth in 'modern' occupations and an increase in opportunities for social and economic mobility. With the introduction of compulsory education, both boys and girls had access to an education and literacy improved markedly. One of the major social changes was in the role and status of women, who became the driving force behind the fertility decline. With the spread of feminism women of all classes wanted more from their lives than being restricted to the home through constant childbearing and parents recognised that they could give their children a better future if they had smaller families. In many ways, the fertility decline can be seen as a period in which the middle and working classes men and women aspired to lead lives like upper class people and realised that they could improve their social and material conditions and give their children a better future through controlling their fertility, as the upper classes had begun to do many years before.

These findings can be applied to other Australian colonies and to the other English-speaking countries and countries of Western Europe that were also experiencing broad social and economic changes together with a fertility decline around the same period.

Appendix A: Appendix tables

Table A2.1: Children ever born to married women by birth cohort, Australian Censuses, 1911 and 1921.				
	Children Ever Born (Australian Censuses			
Birth Cohort	Australia 1911 Census	Tasmania 1911 Census	Australia 1921 Census	Tasmania 1921 Census
1832–36	6.98	7.48	..	..
1837–41	7.02	7.22	..	..
1842–46	7.03	7.15	6.77	6.49
1847–51	6.75	6.69	6.51	6.42
1852–56	6.44	6.64	6.25	6.32
1857–61	5.92	6.11	5.74	5.97
1862–66	5.25	5.67	5.11	5.48
1867–71	..	..	4.57	4.97
1872–76	..	..	4.19	4.56

Note: '..' = not applicable

Source: Commonwealth of Australia 1914a: 1143; *Commonwealth of Australia 1921: 1926*

Table A2.2 : Number of children ever born by birth cohort of married women, Australia 1921 Census							
	1842-46	1847-51	1852-56	1857-61	1862-66	1867-71	1872-76
No. of children	*Per cent*						
None	10.3	10.8	10.1	10.0	10.8	12.1	12.4
One	3.7	3.6	4.3	4.9	5.9	7.6	9.0
Two	3.8	4.9	5.2	6.2	8.3	10.2	12.4
Three	4.9	5.3	6.5	8.1	10.1	11.8	13.2
Four	6.0	6.9	7.4	9.4	11.1	12.0	12.3
Five	7.1	7.5	8.8	10.1	10.5	10.6	10.5
Six	9.1	8.8	9.0	9.6	9.9	9.1	8.3
Seven	8.6	9.1	9.5	9.4	8.5	7.4	6.6
Eight	9.9	9.8	9.0	8.4	7.2	5.9	5.0
Nine	9.2	8.5	8.5	7.4	5.8	4.6	3.8
Ten	9.3	8.4	7.3	6.1	4.4	3.4	2.7
Eleven	7.0	5.9	5.9	4.2	3.0	2.2	1.7
Twelve	4.7	4.8	4.1	2.8	1.0	1.4	1.1
Thirteen	3.4	2.8	2.3	1.7	1.1	0.8	0.6
Fourteen or more	2.9	2.8	2.2	1.6	1.2	0.8	0.3
Total (per cent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (no.)	3,512	8,478	18,098	35,383	52,123	69,258	84,264

Source: Commonwealth of Australia 1921: 1926

Table A2.3 : Number of children ever born by birth cohort of married women, Australia 1911 Census					
	1842-46	1847-51	1852-56	1857-61	1862-66
No. of children	*Per cent*				
None	8.4	8.6	8.1	8.0	8.5
One	3.8	4.1	4.6	5.1	6.4
Two	4.1	4.7	5.3	6.4	8.5
Three	4.8	5.3	6.5	8.2	10.2
Four	5.7	6.8	7.7	9.4	11.3
Five	7.0	7.6	8.5	9.9	10.7
Six	8.5	8.6	8.9	9.7	10.2
Seven	9.2	9.1	9.3	9.5	8.7
Eight	10.0	9.6	9.4	8.8	7.4
Nine	9.3	9.1	8.6	7.7	6.0
Ten	9.5	8.6	7.9	6.4	4.7
Eleven	7.0	6.4	5.8	4.4	3.1
Twelve	5.7	5.1	4.2	3.1	2.0
Thirteen	3.3	2.9	2.5	1.8	1.1
Fourteen or more	1.8	1.6	1.3	0.9	0.6
Total (per cent)	100.0	100.0	100.0	100.0	100.0
Total (no.)	16,632	24,862	37,585	60,945	81,548

Source: Commonwealth of Australia 1914a: 1143

Table A3.1 Net migration, Tasmania 1861-1900	
Period	*Net migration*
1861-1865	-4,355
1866-1870	-813
1871-1875	-4,416
1876-1880	2,880
1881-1885	2,422
1886-1890	2,606
1891-1895	-4,562
1896-1900	4,914

Source: Borrie 1994: 123

Table A3.2: Female population aged 15-49 years, Tasmania, 1861, 1870, 1881 and 1891				
	1861	1870	1881	1891
Age	Per cent			
15-19 years	19.2	21.9	25.1	20.6
20-24 years	18.2	17.5	22.3	19.9
25-29 years	16.8	14.1	15.7	18.0
30-34 years	14.9	13.4	11.0	14.7
35-39 years	12.7	12.5	9.1	11.3
40-44 years	10.4	11.1	8.7	8.5
45-49 years	7.9	9.4	8.1	7.1
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	20,454	20,799	26,602	33,136

Source: Kippen 2002b

Table A3.3: Male population aged 15-49 years, Tasmania, 1861, 1870, 1881 and 1891				
	1861	1870	1881	1891
Age at marriage	Per cent			
15-19 years	13.8	20.1	24.0	18.5
20-24 years	12.1	15.0	21.5	18.7
25-29 years	12.6	11.5	16.1	18.6
30-34 years	15.2	11.7	11.6	15.9
35-39 years	16.5	12.9	9.3	12.4
40-44 years	16.0	14.2	8.7	9.1
45-49 years	13.8	14.6	8.8	6.9
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	24,505	21,330	27,900	38,229

Source: Kippen 2002

Table A3.4: Population by occupation, Tasmania 1842 and 1851				
	1842	*1851*	1841	1851
Type of occupation	No.		Per cent	
Occupation specified:	**20,594**	**28,998**	**35.9**	**41.3**
Landed proprietors, merchants, bankers and professional persons	1846	1577	9	5.4
Shopkeepers and other retail dealers	802	1415	3.9	4.9
Mechanics and artificers	3720	5687	18.1	19.6
Shepherds and others in the care of sheep	879	1445	4.3	5
Gardeners, stockmen and persons employed in agriculture (1)	9870	12545	47.9	43.3
Domestic Servants	3477	5600	16.9	19.3
Seamen, boatmen and whalers (2)	..	729	..	2.5
Convicts employed in public works (3)	**9,759**	**953**	**17**	**1.4**
Military, including wives and children	**..**	**568**	**..**	**0.8**
All other persons not included above	**27,067**	**39,611**	**47.1**	**56.5**
Total	**57,420**	**70,130**	**100**	**100**

..' = Not specified

(1) Includes 'Farmers', 'Market Gardeners', and 'Gardeners, Stockmen and Farm Servants' in 1851

(2) Includes 'Licensed Boatmen', 'Seamen employed in the Coastal and River Craft' and 'Whalers'

(3) In 1842 includes 'Convicts employed on government vessels', 'Convicts employed in public works throughout the colony', 'Convicts at the Penal Settlements on Tasman's Peninsula' and 'Female Convicts in House of Corrections, Hobart'. In 1851 includes only 'Convicts employed in public works'

Source: TAS 1842, 1851

Table A3.5 Population by occupation, Tasmania, 1861 and 1870				
	1861	*1870*	*1861*	*1870*
Type of occupation	No.		Per cent	
Occupation specified:	**27,655**	**32,398**	**30.7**	**32.6**
Professionals (1)	1,908	1,725	6.9	5.3
Shopkeepers and Other Retail Dealers (2)	1,267	1,152	4.6	3.6
Mechanics and Artificers	5,978	4,473	21.6	13.8
Farmers, Stockholders and Farm Labourers (3)	13,647	15,741	49.3	48.6
Domestic Servants	4,372	4,319	15.8	13.3
Licensed Victuallers	483	408	1.7	1.3
Other Labourers and Seamen	..	4,580	..	14.1
All other persons not included above	**62,322**	**66,930**	**69.3**	**67.4**
Total	**89,977**	**99,328**	**100**	**100**

'..'= Not specified

(1) Includes 'Merchants and Bankers', 'Legal Profession', "Medical Profession', 'Clergymen', 'Army or navy', 'Government Employ', 'Schoolmasters' and ,also in 1870, 'Schoolmistresses'.

(2) Includes 'Shopkeepers and other retail dealers' and 'Hawkers' in 1870

Source: TAS 1861, 1870

Table A3.6: Population by occupation, Tasmania 1881 and 1891				
	1881	1891	1881	1891
Type of occupation	*No.*		*Per cent*	
Breadwinners:	**50,071**	**61,411**	**43.3**	**41.9**
Professional	2,546	3,918	5.1	6.4
Domestic	4,856	7,180	9.7	11.7
Commercial-Mercantile, General Dealers	1,777	3,698	3.5	6
Commercial-Transport & Communication	2,241	3,267	4.5	5.3
Industrial	14,996	18,644	29.9	30.4
Primary Producers-Agricultural	17,699	16,031	35.3	26.1
Primary Producers-Pastoral	860	2,447	1.7	4.0
Primary Producers-Mineral	3,164	3,988	6.3	6.5
Primary Producers-Other	462	1,102	0.9	1.8
Indefinite	1,470	1,136	2.9	1.8
Dependants	**65,634**	**85,256**	**56.7**	**58.1**
Total	**115,705**	**146,667**	**100**	**100**

Notes: 'Professional' includes persons mainly 'engaged in the government and defence of the country, and in satisfying the intellectual, moral, and social wants of its inhabitants'
'Domestic' includes 'all persons engaged in the supply of board and lodging and in rendering personal services for which remuneration is usually paid.
'Commercial' includes 'all persons directly connected with the hire, sale, transfer, distribution, storage, and security of property and materials, and with the transport of persons or goods, or engaged in effecting communication'
'Industrial' includes 'all persons principally engaged in various works of utility, or in specialities connected with the manufacture, construction, modification, or alteration of materials so as to render them more available for the various uses of man, but excluding, as far as possible, all who are mainly or solely in the service of commercial interchange'.
'Agricultural, Pastoral, Mineral, and Other Primary Producers' includes 'all persons mainly engaged in the cultivation or original acquisition of food products, and in obtaining other raw materials direct from natural sources'.
'Indefinite' includes 'all persons who derive incomes from services rendered, but the direction of which services cannot be exactly determine'
Source: TAS 1891: 01_viii.

Table A3.7 Population by occupation, Tasmania 1891, 1901 and 1911						
	1891	1901	1911	1891	1901	1911
Type of occupation	No.			Per cent		
Breadwinners:	**60,946**	**72,586**	**75,969**	**41.6**	**42.1**	**39.7**
Professional	3,918	4,997	5,481	6.4	6.9	7.2
Domestic	7,180	7,937	7,864	11.8	10.9	10.4
Commercial-Mercantile, General Dealers	6,326	7,497	8,712	10.4	10.3	11.5
Commercial-Transport and Communication	3,267	4,848	4,738	5.4	6.7	6.2
Industrial	16,016	18,750	17,268	26.3	25.8	22.7
Primary Producers-Agricultural	16,031	19,422	20,168	26.3	26.8	26.5
Primary Producers-Pastoral	2,447	1,881	2,635	4.0	2.6	3.5
Primary Producers-Mineral	3,987	5,467	5,631	6.5	7.5	7.4
Primary Producers-Other	1,103	1,129	2,593	1.8	1.6	3.4
Independent	671	658	879	1.1	0.9	1.2
Dependants	**85,256**	**98,981**	**112,801**	**58.1**	**57.4**	**59.0**
Unspecified	**465**	**908**	**2,441**	**0.3**	**0.5**	**1.3**
Total	**146,667**	**172,475**	**191,211**	**100.0**	**100.0**	**100.0**

Notes: 'Primary Producers_Other' includes capture of wild animals and their produce, fisheries, forestry and water conservation and supply
Source: Commonwealth of Australia 1914c: 1291

Table A3.8 Males aged 20 years and older, occupation by class, Tasmania 1881		
	Males aged 20 years or older	
Occupations	*No.*	*Per cent*
Professional	1,377	4.3
Domestic	996	3.1
Commercial	2,968	9.3
Agricultural	11,776	36.7
Industrial	10,153	31.7
Indefinite and non-productive	4,250	13.3
Not stated.	544	1.7
Total	32,064	100

Notes: 'Professional' includes 'Persons engaged in general or local government, or the defence or protection of the country' and 'Persons engaged in the learned professions, in literature, art, and science'
Domestic' includes 'Persons engaged in the Domestic Offices or Duties of Wives, Mothers, Mistresses of Families, Children, Relatives and Visitors' and 'Persons engaged in entertaining and performing Personal Offices for Man'.
Commercial' includes 'Persons who buy or sell, keep or lend money, houses, or goods of various kinds' and 'Persons engaged in the Conveyance of Men, Animals, Goods and Messages'.

Agricultural includes 'Persons possessing, working or cultivating land, raising or dealing in animals'
Industrial' includes 'Persons engaged in working and dealing in art and mechanic productions' and 'Persons working and dealing in textile fabrics, in dress, and in fibrous materials', 'Persons working and dealing in food and drinks', 'Persons working and dealing in animal and vegetable substances' and 'Persons dealing in minerals'.
Indefinite and non-productive' includes 'Labourers and others', 'Persons of property or rank' and 'Persons supported by the community and of no specified occupation'.

Table A3.9. Males aged 20 years and older, occupations by class, Tasmania 1891		
	Males aged 20 years or older	
Occupations	*No.*	*Per cent*
Breadwinners:	40,194	96.9
Professional	*2,408*	*6*
Domestic	*1,158*	*2.9*
Commercial	*6,979*	*17.4*
Industrial	*11,664*	*29*
Primary Producers	*17,476*	*43.5*
Indefinite	*509*	*1.3*
Dependants	1290	3.1
Total	41,484	100

Notes: 'Professional' includes 'Government, law, defence and protection' and 'Religion, charity, health, education, science and amusement'.

'Domestic' includes 'Board and lodging and personal service'.

'Commercial' includes 'Property and finance', 'Traders and Dealers' and 'Storage, Transport, and Communication'.

'Industrial' includes 'Modifiers, manufacturers of materials'

'Primary Producers' includes 'Agricultural, pastoral, mineral and other primary producers'.

'Indefinite includes 'Persons of independent means' and 'Undefined'.

'Dependants' includes 'Wives, children, and relatives dependent upon natural guardians' and 'Other dependants upon the State or upon public or private support'.

Source: TAS 1891: 04_175, 04_180-181

Table A3.10. Males aged 20 years and older, occupations by class, Tasmania 1901		
	Males aged 20 years or older	
Occupations	*No.*	*Per cent*
Breadwinners:	46,734	97.9
Professional	*2,793*	*6*
Domestic	*1,153*	*2.5*
Commercial	*4,912*	*10.5*
Transportation and Communication	*3,899*	*8.3*
Industrial	*13,276*	*28.4*
Primary Producers	*20,200*	*43.2*
Indefinite	*501*	*1.1*
Dependants	991	2.1
Total	47,725	100

Notes: 'Professional' includes 'Government, law, defence and protection' and 'Religion, charity, health, education, science and amusement'
Domestic' includes 'Board and lodging and personal service'
Commercial' includes 'Property and finance' and "Traders and Dealers'
Transportation and Communication' includes 'Carriers and messengers on railways, roads, seas and rivers', 'Postal service' and 'Telegraph and Telephone Service'
Industrial' includes 'Modifiers, manufacturers of materials'
Primary Producers' includes 'Agricultural, pastoral, mineral and other producers'
Indefinite' includes 'Persons of independent means and undefined'
Dependants' includes 'Children and relatives dependent upon natural guardians' and 'Other dependants upon the State or upon public or private support'
Source: TAS 1901: 05_261, 05_264-267

Table A3.11: Females by occupation and marital status, Tasmania, 1911					
Marital status	Never Married	Married	Widowed (1)	Not specified	Total
Type of occupation					
Breadwinners	11,144	1,473	1,482	24	14,123
Professional	*1,760*	*210*	*155*	*6*	*2,131*
Domestic	*5,318*	*552*	*494*	*11*	*6,375*
Commercial	*1,215*	*214*	*239*	*3*	*1,671*
Transport & Communication	*168*	*122*	*41*	*..*	*331*
Industrial	*2,312*	*149*	*96*	*1*	*2,558*
Primary Producers	*223*	*180*	*208*	*3*	*614*
Independent	*148*	*46*	*249*		*443*
Dependants	45,437	30,016	3,612	106	79,171
Not specified	212	84	26	4	326
Total	56,793	31,573	5,120	134	93,620

(1) The category 'widowed' includes 34 divorced women, 20 of whom were breadwinners

Source: Commonwealth of Australia 1914c: 1672

Table A3.12 Major towns in Tasmania, 1881, 1891 and 1901

		1881	*1891*	*1901*
Town	*Pursuits connected with*	*Population (no.)*		
Beaconsfield	Mining	455	1,584	2,658
Bothwell	A. and P. farming	454	520	384
Burnie (Emu Bay)	A. Farming, mining seaport	305	981	1,548
Campbell Town	P. farming	948	818	735
Carrick	A. farming	282	281	224
Colebrook (Jerusalem)	A. and P. farming, coal mining	194	189	147
Deloraine	A. and P. farming	836	895	949
Derby	Tin mining and agriculture	..	273	587
Devonport E. (Torquay)	Seaport/watering place, A. farming.	370	559	673
Devonport W. (Formby)	Seaport/watering place, A. farming.	162	1,246	2,101
Evandale	Farming	564	540	617
Fingal	Dairy farming and coal mining	247	425	372
Franklin	Fruit growing and timber-producing	457	506	765
George Town	Watering place	299	299	274
Glenorchy	Fruit and hop-growing	..	588	578
Gormanston	Mining	..	..	1,760
Hamilton	P. farming	387	348	232
Hobart	Metropolis	21,118	24,905	24,654
Bellerive	Suburb of Hobart	..	625	653
Beltana	Suburb of Hobart	..	..	251
Glebeton	Suburb of Hobart	..	643	694
Moonah	Suburb of Hobart	..	..	732
Mt. Stuart	Suburb of Hobart	..	..	523
New Town (1)	Suburb of Hobart	1,720	2,288	2,314
Queensborough (Sandy Bay) (2)	Suburb of Hobart	795	1,443	1,821
Wellington Hamlets	Suburb of Hobart	..	704	776
Kempton	A. and P. farming	434	426	288
Kingston	Fruit growing and dairying.	171	249	219
Latrobe	A. farming	711	1,560	1,360
Launceston	City	12,752	17,208	18,022
Invermay	Suburb of Launceston	..	882	1010
Trevallyn	Suburb of Launceston	..	256	529
Lefroy	Mining, gold	436	465	709
Longford	A. and P. farming	1,286	1,084	1,223
Mathinna	Gold-mining	..	426	815
New Norfolk	Fruit and hop-growing	1,036	1,072	1,151
Oatlands	A. and P. farming	673	731	618
Penguin	A. Farming, mining seaport	..	396	540
Perth	A. and P. farming	478	517	442

Table A3.12 Major towns in Tasmania, 1881, 1891 and 1901 (cont.)				
		1881	1891	1901
Town	*Pursuits connected with*	*Population (no.)*		
Pillinger	Mining seaport	..	..	637
Pontville	A. and dairy farming	329	172	114
Queenstown	Mining	..	..	5,051
Richmond	A. and P. farming	448	536	395
Ross	P. farming	353	389	311
St Helen's	Dairy and A. farming	257	363	410
Scottsdale	A. farming	..	..	636
Sheffield	A. farming	263	429	446
Sorell	A. and P. farming	267	282	245
Stanley	A. farming	332	400	484
Strahan	Mining seaport	..	561	1,504
Swansea	A. farming and fruit growing	244	295	213
Ulverstone	A. farming	..	1,129	1,164
Waratah	Tin-mining	874	1,420	1,265
Westbury	A. farming	1,156	1,104	1,027
Wynyard	A. farming	168	621	526
Zeehan	Silver-mining	..	1,965	5,014

Notes:
Comprises the 36 largest of the 45 towns listed in the 1881 Census Table 'Population of Towns' and all towns of 500 or more people listed in the Table 'Population and Dwellings, 1901.

".. "= Not included as a town in the 1881 and/or 1891 Census tables.

A. farming= agricultural farming, P. farming=pastoral farming

Town names as of 1901. Names in brackets are the earlier names of these towns.

(1) New Town was a separate town from Hobart prior to 1891.
(2) Sandy Bay was a separate town from Hobart prior to 1891

Source: TAS 1887: 76, TAS 1892: 90-91, TAS 1902: 86-87; Tas Family History Society 2014.

Table A5.1: Previous marriages and children, where known, for widows: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania.				
	1860	1870	1880	1890
	No.			
Previous marriage in Tasmania	24	27	35	48
With Tasmanian-born children of previous marriage	*15*	*17*	*31*	*42*
Number of children				
1-2	*7*	*7*	*15*	*15*
3-4	*8*	*8*	*9*	*11*
5+	*0*	*2*	*7*	*16*
Previous marriage unknown place	11	5	0	0
With Tasmanian-born children of previous marriage	*10*	*5*	*0*	*0*
Number of children				
1-2	*6*	*2*	*0*	*0*
3-4	*3*	*3*	*0*	*0*
5+	*1*	*0*	*0*	*0*
Previous marriage in Tasmania or unknown place				
With children of the cohort marriage	*21*	*24*	*25*	*31*
Number of children				
1-2	*11*	*14*	*10*	*15*
3-4	*2*	*3*	*4*	*9*
5+	*8*	*7*	*11*	*7*
With children of previous and cohort marriages	*16*	*14*	*19*	*22*
Total widows (no.)	104	102	93	81

Table A5.2: Marital outcomes for couples with women in their first marriage with no children of that marriage: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)				
	1860	1870	1880	1890
Marriage outcomes	Per cent			
Separated or divorced during wife's childbearing years (2)	2.3	1.3	7.6	3.9
Wife died during childbearing years	10.5	12.7	14.1	7.8
Husband died during childbearing years (3)(4)	4.7	13.9	6.5	6.9
Both survived childbearing years	15.1	24.1	32.6	38.2
Unobserved	67.4	48.1	39.1	43.1
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	86	79	92	102

(1) Two women in the 1860 cohort, one in the 1870 cohort, one in the 1880 cohort and two in the 1890 cohort had an ex-nuptial birth prior to marriage.

(2) One woman in the 1880 cohort had children from a subsequent relationship

(3) One woman in the 1860 cohort had an ex-nuptial child after the husband died.

(4) Four women in the 1860 cohort, two in the 1870 cohort, one in the 1880 cohort and one in the 1890 cohort remarried and had children of that marriage

Table A5.3: Age at marriage for women with unknown marital status where there were no children of the marriage: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	No.			
Less than 21 years	8	2	1	0
21-24 years	2	1	2	0
25-29 years	8	1	0	2
30-34 years	0	2	0	1
35-39 years	3	0	0	0
40-44 years	1	2	1	0
45 years and older	2	7	0	1
Missing	17	2	1	0
Total (no.)	41	17	5	4
Mean age (1)	28.5	..	..	..
Median age (1)	26.5	..	..	..

'..'= numbers are too small to calculate mean/median

(1) Includes population where age is known

Table A5.4: Marital outcomes for couples where women's marital status was unknown and there were no children of the marriage: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania(1)				
	1860	1870	1880	1890
Marriage outcomes	No.			
Separated during wife's childbearing years (2)	2	1	1	0
Wife died during childbearing years	4	0	0	0
Husband died during childbearing years (3)	3	0	0	0
Both survived childbearing years	4	7	1	1
Unobserved	27	9	3	3
Total	41	17	5	4

(1) One woman in the 1860 cohort had ex-nuptial births prior to marriage.

(2) One woman in the 1860 cohort had 6 children in a subsequent relationship

(3) One woman in the 1860 cohort remarried and had children of that marriage

Table A5.5: Marriage outcomes for Incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania.				
Marriage outcome	1860	1870	1880	1890
	No.			
Separated during wife's childbearing years	14	4	10	9
Wife re-partnered and had more children(1)	*5*	*2*	*2*	*1*
Wife died during childbearing years	50	60	70	82
Husband died during wife's childbearing years	57	58	76	71
Wife re-partnered and had more children(2)	*10*	*19*	*23*	*28*
Total	121	122	156	162
	Per cent			
Separated during wife's childbearing years	11.6	3.3	6.4	5.6
Wife died during childbearing years	41.3	47.5	44.9	50.6
Husband died during wife's childbearing years	47.1	49.2	48.7	43.8
Total	100.0	100.0	100.0	100.0

(1) Some of these children were ex-nuptial, while some women remarried, either bigamously, when their husbands died or after divorce.

(2) Most of these women remarried, while a few had an ex-nuptial child after their husband died

Table A5.6: Women in their first marriage with premarital births by type of premarital birth: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Type of premarital birth	No.			
One premarital birth	20	23	19	11
Two or more premarital births	8	2	5	1
Premarital and ex-nuptial birth/s	0	0	1	7
Two or more ex-nuptial births	2	5	4	4
Total couples	30	30	29	24

Table A5.7: Marital outcomes and number of children of the marriage for women in their first marriage with premarital births: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania.				
	1860	*1870*	*1880*	*1890*
Marital outcomes	No.			
Husband and wife survived their childbearing years	13	17	19	12
Number of children				
1-2	*1*	*2*	*1*	*2*
3-4	*2*	*2*	*2*	*1*
5+	*10*	*13*	*16*	*9*
Husband and/or wife died during the wife's childbearing years	11	9	8	7
Number of children				
1-2	*2*	*1*	*5*	*2*
3-4	*2*	*1*	*0*	*2*
5+	*7*	*7*	*3*	*3*
Unobserved	6	4	2	5
Number of children				
1-2	*1*	*1*	*1*	*3*
3-4	*1*	*2*	*1*	*1*
5+	*4*	*1*	*0*	*1*
Total (no.)	30	30	29	24

Table A5.8: Marital status of husband and wife at marriage for women in their first marriage with children, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)				
	1860	1870	1880	1890
Marital status of husband and wife at marriage.	Per cent			
Wife and husband's marital status not given	15.7	15.6	0.0	0.6
Spinster, husband's marital status not given	21.5	12.3	0.0	0
Spinster married bachelor	57.0	63.9	91.0	95.7
Spinster married widower	5.8	8.2	9.0	3.7
Total (per cent)	100.0	100.0	100.0	100.0
Total	121	122	156	162

(1) Wife's marital status was determined from other information if not given

Table A5.9: Marital status of husband and wife at marriage for women in their first marriage with children unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania (1)				
	1860	1870	1880	1890
Marital status of husband and wife at marriage.	Per cent			
Wife and Husband's marital status not given	12.0	15.0	1.7	2.0
Spinster, husband's marital status not given	29.3	10.0	0.0	0.0
Spinster married Bachelor	53.3	62.5	96.6	90.0
Spinster married Widower	5.3	12.5	1.7	8.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

(1) Wife's marital status was determined from other information if not given

Table A5.10: Age at marriage for women with children in their first marriage, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	Per cent			
Less than 21 years	*53.7*	*62.3*	*48.7*	*43.8*
21-24 years	32.2	25.4	34.6	30.2
25-29 years	10.7	10.7	12.8	17.9
30-34 years	2.5	0.0	2.6	6.2
35-39 years	0.8	0.8	1.3	0.6
40-44 years	0.0	0.0	0.0	0.0
45 years and older	0.0	0.0	0.0	0.0
Missing	0.0	1.6	0.0	1.2
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	162
Mean age (1)	21.2	20.3	21.6	22.4
Median age (1)	20.8	19.8	21.0	21.5

(1) Excludes missing data.

Table A5.11: Age at marriage for women with children in their first marriage, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	Per cent			
Less than 21 years	*38.7*	*45.0*	*52.5*	*28.0*
21-24 years	22.7	22.5	32.2	40.0
25-29 years	12.0	20.0	5.1	14.0
30-34 years	0.0	0.0	0.0	2.0
35-39 years	1.3	0.0	0.0	0.0
40-44 years	0.0	0.0	0.0	0.0
45 years and older	0.0	0.0	0.0	0.0
Missing	25.3	12.5	10.2	16.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50
Mean age (1)	21.5	21.9	20.7	22.3
Median age (1)	20.9	20.9	20.5	22.4

(1) Excludes missing data.

Table A5.12: Age at marriage for husbands of women with children in their first marriage, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	Per cent			
Less than 21 years	8.3	9.0	13.5	6.8
21-24 years	27.3	40.2	31.4	36.4
25-29 years	23.1	26.2	32.1	32.7
30-34 years	11.6	8.2	8.3	8.6
35-39 years	5.8	1.6	9.0	5.6
40-44 years	0.8	2.5	2.6	4.3
45 years and older	5.0	4.9	2.6	2.5
Missing	18.2	7.4	0.6	3.1
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	162
Mean age (1)	28.3	27.3	27.2	27.2
Median age (1)	25.8	24.5	25.5	25.6

(1) Excludes missing data.

Table A5.13: Age at marriage for husbands of women with children in their first marriage, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age at marriage	Per cent			
Less than 21 years	6.7	7.5	15.3	10.0
21-24 years	17.3	27.5	47.5	26.0
25-29 years	24.0	22.5	15.3	20.0
30-34 years	10.7	10.0	5.1	6.0
35-39 years	10.7	0.5	1.7	2.0
40-44 years	2.7	0.0	3.4	0.0
45 years and older	1.3	0.5	0.0	0.0
Missing	26.7	22.5	11.9	36.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50
Mean age (1)	28.5	27.1	24.9	25.2
Median age (1)	27.3	25.0	23.4	23.7

(1) Excludes missing data.

Table A5.14: Age difference between spouses at marriage for women in their first marriage with children, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Age difference	Per cent			
Wife 5 or more years older	2.5	0.8	1.2	1.2
Wife 1–4 years older	5.0	10.7	12.8	12.3
Same age or Husband 1-4 years older	28.9	36.9	39.1	41.4
Husband 5–9 years older	22.3	23.0	25.0	21.6
Husband 10–14 years older	10.7	9.8	10.3	11.7
Husband 15 or more years older	12.4	9.8	10.3	7.4
Husband and/or wife's age missing	18.2	9.0	0.6	4.3
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	162	181

Table A5.15: Age difference between spouses at marriage for women in their first marriage with children, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
Age difference	1860	1870	1880	1890
Age difference	Per cent			
Wife 5 or more years older	0.0	2.5	0.0	2.0
Wife 1-4 years older	9.3	10.0	11.9	16.9
Same age or Husband 1-4 years older	17.3	35.0	45.8	24.0
Husband 5-9 years older	25.3	12.5	18.6	16.0
Husband 10-14 years older	13.3	7.5	5.1	2.0
Husband 15 or more years older	6.7	5.0	6.8	4.0
Husband and/or wife's age missing.	28.0	27.5	11.9	36.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

Table A5.16 Composition of 'Other Nonconformists': 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Type of Other Nonconformist	Per cent			
Baptists	0.0	6.7	13.3	49.1
Civil	0.0	0.0	1.3	2.8
Congregationalists	44.8	73.3	66.7	34.9
Independent	55.2	20.0	18.7	9.4
Christian Mission	0.0	0.0	0.0	3.8
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	29	60	75	106

Table A5.17: Type of religion at marriage, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Type of religion	Per cent			
Anglican	51.2	39.3	28.8	28.4
Catholic	12.4	7.4	17.3	14.8
Presbyterian	15.7	14.8	15.4	13.6
Methodist	8.3	19.7	16.7	17.9
Other Nonconformist	11.6	18.9	21.8	25.3
Missing	0.8	0.0	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	162

Table A5.18: Type of religion at marriage, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Type of religion	Per cent			
Anglican	24.0	22.5	22.0	28.0
Catholic	30.7	27.5	20.3	10.0
Presbyterian	21.3	15.0	6.8	18.0
Methodist	6.7	7.5	22.0	14.0
Other Nonconformist	17.3	27.5	28.8	30.0
Missing	0.0	0.0	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

Table A5.19: Whether husband and/or wife signed the marriage register, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Literacy	Per cent			
Both husband and wife signed	71.9	76.7	80.1	94.4
Wife did not sign, husband signed	11.6	12.3	7.1	1.9
Husband did not sign, wife signed	7.4	10.7	7.7	3.7
Neither husband nor wife signed	9.1	3.3	5.1	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	181

Table A5.20: Whether husband and/or wife signed the marriage register, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Literacy	Per cent			
Both husband and wife signed	69.3	65.0	71.2	84.0
Wife did not sign, husband signed	14.7	12.5	15.3	10.0
Husband did not sign, wife signed	4.0	12.5	5.1	6.0
Neither husband nor wife signed	12.0	10.0	8.5	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

Table A5.21: Husband's occupational group (HISCO) at the birth of first child, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
HISCO occupational group	Per cent			
Professional, technical & related workers	5.0	3.3	6.4	2.5
Administrative & managerial workers	0.8	0.8	2.6	3.1
Clerical & related workers	2.5	2.5	2.6	6.8
Sales workers	10.7	5.7	7.7	4.9
Service workers	4.1	1.6	1.3	3.1
Agricultural, forestry, fishery, hunting	31.4	32.0	25.0	21.0
Mining, manufacturing and transport	43.0	54.1	53.2	58.0
Missing	2.5	0.0	1.3	0.6
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	162

Table A5.22: Husband's occupational group (HISCO) at the birth of first child, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
HISCO occupational group	Per cent			
Professional, technical & related workers	1.3	7.5	3.4	4.0
Administrative & managerial workers	1.3	0.0	0.0	2.0
Clerical & related workers	1.3	0.0	5.1	0.0
Sales workers	1.3	0.0	3.4	10.0
Service workers	8.0	7.5	5.1	2.0
Agricultural, forestry, fishery, hunting	34.7	15.0	11.9	12.0
Mining, manufacturing and transport	50.7	65.0	69.5	68.0
Missing	1.3	5.0	1.7	2.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

Table A5.23: Husband's socioeconomic status (HISCLASS) at first birth, incomplete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
HISCLASS group	Per cent			
Higher managers (1)	0.8	0.0	0.0	1.2
Higher professionals (2)	2.5	2.5	5.1	2.5
Lower managers (3)	4.1	0.8	2.6	1.9
Lower prof & clerical, sales (4)	10.7	7.4	10.9	5.6
Lower clerical & sales (5)	2.5	2.5	1.9	6.8
Foremen (6)	0.0	0.0	0.6	0.6
Skilled workers (7)	17.4	14.8	15.4	17.3
Farmers (8)	26.4	25.4	20.5	19.8
Lower skilled workers (9)	9.1	10.7	13.5	10.5
Lower skilled farm workers (10)	0.0	0.8	0.0	0.0
Unskilled workers (11)	19.0	28.7	24.4	32.7
Unskilled farm workers (12)	5.0	6.6	4.5	1.2
Missing	2.5	0.0	0.6	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	162

Table A5.24: Husband's socioeconomic status (HISCLASS) at first birth, unobserved group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
HISCLASS group	Per cent			
Higher managers (1)	0.0	0.0	0.0	0.0
Higher professionals (2)	1.3	7.5	3.4	2.0
Lower managers (3)	2.7	0.0	0.0	4.0
Lower prof & clerical, sales (4)	4.0	5.0	3.4	8.0
Lower clerical & sales (5)	2.7	0.0	8.5	2.0
Foremen (6)	0.0	0.0	0.0	0.0
Skilled workers (7)	22.7	27.5	22.0	24.0
Farmers (8)	16.0	10.0	10.2	12.0
Lower skilled workers (9)	5.3	7.5	11.9	14.0
Lower skilled farm workers (10)	4.0	0.0	0.0	0.0
Unskilled workers (11)	25.3	32.5	37.3	34.0
Unskilled farm workers (12)	14.7	5.0	1.7	0.0
Missing	1.3	5.0	1.7	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

Table A5.25: Type of location of first birth, incomplete group: 1860. 1870, 1880 and 1890 marriage cohorts, Tasmania.				
	1860	1870	1880	1890
Type of location	Per cent			
Urban	47.9	32.8	42.3	39.5
Rural	44.6	61.5	52.6	55.6
Outside Tasmania	7.4	5.7	5.1	4.9
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	121	122	156	162

Table A5.26: Type of location of first birth, unobserved group: 1860. 1870, 1880 and 1890 marriage cohorts, Tasmania.				
	1860	1870	1880	1890
Type of location	Per cent			
Urban	54.7	47.5	40.7	50.0
Rural	40.0	35.0	54.2	42.0
Outside Tasmania	5.3	17.5	5.1	8.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	75	40	59	50

Table A6.1. Proportion of families by number of children, complete group: 1860, 1870, 1880 and 1890 marriage cohorts, Tasmania				
	1860	1870	1880	1890
Number of children	Per cent			
1-3	14.5	14.1	14.6	27.6
4-6	20.7	18.0	30.2	37.6
7-9	29.7	30.4	32.1	23.3
10+	35.2	37.5	23.0	11.5
Total (per cent)	100.0	100.0	100.0	100.0
Total (no.)	256	283	417	529

Table A6.2. Number of children ever born from cohort marriage, incomplete group: 1860, 1870, 1880 and 1890 cohorts, Tasmania				
	1860	1870	1880	1890
No of children	Per cent			
One	19.8	12.3	14.7	19.4
Two	7.4	14.8	14.1	17.9
Three	9.1	18.9	15.4	17.9
Four	7.4	10.7	12.1	14.2
Five	12.4	7.4	11.5	8.6
Six	13.2	10.7	9.0	6.8
Seven	10.7	7.4	5.1	5.0
Eight	5.0	6.6	6.4	5.6
Nine	7.4	4.1	3.9	3.7
Ten	3.3	2.5	1.3	0.6
Eleven	0.8	2.5	5.8	0.0
Twelve	0.8	1.6	0.0	0.6
Thirteen	1.7	0.8	0.6	0.0
Fourteen	0.8	0.0	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no)	121	122	156	162
Mean	5.00	4.65	4.56	3.75
Median	5	4	4	3

Table A6.3. Number of children observed, unobserved group: 1860, 1870, 1880 and 1890 cohorts, Tasmania				
	1860	1870	1880	1890
No of children	Per cent			
One	25.3	22.5	22.0	34.0
Two	22.7	20.0	18.6	24.0
Three	9.3	15.0	13.6	6.0
Four	16.0	7.5	11.9	8.0
Five	8.0	15.0	13.6	6.0
Six	8.0	5.0	3.4	12.0
Seven	4.0	0.0	3.4	4.0
Eight	2.7	7.5	6.8	2.0
Nine	1.3	0.0	6.8	0.0
Ten	0.0	2.5	5.1	0.6
Eleven	1.3	5.0	0.0	0.6
Twelve	0.0	0.0	0.0	0.6
Thirteen	0.0	0.0	1.7	0.0
Fourteen	1.3	0.0	0.0	0.0
Total (per cent)	100.0	100.0	100.0	100.0
Total (no)	75	40	59	50
Mean	3.45	3.83	4.14	2.98
Median	3	3	3	2

Table A6.4: Infant and child mortality, incomplete group: 1860, 1870, 1880 and 1890 cohorts, Tasmania				
	1860	1870	1880	1890
Infant/child deaths	Per 1,000 (1)			
Infant death/s (<1 year)	105	83	70	82
Child death/s (1-4 years)	42	47	30	36
Total births (no.)	640	651	762	672

Note: Rates for infant deaths calculated per 1,000 live births, for child deaths per 1,000 children reaching age one.

Table A6.5: Infant and child mortality, unobserved group: 1860, 1870, 1880 and 1890 cohorts, Tasmania				
	1860	1870	1880	1890
Infant/child death in family	Per 1,000 (1)			
Infant death/s (<1 year)	89	103	66	34
Child death/s (1-4 years)	55	50	53	35
Total births (no.)	259	156	244	149

Note: Rates for infant deaths calculated per 1,000 live births, for child deaths per 1,000 children reaching age one.

Table A6.6: Husband's socioeconomic status at first birth by religion, complete group: 1860/70 marriage cohorts, Tasmania					
	Anglicans	Catholics	Presbyterians	Methodist	Other Non-Conformist
Socioeconomic status	Per cent				
White-collar	20.4	14.0	32.5	15.9	15.9
Skilled workers	12.2	5.3	15.0	15.9	30.7
Farmers	31.2	19.3	25.0	30.7	26.1
Lower skilled (2)	5.9	12.3	5.0	8.0	8.0
Unskilled	30.3	49.1	22.5	29.5	19.3
Total	100.0	100.0	100.0	100.0	100.0
Total (no.)	221	57	80	88	88

Note: religion missing for one couple in the 1860/70 cohorts and socioeconomic status missing for four couples

Table A6.7: Husband's socioeconomic status at first birth by religion, complete group: 1880 marriage cohort, Tasmania					
	Anglicans	Catholics	Presbyterians	Methodist	Other Non-Conformist
Socioeconomic status	Per cent				
White-collar	27.3	7.7	22.2	15.5	22.7
Skilled workers	12.1	21.2	24.1	18.6	17.3
Farmers	25.9	3.8	25.9	28.9	12.0
Lower skilled (2)	10.1	7.7	5.6	18.6	18.7
Unskilled	24.5	59.6	22.2	18.6	29.3
Total	100.0	100.0	100.0	100.0	100.0
Total (no.)	139	52	54	97	75

Table A6.8: Husband's socioeconomic status at first birth by religion, complete group: 1890 marriage cohort, Tasmania					
	Anglicans	Catholics	Presbyterians	Methodist	Other Non-Conformist
Socioeconomic status	Per cent				
White-collar	27.4	17.0	23.8	11.0	29.2
Skilled workers	10.7	11.3	19.0	15.3	25.5
Farmers	21.4	26.4	20.2	33.9	7.5
Lower skilled (2)	14.3	18.9	9.5	16.9	11.3
Unskilled	26.2	26.4	27.4	22.9	26.4
Total	100.0	100.0	100.0	100.0	100.0
Total (no.)	168	53	84	118	106

Table A7.1: Age at last birth by age at marriage, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania			
	1860 /1870	1880	1890
Age at marriage/Age at last birth	Per cent		
Under 20 years			
Less than 30 years	11.1	18.9	27.4
30-34 years	9.6	15.4	11.5
35-39 years	23.2	28.3	25.7
40+ years	56.1	37.8	35.4
Total (per cent)	100	100	100
Total (no.)	198	127	113
20-24 years			
Less than 30 years	8.6	13.6	23
30-34 years	11.9	15.4	18.9
35-39 years	31.3	31.7	30.9
40+ years	48.1	39.4	27.2
Total (per cent)	100	100	100
Total (no.)	243	221	265
25+years			
Less than 30 years	4.1	6.1	8.2
30-34 years	13.3	4.5	15.8
35-39 years	33.7	42.4	45.2
40+ years	49	47	30.8
Total (per cent)	100	100	100
Total (no.)	98	66	146

(1) There were three women in the 1880 cohort and five in the 1890 cohort for whom age was missing.

Table A7.2. Mean birth interval by birth order, complete group: 1860/1870, 1880 & 1890 marriage cohorts, Tasmania (1)			
	1860/1870	1880	1890
Birth order	*Mean birth interval (months)*		
1–2	23	23.3	24.3
2–3	26	25.4	26.1
3–4	27.2	25.9	28.7
4–5	25.8	27.6	28.1
5–6	27.1	28.3	27.4
6–7	26.5	27.5	28.2
7–8	26.1	26.9	27.6
8–9	25	27.1	26.9
9–10	25.8	24.5	24.6

(1) Excludes last birth interval

Table A7.3 Distribution of covariates for logistic regression (Table 7.16)

Covariate	No. of births	Per cent	Covariate	No. of Births	Per cent
Mother's age at the birth			Type of geographic location		
<25 years (ref.)	2,416	24.0	Urban area in Tasmania (ref.)	2,773	27.5
25-<30 years	2,663	26.4	Rural area in Tasmania	6,376	63.2
30+ years	4,970	49.3	Another colony	937	9.3
Missing	37	0.4	Religion		
Mother's age at marriage			Anglican (ref.)	3,634	36.0
<20 years (ref.)	3,743	37.1	Catholic	1,194	11.8
20-<25 years	4,834	47.9	Presbyterian	1,381	13.7
25+ years	1,472	14.6	Methodist	2,170	21.5
Missing	37	0.4	Other Nonconformist	1,701	16.9
Age difference between couple			Missing	6	0.1
Same/ Husband up to 5 yrs older (ref.)	4,432	43.9	Literacy status of husband and wife		
Wife older	1,416	14.0	Both literate (ref.)	8,483	84.1
Husband 5+ years older	4,100	40.7	Husband and/or wife illiterate	1,603	15.9
Missing	138	1.4	Twin birth	99	1.0
Marriage cohort			Child dies as infant before conception of another	620	6.2
1860/70 cohorts (ref.)	4,215	41.8	Family composition		
1880 cohort	2,921	29.0	More girls than boys	3,917	38.8
1890 cohort	2,950	29.3	More boys than girls	4,413	43.8
Socioeconomic status			Equal numbers of boys and girls	1,756	17.4
White-collar (ref.)	1,862	18.5			
Skilled	1,460	14.5	Total births=10,086		
Farmers	2,861	28.4			
Lower skilled	1,068	10.6			
Unskilled	2,806	27.8			
Missing	29	0.3			

Table A7.4. Predicted probability that a birth is the last by socioeconomic status, complete group: 1860/70, 1880, 1890 marriage cohorts, Tasmania			
Marriage cohort/ Socioeconomic status	Predicted probability	Standard error	Significance
1860/70 cohort			
White-collar	0.14	0.008	0.000
Skilled	0.12	0.009	0.000
Farmers	0.10	0.006	0.000
Lower skilled	0.13	0.010	0.000
Unskilled	0.10	0.006	0.000
1880 cohort			
White-collar	0.18	0.010	0.000
Skilled	0.16	0.011	0.000
Farmers	0.13	0.008	0.000
Lower skilled	0.16	0.012	0.000
Unskilled	0.13	0.008	0.000
1890 cohort			
White-collar	0.24	0.012	0.000
Skilled	0.21	0.013	0.000
Farmers	0.18	0.009	0.000
Lower skilled	0.22	0.014	0.000
Unskilled	0.18	0.009	0.000

Table A7.5. Predicted probability that a birth is the last by socioeconomic status for women who married at 20-24 years, gave birth at 30+ years with a husband the same age or 1-4 years older, complete group: 1860/70, 1880, 1890 marriage cohorts, Tasmania

Marriage cohort/ Socioeconomic status	Predicted probability	Standard error	Significance
1860/70 cohort			
White-collar	0.19	0.013	0.000
Skilled	0.16	0.013	0.000
Farmers	0.13	0.010	0.000
Lower skilled	0.17	0.015	0.000
Unskilled	0.14	0.010	0.000
1880 cohort			
White-collar	0.24	0.016	0.000
Skilled	0.21	0.017	0.000
Farmers	0.17	0.013	0.000
Lower skilled	0.22	0.018	0.000
Unskilled	0.18	0.013	0.000
1890 cohort			
White-collar	0.32	0.020	0.000
Skilled	0.28	0.020	0.000
Farmers	0.24	0.015	0.000
Lower skilled	0.30	0.021	0.000
Unskilled	0.24	0.015	0.000

Table A7.6. Predicted probability that a birth is the last by urban/rural location, complete group: 1860/70, 1880, 1890 marriage cohorts, Tasmania

Marriage cohort/ Geographic location	Predicted probability	Standard error	Significance
1860/70 cohort			
Urban	0.13	0.007	0.000
Rural	0.10	0.005	0.000
1880 cohort			
Urban	0.17	0.009	0.000
Rural	0.13	0.006	0.000
1890 cohort			
Urban	0.23	0.011	0.000
Rural	0.18	0.007	0.000

Table A7.7. Predicted probability that a birth is the last by urban/rural location for women who married at 20-24 years, gave birth at 30+ years with a husband the same age or 1-4 years older, complete group: 1860/70, 1880, 1890 marriage cohorts, Tasmania			
Marriage cohort/ Geographic location	Predicted probability	Standard error	Significance
1860/70 cohort			
Urban	0.18	0.012	0.000
Rural	0.13	0.009	0.000
1880 cohort			
Urban	0.23	0.015	0.000
Rural	0.18	0.010	0.000
1890 cohort			
Urban	0.31	0.018	0.000
Rural	0.24	0.013	0.000

Table A7.8 Proportion of women who have at least a specific number of surviving children, complete group: 1860/70, 1880 and 1890 marriage cohorts, Tasmania			
No. of surviving children	1860/70	1880	1890
One	100.0	100.0	100.0
Two	0.95	0.94	0.91
Three	0.90	0.86	0.80
Four	0.84	0.78	0.69
Five	0.76	0.69	0.58
Six	0.69	0.60	0.47
Seven	0.60	0.50	0.37
Eight	0.51	0.41	0.27
Nine	0.43	0.32	0.19
Ten	0.34	0.24	0.13
Eleven	0.26	0.17	0.08
Twelve	0.19	0.11	0.05

Table A7.9 Distribution of covariates for survival analysis (Table 7.17)					
Covariate	No. of births	Per cent	Covariate	No. of Births	Per cent
Mother's age at the birth			Type of geographic location		
<25 years (ref.)	2,359	27.4	Urban area in Tasmania (ref.)	2,310	26.9
25-<30 years	2,511	29.2	Rural area in Tasmania	5,537	64.4
30+ years	3,702	43.0	Another colony	754	8.8
Missing	29	0.3	Religion		
Mother's age at marriage			Anglican (ref.)	3,105	36.1
<20 years (ref.)	3,305	38.4	Catholic	1,032	12.0
20-<25 years	4,105	47.7	Presbyterian	1,161	13.5
25+ years	1,162	13.5	Methodist	1,867	21.7
Missing	29	0.3	Other Nonconformist	1,431	16.6
Age difference between couple			Missing	5	0.1
Same age/husband up to 5 years older (ref.)	3,785	44.0	Literacy status of husband and wife		
Wife older	1,174	13.7	Both literate (ref.)	7,196	83.7
Husband 5+ years older	3,529	41.0	Husband and/or wife illiterate	1,405	16.3
Missing	113	1.3	Twin birth	72	0.8
Marriage cohort			Child dies as infant before conception of another	522	6.1
1860/70 cohorts (ref.)	3,676	42.7			
1880 cohort	2,504	29.1	Family composition		
1890 cohort	2,421	28.2	More girls than boys	3,317	38.6
Socioeconomic status			More boys than girls	3,760	43.7
White-collar (ref.)	1,510	17.6	Equal numbers of boys and girls	1,524	17.7
Skilled	1,235	14.4			
Farmers	2,482	28.9	Total birth intervals=8601		
Lower skilled	887	10.3			
Unskilled	2,461	28.6			
Missing	26	0.3			

Table A7.10: Estimated effects (relative risks) of various characteristics on the time to the next birth (closed birth intervals), interaction model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard Error*	*Significance (p)*	
Constant	0.08	0.006	0	**
Mother's age at birth of a child				
<25 years (ref.)	1.00	–	–	
25-29 years	0.74	0.025	0	**
30+ years	0.63	0.029	0	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-24 years	1.14	0.031	0	**
25+ years	1.56	0.075	0	**
Age difference between couple				
Same age/husband up to 5 years older (ref.)	1.00	–	–	
Wife older	1.05	0.038	0.188	
Husband 5+ years older	1.01	0.025	0.576	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.94	0.075	0.406	
1890 cohort	0.7	0.062	0	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.04	0.062	0.515	
Farmers	1.02	0.053	0.649	
Lower skilled	1.00	0.075	0.985	
Unskilled	0.98	0.051	0.696	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.04	0.044	0.414	
Another colony	1.03	0.062	0.571	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.00	0.058	0.992	
Presbyterian	1.001	0.053	0.967	
Methodist	1.03	0.049	0.564	
Other Nonconformist	0.91	0.046	0.053	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.97	0.032	0.428	
Twin birth	1.06	0.128	0.638	
Number of children (crude parity)	1.05	0.018	0.007	**

Table A7.10 (cont.): Estimated effects (relative risks) of various characteristics on the time to the next birth (closed birth intervals), interaction model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard Error*	*Significance (p)*	
Number of surviving children	0.99	0.018	0.707	
Child dies as infant before conception of another	1.44	0.067	0	**
Ultimate birth interval	0.42	0.014	0	**
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	1.02	0.025	0.515	
Equal numbers of surviving boys and girls	0.96	0.03	0.196	
Interactions				
Marriage Cohort*Socioeconomic Status				
1880*Skilled Workers	0.87	0.82	0.143	
1880*Farmers	0.95	0.81	0.556	
1880*Lower Skilled	0.98	0.103	0.87	
1880*Unskilled	1.06	0.086	0.485	
1890*Skilled Workers	1.05	0.102	0.622	
1890*Farmers	1.24	0.107	0.014	*
1890*Lower Skilled	1.03	0.113	0.789	
1890*Unskilled	1.21	0.102	0.024	*
Marriage Cohort*Geographic Location				
1880*Rural	0.98	0.066	0.762	
1880*Outside Tasmania	0.83	0.092	0.098	
1890*Rural	1.12	0.076	0.108	
1890*Outside Tasmania	1.2	0.133	0.106	
Marriage Cohort*Socioeconomic Status				
1880*Catholic	1.13	0.098	0.177	
1880*Presbyterian	0.94	0.084	0.458	
1880*Methodist	1.17	0.086	0.028	*
1880*Other Nonconformist	1.07	0.086	0.405	
1890*Catholic	1.01	0.092	0.926	
1890*Presbyterian	1.04	0.088	0.61	
1890*Methodist	0.93	0.068	0.318	
1890*Other Nonconformist	1.03	0.084	0.721	
Number of birth intervals=8466				

* P<0.05 ** P<0.01

Table A7.11: Estimated effects (relative risks) of various family characteristics on the likelihood of having a 2nd child for women with 1 child from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard Error*	*Significance (p)*	
Constant	0.00	0.000	0.000	
Mother's age at the birth				
<25 years (ref.)	1.00	–	–	
25-<30 years	0.78	0.081	0.019	*
30+ years	0.41	0.060	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.06	0.072	0.373	
25+ years	1.32	0.175	0.034	*
Age difference between couple				
Same age or husband up to 5 years older (ref)	1.00	–	–	
Wife older	1.00	0.083	0.979	
Husband 5+ years older	0.95	0.058	0.411	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	1.07	0.073	0.319	
1890 cohort	0.88	0.059	0.051	
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.10	0.102	0.295	
Farmers	1.24	0.111	0.017	*
Lower skilled	0.97	0.102	0.799	
Unskilled	1.15	0.102	0.103	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.07	0.069	0.316	
Another colony	1.09	0.142	0.506	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.20	0.113	0.050	
Presbyterian	1.08	0.092	0.380	
Methodist	1.10	0.084	0.189	
Other Nonconformist	0.98	0.078	0.755	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.88	0.073	0.118	
Child dies as infant before conception of another	1.40	0.151	0.002	**
No of births=1456				

* P<0.05 ** P<0.01

Table A7.12. Estimated effects (relative risks) of various characteristics on the likelihood of having a 3rd child for women with 2 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard Error*	*Significance (p)*	
Constant	0.00	0.000	0.000	**
Mother's age at the birth				
<25 years (ref.)	1.00	–	–	
25-<30 years	0.82	0.064	0.012	*
30+ years	0.50	0.068	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.03	0.078	0.711	
25+ years	1.04	0.135	0.744	
Age difference between couple				
Same age/ husband up to 5 years older (Ref.)	1.00	–	–	
Wife older	1.25	0.107	0.009	**
Husband 5+ years older	1.01	0.064	0.841	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.95	0.067	0.508	
1890 cohort	0.77	0.054	0.000	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.12	0.109	0.229	
Farmers	1.31	0.118	0.003	**
Lower skilled	1.22	0.133	0.073	
Unskilled	1.30	0.117	0.004	**
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.21	0.083	0.004	**
Another colony	1.07	0.125	0.534	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.13	0.108	0.206	
Presbyterian	1.11	0.099	0.228	
Methodist	0.99	0.079	0.924	
Other Nonconformist	0.93	0.078	0.361	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.87	0.076	0.115	
Child dies as infant before conception of another	1.54	0.186	0.000	**
Number of surviving children	1.06	0.105	0.561	
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	0.97	0.073	0.647	
Equal numbers of surviving boys and girls	0.98	0.070	0.732	
No. of births=1400				

* P<0.05 ** P<0.01

Table A7.13: Estimated effects (relative risks) of various characteristics on the likelihood of having a 4th child for women with 3 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard Error*	*Significance (p)*	
Constant	0.00	0.000	0.000	**
Mother's age at the birth				
<25 years (ref.)	1.00	–	–	
25-<30 years	0.67	0.061	0.000	**
30+ years	0.37	0.047	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.25	0.112	0.013	*
25-<30 years	1.63	0.230	0.000	**
Age difference between couple				
Same age/husband up to 5 years older (ref.)	1.00	–	–	
Wife older	1.13	0.105	0.192	
Husband 5+ years older	0.87	0.059	0.045	*
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.99	0.072	0.837	
1890 cohort	0.67	0.050	0.000	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	0.96	0.102	0.720	
Farmers	1.43	0.136	0.000	**
Lower skilled	1.08	0.126	0.492	
Unskilled	1.32	0.126	0.003	**
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.08	0.077	0.312	
Another colony	1.04	0.118	0.726	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.17	0.116	0.116	
Presbyterian	0.94	0.088	0.512	
Methodist	1.16	0.096	0.068	
Other Nonconformist	1.00	0.088	0.994	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.98	0.089	0.787	
Child dies as infant before conception of another	1.62	0.214	0.000	**
Number of surviving children	1.02	0.083	0.850	
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00			
More surviving boys than girls	0.98	0.061	0.739	
Equal numbers of surviving boys and girls	1.17	0.143	0.212	
No. of births=1307				

* P<0.05 ** P<0.01

Table A7.14: Estimated effects (relative risks) of various characteristics on the likelihood of having a 5th child for women with 4 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard error*	*Significance (p)*	
Constant	0.00	0.000	0.000	**
Mother's age at the birth				
<25 years (ref.)	1.00	–	–	
25-<30 years	0.84	0.086	0.093	
30+ years	0.41	0.053	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.06	0.088	0.483	
25-<30 years	1.15	0.159	0.299	
Age difference between couple				
Same age or husband up to 5 years older (Ref.)	1.00	–	–	
Wife older	0.98	0.098	0.817	
Husband 5+ years older	0.95	0.067	0.438	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.72	0.056	0.000	**
1890 cohort	0.58	0.046	0.000	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.06	0.120	0.625	
Farmers	1.04	0.107	0.715	
Lower skilled	0.93	0.117	0.561	
Unskilled	0.96	0.097	0.669	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.23	0.099	0.010	*
Another colony	0.96	0.115	0.758	
Religion				
Anglican (ref.)	–	–	–	
Catholic	1.11	0.117	0.308	
Presbyterian	0.82	0.084	0.057	
Methodist	1.17	0.102	0.077	
Other Nonconformist	0.98	0.092	0.796	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	0.90	0.086	0.254	
Child dies as infant before conception of another	1.06	0.136	0.673	
Number of surviving children	1.00	0.057	0.938	
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	0.90	0.067	0.153	
Equal numbers of surviving boys and girls	0.82	0.066	0.016	*
No. of births=1181				

* P<0.05 ** P<0.01

Table 7A.15: Estimated effects (relative risks) of various characteristics on the likelihood of having a 6th child for women with 5 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard error*	*Significance (p)*	
Constant	0.00	0.000	0.000	**
Mother's age at the birth	1.00	–	–	
30-<35 years	0.61	0.054	0.000	**
35+ years	0.15	0.023	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.28	0.112	0.005	**
25+ years	2.60	0.422	0.000	**
Age difference between couple				
Same age or husband up to 5 years older (Ref.)	1.00	–	–	
Wife older	1.00	0.111	0.969	
Husband 5+ years older	1.01	0.076	0.945	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.73	0.061	0.000	**
1890 cohort	0.68	0.060	0.000	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	0.99	0.128	0.918	
Farmers	1.23	0.137	0.060	
Lower skilled	0.98	0.134	0.911	
Unskilled	1.06	0.116	0.587	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.11	0.098	0.245	
Another colony	1.00	0.127	0.930	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.10	0.123	0.411	
Presbyterian	0.98	0.110	0.832	
Methodist	0.97	0.091	0.724	
Other Nonconformist	0.94	0.096	0.547	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	1.12	0.109	0.251	
Child dies as infant before conception of another	1.50	0.258	0.018	*
Number of surviving children	1.13	0.061	0.029	*
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	1.08	0.078	0.267	
Equals numbers of surviving boys and girls	1.25	0.153	0.063	
No. of births=1047				

* P<0.05 ** P<0.01

Table 7A.16: Estimated effects (relative risks) of various characteristics on the likelihood of having a 7th child for women with 6 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard error*	*Significance (p)*	
Constant	0.00	0.000	0.000	**
Mother's age at the birth	1.00	–	–	
30-<35 years	0.81	0.084	0.047	*
35+ years	0.29	0.040	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.10	0.106	0.302	
25+ years	1.43	0.234	0.029	*
Age difference between couple				
Same age or husband up to 5 years older (Ref.)	1.00	–	–	
Wife older	0.83	0.104	0.140	
Husband 5+ years older	0.83	0.068	0.023	*
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.88	0.079	0.170	
1890 cohort	0.73	0.070	0.001	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.19	0.168	0.222	
Farmers	1.34	0.158	0.013	*
Lower skilled	1.00	0.147	0.988	
Unskilled	1.14	0.136	0.256	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.09	0.110	0.396	
Another colony	0.82	0.119	0.174	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	0.98	0.118	0.869	
Presbyterian	0.97	0.120	0.784	
Methodist	0.98	0.101	0.855	
Other Nonconformist	0.92	0.105	0.487	
Literacy status of husband and wife		–	–	
Both literate (ref.)	1.00			
Husband and/or wife illiterate	0.91	0.095	0.345	
Child dies as infant before conception of another	1.60	0.247	0.002	**
Number of surviving children	1.11	0.059	0.050	
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	0.90	0.077	0.233	
Equals numbers of surviving boys and girls	0.86	0.088	0.142	
No. of births=884				

* P<0.05 ** P<0.01

Table 7A.17: Estimated effects (relative risks) of various characteristics on the likelihood of having an 8th child for women with 7 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard error*	*Significance (p)*	
Constant	0.00	0.000	0.000	**
Mother's age at the birth	1.00	–	–	
30-<35 years	0.53	0.076	0.000	**
35+ years	0.20	0.034	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.17	0.122	0.132	
25+ years	1.38	0.260	0.087	
Age difference between couple				
Same age or husband up to 5 years older (Ref.)	1.00	–	–	
Wife older	1.06	0.151	0.660	
Husband 5+ years older	0.90	0.084	0.271	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.90	0.089	0.287	
1890 cohort	0.72	0.079	0.002	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	0.98	0.150	0.876	
Farmers	1.09	0.144	0.537	
Lower skilled	1.34	0.236	0.102	
Unskilled	1.09	0.143	0.500	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.24	0.138	0.049	*
Another colony	1.33	0.213	0.071	
Religion				
Anglican (ref.)	1.00	–	–	
Catholic	1.00	0.130	0.993	
Presbyterian	0.98	0.134	0.860	
Methodist	0.76	0.088	0.019	*
Other Nonconformist	0.81	0.105	0.112	
Literacy status of husband and wife		–	–	
Both literate (ref.)	1.00			
Husband and/or wife illiterate	1.04	0.118	0.759	
Child dies as infant before conception of another	1.43	0.248	0.041	*
Number of surviving children	1.11	0.054	0.034	*
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	1.00	0.087	0.967	
Equals numbers of surviving boys and girls	0.99	0.154	0.973	
No. of births=751				

* P<0.05 ** P<0.01

Table A7.18: Estimated effects (Relative risks) of various characteristics on the likelihood of having an 9th child for women with 8 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

Covariate	*Relative risk*	*Standard error*	*Significance (p)*	
Constant	0.00	0.001	0.000	**
Mother's age at the birth				
<30 years (ref.)	1.00	–	–	
30-<35 years	0.73	0.183	0.204	
35+ years	0.32	0.084	0.000	**
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.16	0.135	0.202	
25+ years	1.33	0.286	0.191	
Age difference between couple				
Same age or husband up to 5 years older (ref.)	1.00	–	–	
Wife older	0.93	0.160	0.659	
Husband 5+ years older	0.93	0.097	0.473	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.82	0.094	0.088	
1890 cohort	0.68	0.089	0.003	**
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	0.94	0.177	0.756	
Farmers	1.00	0.154	0.992	
Lower skilled	0.92	0.189	0.670	
Unskilled	1.09	0.168	0.578	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.24	0.161	0.091	
Another colony	0.77	0.148	0.168	
Religion				
Anglican (ref.)	1.00			
Catholic	1.07	0.160	0.671	
Presbyterian	1.16	0.184	0.355	
Methodist	1.24	0.159	0.101	
Other Nonconformist	1.21	0.181	0.202	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	1.26	0.157	0.062	
Child dies as infant before conception of another	1.30	0.295	0.250	
Number of surviving children	0.99	0.052	0.905	
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	1.02	0.110	0.834	
Equals numbers of surviving boys and girls	1.19	0.157	0.190	
No. of births=612				

* P<0.05 ** P<0.01

Table A7.19: Estimated effects (relative risks) of various characteristics on the likelihood of having a 10th child for women with 9 children from a piecewise exponential hazard model, complete group: 1860/1870, 1880 and 1890 marriage cohorts, Tasmania

	Relative risk	*Standard error*	*Significance (p)*	
Constant	0.00	0.002	0.000	**
Mother's age at the birth				
<30 years (ref.)	1.00	–	–	
30-<35 years	0.85	0.410	0.740	
35+ years	0.39	0.188	0.051	
Mother's age at marriage				
<20 years (ref.)	1.00	–	–	
20-<25 years	1.01	0.138	0.930	
25+ years	0.83	0.236	0.511	
Age difference between couple				
Same age or husband up to 5 years older (ref.)	1.00	–	–	
Wife older	1.09	0.244	0.686	
Husband 5+ years older	1.07	0.132	0.599	
Marriage cohort				
1860/70 cohorts (ref.)	1.00	–	–	
1880 cohort	0.81	0.109	0.120	
1890 cohort	0.87	0.136	0.366	
Socioeconomic status				
White-collar (ref.)	1.00	–	–	
Skilled	1.17	0.275	0.507	
Farmers	1.16	0.228	0.445	
Lower skilled	1.46	0.370	0.138	
Unskilled	1.12	0.223	0.568	
Type of geographic location				
Urban area in Tasmania (ref.)	1.00	–	–	
Rural area in Tasmania	1.28	0.206	0.124	
Another colony	1.17	0.276	0.505	
Religion		–	–	
Anglican (ref.)	1.00			
Catholic	1.00	0.175	0.988	
Presbyterian	1.05	0.208	0.821	
Methodist	1.39	0.207	0.027	*
Other Nonconformist	1.03	0.182	0.851	
Literacy status of husband and wife				
Both literate (ref.)	1.00	–	–	
Husband and/or wife illiterate	1.23	0.180	0.161	
Child dies as infant before conception of another	1.65	0.364	0.025	*
Number of surviving children	0.98	0.054	0.770	
Sex composition of surviving children				
More surviving girls than boys (ref.)	1.00	–	–	
More surviving boys than girls	1.21	0.145	0.098	
Equals numbers of surviving boys and girls	1.17	0.237	0.444	
No. of births=468				

* P<0.05 ** P<0.01

Appendix B

Data sources used for family reconstitution

1. Tasbirths Birth registrations for Tasmania, 1838–99, Tasdeaths Death registrations for Tasmania, 1838–99, and Tasmarriages Marriage registrations for Tasmania, 1838–99. Civil register data collected in machine readable form c.1993 as part of the *Nineteenth-Century Household Formation in Tasmania Project* by P. Gunn, University of Tasmania. Funded by the Australian Research Council under grants A78715590, A79131567 and A79532723, Australian Data Archive, Australian National University, Canberra.

2. Kippen, Rebecca 2013. Database of deaths registered in Tasmania, 1900-1930. Melbourne: University of Melbourne.

3. Catholic Church Museums and Registers. Various Tasmanian Catholic parish registers for 19th century. Microfilm. Founders and Survivors Project. University of Melbourne

4. Federation Index. Births 1900-1919, Deaths and Marriages 1900–1930Registry of Births, Deaths and Marriages Tasmania, 2006. Tasmanian. CD format.

5. Colonial Tasmanian Family Links database. Archives Office of Tasmania. This database is designed to provide an initial online genealogical research resource. The database is incomplete and the information not always accurate. http://portal.archives.tas.gov.au

6. Index to Divorces, 1861–1920. Archives Office of Tasmania. http://portal.archives.tas.gov.au

7. Index to Wills and Letters of Administration from 1824–1989. Archives Office of Tasmania http://portal.archives.tas.gov.au

8. Pioneer Index, Victoria 1836–1888, Index to births, deaths and marriages in Victoria. Melbourne: Registry of Births, Deaths and Marriages, Victoria. CD format

9. Federation Index, Victoria, 1889–1901, Index to births, deaths and marriage in Victoria. Melbourne: Registry of Births, Deaths and Marriages, Victoria, 1997. CD format.

10. Edwardian Index, Victoria, 1902–1913, Index to births, deaths and marriages in Victoria. Melbourne: Registry of Births, Deaths and Marriages, Victoria. CD format

11. Great War Index, Victoria, 1914–1920, Index to births, deaths and marriages in Victoria. Melbourne: Registry of Births, Deaths and Marriages, Victoria. CD format

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22. English Censuses, 1871, 1881, 1891, 1901 and 1911. Ancestry. www.ancestry.com.au

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25. Australian Dictionary of Biography. Canberra: Australian National University. www.adb.anu.edu.au

26. Boer War Embarkation Rolls. Canberra: Australian War Memorial. www.awm.gov.au

27. World War 1 Embarkation Rolls. Canberra: Australian War Memorial. www.awm.gov.au

28. Mapping Our Anzacs. Canberra: National Archives of Australia. www.mappingouranzacs.naa.gov.au

Appendix C: Local history museums

I visited the following Tasmanian local history museums:

Cygnet Living History Museum

Deloraine Folk Museum

Campbell Town Heritage Highway Museum

Derby History Room

Evandale History Room

Grubb Shaft Gold and Heritage Museum, Beaconsfield

Oatlands History Room

St Helen's History Room

Stanley Folk Museum

Ulverstone Local History Museum

Waratah Museum

Zeehan West Coast Pioneers Museum

Queenstown Galley Museum

Woolmers Estate, Longford, World Heritage Listed Convict Site.

Appendix D:

Individual stories

Story 1: Thomas Cathcart Archer and Eleanor Harrop (1890 marriage cohort): landowners, Woolmers Estate.

Thomas Cathcart Archer married Eleanor May Harrop on 7 October 1890 in Launceston. They had one child, Thomas Edward Cathcart Archer, born on the 24 November 1892.

"Thomas Cathcart Archer (1862-1934) inherited Woolmers on the death of his father, Thomas Chalmers in 1890. He had little interest in farming and chose to remain in Launceston where he could pursue his sporting interest. Thomas Cathcart represented Northern Tasmania in cricket and was patron and commodore of the Tamar Yacht Club and president of the Longford Regatta Association. He chose to live at Woolmers in the late 1890s where he built a nine-hole golf course near the house. This course became the home of the Longford Golf Club between 1902 and 1914. Thomas Cathcart was noted for his interest in public affairs, being a member of the Longford Council from 1902 to 1934" (Notice Board: Woolmers Estate, near Longford, Tasmania. 9 Dec 2014).

Story 2: Alfred Gale and Emma Wigg (1890 marriage cohort): Selector in Marrawah, remote north-western Tasmania.

Alfred Herbert Gale married Emma Elizabeth Wigg in her father's house in Duck River, Stanley on 20 August 1890. They had nine children, born between 18 June 1891 and 21 June 1911. Their fifth child died in infancy. Alf Gale was a 'selector' who selected a large area of land at Green Point, near Marrawah and made it into one of the most productive dairy farms in the district. They established a cheese factor, store and sawmill. For many years Alf acted as a bush doctor and dentist to the residents of the isolated area.

Story 3: Charles Fleming and Lavinia Jane Rawsley (1870 cohort): modern occupations

Charles Fleming married Lavinia Jane Rawsley in Oatlands on 8 November 1870. They had eight children, born between April 1871 and January 1888. Charles was a labourer when he married and when the first four children were born, although he also did some farming. However, by the time the fifth child was born in 1880 he was working as a railway porter. When his last child was born in 1888 he was also a postmaster and remained in that position until he died in 1908. 'The government has approved of the establishment of a post office at Anthill Ponds Railway Station and of the appointment of Mr Charles Fleming as Post Master' (Tasmanian News, Hobart, 20 September 1887).

Story 4: Richard Fleming and Eliza Barwick (1860 marriage cohort): Emigration and return to Tasmania

Richard Fleming married Eliza Barwick on 1 August 1860 in Oatlands. The couple had 13 children born between May 1861 and April 1884. Their 12th child died in infancy. They had two children in Oatlands, but in March 1863 they left Hobart aboard the vessel "Hargreaves" to travel to the gold fields at Wyndham, New Zealand. They had three children in New Zealand, but by 1869 had returned to Oatlands where another eight children were born. Richard died in Oatlands and Eliza in Launceston. Richard was a farmer in Oatlands, but towards the end of his life was also running a hotel/public house in Antill Ponds, just outside Oatlands (Oatlands History Room).

Story 5. John Fletcher Walker and Amy Clarisse Davenport (1870 marriage cohort): Amy Walker's diaries (Walker 1879, 1880, 1881, 1882, 1888, 1898)

John Fletcher Walker and Amy Clarisse Davenport married in Holy Trinity church, Hobart on 3 February 1870. They had one child, a daughter Violet Hope, born 6 August 1875.

Amy Clarisse Davenport (1851–1940) was the daughter of the Reverend Arthur Davenport. Her father was rector of Holy Trinity Hobart for most of Amy's childhood, became Canon of St David's Cathedral Hobart in 1872 and then Archdeacon of Hobart. John Walker owned and ran a large number of properties near Gretna (south of Hamilton). Some of these estates were inherited from his father, others he purchased. The Walkers lived at 'Clarendon' which was a few miles from Gretna and around 35 miles from Hobart. John Walker was a Justice of the Peace, Coroner and Warden (i.e. Mayor) of Hamilton.

Amy was involved in many charitable activities and very active in church affairs. She took a keen interest in farming during her husband's life and after his death in 1906 she ran the farming property with the assistance of her manager/overseer (*The Mercury* 23 Nov 1906, *The Examiner*, 9 Nov 1940).

The Tasmanian Archives holds diaries written by Amy from when she was a young girl to the month before she was married in 1870 and then annually from 1879 to 1900 inclusive.

Story 6: Ida McAulay nee Butler (1858–1949): Ida McAulay's diaries (McAulay 1889–90, 1890, 1897, 1898, 1899, 1900, 1903, 1904, 1905)

Ida Butler was the daughter of Charles Butler, who was a Hobart solicitor, and was a member of a prominent family in Hobart society. Ida married Alexander McAulay, lecturer and then professor of mathematics and physics at the University of Tasmania, in February 1895. The couple had three children—a son born in 1895 and twin girls born in 1898.

'Ida McAulay …was a feminist who rejected the argument of intrinsic differences in "the mind-stuff of the sexes" and advocated higher education for girls, sex education and family planning. In 1899 she dismissed the claim that women would be drawn out of their sphere by the franchise: "a woman's sphere is just that which she chooses to make it". She was active in women's clubs and was president (1903-05) of the Tasmanian Women's Suffrage Association (later the Women's Political Association), resigning after a controversy'. (Scott 1986: 203)

Story 7: Edward Henry Sutton and Henrietta Lloyd (1860 marriage cohort): upward social and economic mobility.

Edward Sutton, who was born in Launceston in 1838 was the second of 13 children. Edward worked as a baker in Launceston for several years. He married Henrietta Lloyd in Launceston on 15 November 1860 and they had three sons in 1862, 1864 and 1870. The family moved to Longford in 1867 where Edward 'identified himself with all local matters, taking special interest in the Poultry and Agricultural Societies and the Library, to the success of which he contributed largely. Mr Sutton had, early in life, a turn for political study, and always manifested a desire to enter Parliament. In the year 1886 he opposed Mr W. St. Paul Gellibrand for the Cressy seat in the House of Assembly, and was elected for that constituency, which he represented until the time of his death…Though his oratory was not brilliant, he was practical, and did not throw away many words…Keeping himself closely in touch with passing events, his opinions were formed after due

thought, and his expressions in the House were listened to with attention' (*The Examiner*, 25 April, 1893). One of his sons was supervisor of the Tasmanian International Exhibition of 1891–92, a highly prestigious event.

Story 8: David Dally and Maria Cox (1870 marriage cohort): upward social and economic mobility

David Dally married Maria Cox in Launceston on 14 May 1870. They had five children born between June 1871 and June 1882. David was a lime-dealer during the early years of his marriage. However, in 1877, he and his brother William Dally discovered a huge gold reef, the famous *Tasmania Reef*, at Beaconsfield. By October 1877 the Dally brothers had sold their claim on the *Reef* to William Grubb and William Hart for £15,000 and a tenth share of the Tasmania Gold Mining and Quartz Crushing Company (Critchett 2012b). David Dally subsequently used his share of the money to acquire a large amount of property. At the time he died owned a lime quarry near Beaconsfield and was a large property owner in Launceston (North West Advocate and Emu Bay Times, 19 February, 1913).

Story 9: Michael Lyons and Ellen Carroll (1870 marriage cohort): parents of a Prime Minister, Joseph Lyons.

Michael Lyons and Ellen Carroll were married in Stanley on 7 September 1870. They had eight children, born between July 1871 and May 1887. Joseph Lyons, their fifth child was born in Stanley on 15 September 1879. Michael was a farmer when he married, but later also ran a small store. Michael and Ellen had seven children while living in this small house pictured above.

The family moved to Ulverstone in late 1884, but in 1887 Michael lost all his money on a bet on the Melbourne cup and was forced to work as a labourer. Joseph had to attend school part-time so that he could work to help the family survive. In 1892 his two aunts, Misses Letitia and Mary Carroll, his mother's sisters, invited Joseph to come back to Stanley to live with them so that he could attend school full-time. He attended the local school and eventually became a teacher with the Education Department. Joseph became Premier of Tasmania (1923-1928) and later Prime Minister of Australia (1932-1939) (Stanley Discovery Museum 2014).

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