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The Shaping of a Settler Fertility Transition: Eighteenth and Nineteenth Century South African Demographic History Reconsidered[1]

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Abstract

Using South African Families (SAF), a new database of settler genealogies, we provide for the first time, a description of female marital fertility in South Africa from 1700 to 1909. We find high and stable levels of fertility up to the mid-nineteenth century, typical of a pre-transition population, after which fertility declines. The usual correlates of a decline in fertility, namely, later starting and earlier stopping of childbearing, together with increased spacing between births, can be seen from the second half of the nineteenth century. The South African fertility transition mirrors to a large extent the pattern found in other settler communities, as well as the European experience despite the somewhat different economic and social circumstances of the country, in particular relative to Europe.

Keywords: South Africa, Fertility, Genealogies, Settler demography

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1. Introduction

Using new data from South African Families (SAF), a recently digitised genealogical database, we provide for the first time, a descriptive account of female fertility amongst the white settler population of South Africa from 1700 - 1909. This study describes the demographic context and socio-economic developments surrounding the settler demographic transition, while positioning the South African experience within the global debate on the nature and timing of fertility declines. Our data show a steady average parity for the first 150 years, with arguably only a slight decline from an average of seven and a half children per married woman to an average of six anda half per married woman. Then, starting in the second half of the nineteenth century we see a decline in the number of births per married woman until we reach three and a half children for women born between 1900 and 1909. The decline in fertility starts for women born in the third quarter of the nineteenth century between 1850 and 1875 and for whom childbearing would have occurred between approximately 1865 and 1920. This decline is visible first in urban areas and spreads later to the large farms of the interior and frontier. Our observed fertility decline is partly applied through an increase in the age of first birth, differing from the European experience (Lesthaeghe 2010), and partly through an increase in birth spacing.

We find that the average number of children born to women at the Cape is very similar to those in Europe as well as other settler societies. Crucially, despite the very different socio-economic conditions at the Cape relative to the European nations undergoing industrialisation in the second half of the nineteenth century, the demographic patterns appear very similar, particularly with respect to the timing of the fertility transition. Unlike in Europe but very much like in other settler societies, the South African fertility transition began prior to the substantial economic changes that took place in the four colonies at the end of the nineteenth century following the mineral discoveries in the interior (Falconer 2003).

To provide some demographic context within which to think about fertility and fertility declines, we provide evidence on the gender-age profile of our sample over the 200-year period as well as a discussion of the average length of life. Our gender-age profiles show that in the early years of settlement, the population was highly skewed towards men, with very few adult females residing in the colony. Over time, particularly through natural increase, a more conventional gender and age balance was achieved. Indeed, by 1850, the gender-age profile looks very similar to other pre-transition societies. In

addition, we begin to see evidence of a decline in mortality in childhood and early adulthood. The gender-age profile from 1900 confirms our finding of a fertility transition that started between 1850 and 1900. Concerning longevity, we find a slow and steady increase in life length for both men and women, with women's mean life length overtaking that of men for the 1890 birth cohort.

Our fertility estimates are based on the observed number of children born to each married woman in the sample rather than on estimates derived from census data. The advantage of this is that because we have a record of the number of births per woman, we avoid making the typical assumptions and calculations required when census or other population data are used to undertake demographic analysis (Coale and Watkins 1986). However, we do run the risk of our data not being fully representative of the population. To deal with this concern we provide extensive comparisons to population estimates as well as comparisons to census data, where possible, to confirm that our data do not suffer from systematic omissions. Where our data are not representative is with respect to race. Due to the nature of race relations throughout South Africa's colonised history, no systematic attempt was made to record the populations of the indigenous Khoisan, the African tribes, the people of mixed racial descent and those from the Asian subcontinent with the result that our study is restricted to the white settlers of South Africa.

Until now, much of the discussion of the Colony's demographic characteristics has been based on anecdotal evidence which has suggested exceptionally high completed fertility (Shell 2005). For example, Penn (2014) describes in 1727, a woman in her early 30s already the mother of seven children, who would go on to bear 11 children in all. Ross (1975) refers to a woman dying at the age of 49 at the birth of her twelfth child, whose husband would incidentally go on to father another 12 children with his second wife. The primary reason for absence of analysis on this topic is a shortage of adequate data. As a result, South African historical demography remains in its infancy. With the exception of a handful of notable contributions to the field (Ross 1975, Gouws 1987, Guelke 1988, Simkins and van Heyningen 1989) nothing has been produced on South Africa over the last three decades that could be termed historical demography of the kind that is known today.[4] Our data allows us to begin to fill that gap and to provide

[4]With the exception perhaps of Sadie (2000) which considers some aspects of South African demography, beginning in the 1920s.

a foundation for a new generation of South African historical demographic research.

The paper proceeds as follows: Section 2 discusses the social and economic context within which this study takes place. Sections 3 and 4 introduce and evaluate our novel dataset, section 5 provides a census comparison, section 6 describes the borader demographic context and section 7 discusses the fertility history of the settlers of South Africa. Section 8 concludes.

2. Settler life and the demand for children

The Cape Colony was first settled in 1652 by the Dutch East India Company (Vereenigde Oost-Indische Compagnie, hereafter VOC) as a refuelling station for Dutch ships on their way to the East. The VOC did not employ women and it was not common for young men in the service of the company to bring wives with them from home, with the result that the early Cape population was skewed towards males (Groenewald, 2008). No doubt aware of this, the early government at the Cape, who initially believed that a prerequisite for a stable colony was the establishment of a large number of married farmers with large families, as opposed to a high number of bachelors, took steps to rectify the imbalance. In the late seventeenth century there was an attempt to transport Dutch orphan girls to the Cape and while a handful of girls from Amsterdam and Rotterdam did come to the Cape, the immigration of young men into the Cape was much larger than that of young girls. While officials at the Cape did support the notion of large families, Shell (2005) suggests that there was at the same time the belief that single men were likely to work harder. The consequence was that VOC wages were not enough to support large families and hence that the demand for young ladies was likely dampened. Ross (1975) notes that in 1713 the sex ratio stood at 180 adult men to 100 adult women. The greatest imbalance of the sexes was found in the frontier districts where there were 227 men for every 100 women. Cape Town and the immediate surroundings were slightly less extreme, having 174 settler men for every 100 settler women in Cape Town and 193 men to 100 women in the surrounding rural district (Guelke 1988).[5]

Rapid population growth and the fact that there was a continuous flow of primarily male immigrants allowed for the gender imbalance to persist until

[5]Guelke's estimates do not include the non-settler white population of white farm servants (knegts) and Company personnel. The addition of these groups, he suggests, would substantially increase the imbalance between sexes within the white population.

the early nineteenth century (Shell 2005). This gender imbalance led to low ages at marriage for the women who were there and resulted in only a very small proportion of single women. The early South African colonial family resembles other early settler societies (insert reference), it was typical for women to marry at between 20-22 years old with the age difference between husbands and wives being on average up to seven years during most of the eighteenth and early nineteenth centuries (Groenewald 2008).

Cape Town became the dominant economic centre of the colony with smaller urban pockets in the eastern region of the colony surrounding Port Elizabeth. The immediate Cape hinterland was relatively densely populated with economic activity focused on farming, in particular viniculture. Employment at the Cape was fairly diversified across the major sectors of the economy (Fourie 2013). Primary sector occupations ranged from crop and stock farming in the country side from the Cape hinterland to deep into the interior; to more productive employment in the form of bakers, brewers, millers and artisans closer to Cape Town, to services provision in Cape Town and its immediate surroundings. For those women who did not labour alongside their husbands on the land, many worked in the production of agricultural by-products or as teachers, nurses and wine traders (Fourie 2013).

At this time, the Cape and particularly, the agricultural surrounds suffered from chronic labour shortages. Initially, these were to be met predominantly by the local indigenous population but when these proved insufficient, the free burghers at the Cape convinced the government to allow a trade in slaves, with slaves originating predominantly in the East Indies. The slave trade was however conducted in fits and starts and it is likely the case that one more reliable option for increasing the workforce would be natural population growth. More specifically, for those unable to purchase the desired number of slaves, an increase in the number of children must surely have seemed like a convincing way to meet one's demand for workers. The eighteenth century also saw a systematic migration of people into the interior of the Cape Colony, first eastwards from Cape Town inland from the coastal mountain ranges and later also northeast from Cape Town into the drier interior. Both regions were far enough from Cape Town to make purchase of slaves more complicated. Labour demand was met through the local indigenous populations where available but also from natural increase of the family. These inland "*Boers*" (farmers in Dutch) were more likely to specialise in livestock rearing than crop cultivation and may therefore have had less of a need for labour than those crop farmers in the Western Cape.

While procreation may solve an immediate need for labour, the *boer* sys-

tem of partible inheritance meant that when a parent died, the farm was split equally between the surviving spouse and the children (with the spouse inheriting half and the children the other half), resulting in ever decreasing farm sizes in the older settled regions and the movement of landless descendents further into the interior in a search for land in an ever more arid region. Therefore while immediate labour demand may have led to increasing family sizes, a decrease in land availability may have led to restrictions on family size.

In 1806 the British occupied the Cape. The British occupation resulted in two distinct groups of settlers within the Cape Colony: those of British origin speaking English who settled either in the Eastern rural districts of the Cape Colony or when farming did not work out, moved as artisans into the local towns, and those who had come prior to the British occupation from all over Europe and assimilated as the *Boers*. Other than a ban on the slave trade in 1834 the British maintained much the same arrangement in terms of governing the Cape that had been in place under the Dutch. Boer migration into the arid interior continued, land and labour shortages persisted. However one new vital event took place, that of the movement of *Boers* from the eastern districts of the Cape Colony out of the Colony into what became the two Boer republics as well as the second British colony in South Africa of Natal, the movement known as the Great Trek.

During the first half of the nineteenth century the pattern of life in the Cape Colony remained somewhat stable despite the change in colonising authority. The local economy grew slowly, specialising in agriculture with manufacturing and services concentrated in the three main towns, Cape Town in the west, Port Elizabeth and East London in the east. Farmers in the interior were relatively isolated from Cape Town and by extension, the rest of the world. However, traders did visit farming communities throughout the year and farmers themselves would, from time to time, travel to Cape Town to sell wool and sheep. The economies in the two independent republics and in Natal remained small and dominated by livestock rearing, the largest problems being a shortage of land due to both the size of the initially settled farms and the partible inheritance system. The demand for children would have been driven by the same factors as in the previous century, demand for labour and concerns about land and food availability (and possibly also love). For the *TrekBoers* (the migrants) these decisions would have been the same albeit in an ungoverned location. However, two additional factors would have influenced the demand for children. In the east of the Cape Colony, the continuous exposure to warfare with the neighbouring

African tribes would have increased the demand for armed commandos [6] thereby increasing the demand for sons and in the north east, migration into the very arid interior would have made it harder to feed a family in adverse conditions.

The discovery of diamonds on the arid north western frontier of the Cape Colony in the 1860s and the subsequent growth of the mining industry most likely had little impact on family size of the *Boer* families as these remained to a large extent disengaged from mining profits (Davenport 2013, page number?). The British descendents too were unlikely to experience changes in family size as a result of the growing mining industry as the industry was dominated by both foreign capital as well as immigrant workers. Indeed, changes to family size would most likely have only taken place amongst the African workers who saw a surge in employment at this time. As noted in the introduction, there is unfortunately insufficient data on this group with which to discuss family structure.

The discovery of gold in 1886 was to change the fortunes of the South African economy and lead to a war that arguably devastated the rural *Boer* population. The economic development that took place particularly in Cape Town and Johannesburg following the advent of large scale gold mining is typical of the type of industrial change that is often argued to be necessary to effect a fertility transition and we investigate whether this was indeed the outcome in settler South Africa.

With regards to possible changes to the incentive for children because of changes to women's preferences, education in the colonies over the 200 year period did little to challenge the prevailing notion that a woman's place was in the home. Public education in its earliest form only emerged in the 1830s with the opening of an infant school in Cape Town that took in children up to the age of eight. The school attracted many young women, mainly missionarie's daughters, who were trained in the system and would later open similar schools in the various towns of the Colony. According to the institution's first annual report "the principal subjects brought before the children, in order to employ, amuse, and instruct them – [were] Spelling, Numbers, Grammar, Natural and Scripture History; – and for the Girls, Needle-work" (Ross, 2004 p. 89). The expectation was that girls were not being prepared for one of the professions, but for a life as a wife and mother.

[6] *Boers* on the frontier were accostomed to arming themselves and forming small combat units that would either retreave stolen cattle exacting retribution or themselves maraud the neighbouring kraals, these armed units were semi-formal institutions with recognised commanders and the local *Boer* population was obliged to serve in one

In this context, subjects such as domestic economy and sewing were thought to be more essential (Duff 2011).

Finally, a note about the recordings of births, particularly in the interior of the Cape Colony and in the Boer republics since there may be a concern that farmers isolated inland had little access to formal registers in which to record notable family events such as births, deaths and marriage. Religion played an important role in the Boer household, a consequences of which was the desire to baptise all children born in the family, thereby ensuring substantial records of birth but not always of death. Even the geographically isolated *TrekBoers* would meet several times a year at the nearest settlement for the *nagmaal*, a religious ceremony allowing these isolated families to socialise and where all new born children could be baptised. The result is that surviving children would have been baptised but those infants that died before the opportunity to baptise them are most likely underreported. Indeed, our data underrepresents infant mortality.

3. Data and transcription

This study will make use of South African Families obtained from the Genealogical Institute of South Africa (GISA). These genealogical registers include records of all known families that settled in South Africa and their descendants until 1910, and contain vital information on over half a million individuals over a period of 200 years.[7] The registers were compiled by professional and amateur South African genealogists, from inter alia, baptism and marriage records of the Dutch Reformed Church archives in Cape Town, marriage documents of the courts of Cape Town, Graaff-Reinet, Tulbagh, Colesberg, collected from a card index in the Cape Archives Depot, death notices in the estate files of Cape Town and Bloemfontein, registers of the Reverends Archbell and Lindley, voortrekker baptismal register in the Dutch Reformed Church archive in Cape Town, marriage register of the magistrate of Potchefstroom, and other notable genealogical publications including: C.C. de Villiers (1894) "Geslacht-register der oude Kaapsche familiën", D. F. du Toit and T. Malherbe (1966) "The Family register of the South African nation", J.A.Heese (1971) "Die herkoms van die Afrikaner, 1657-1867", I. Mitford-Baberton (1968) "Some frontier families", and vari-

[7] Although the data contain all known families, they do not always contain all members of these families. We discuss the implications further on.

ous other genealogies on individual families.[8] We note that the genealogies that make up the SAF database are limited to families of European origin only. The Black, Coloured and Indian population groups of South Africa are not recorded in these genealogical records.[9] Whether or not such information exists for these groups, regrettably, is not yet known.

Since the original data are in text format, we created a novel data transcription program that converts the data from plain text into comma separated values, delineating the nature and timing of life-course events. In addition we translated any data that were in Afrikaans into English. The dataset contains information at the individual-level which includes, where available, birth, baptism, marriage and death dates, occupation, geographic information for said events, and spousal information including birth, baptism, and death dates and places, as well as maiden names (where applicable) and parents' names. We created unique individual, household, and mother identifier codes which allowed for the matching of offspring to both parents so that families can be traced with relative ease over multiple generations. Genealogical codes were concatenated to unique individual identifiers indicating relative position in the lineage. For example, an a1 identifier-suffix indicates that an individual was the patriarch of the family or the 'first arriver' of that line to South Africa. If said individual had 2 children, their respective identifier-suffixes would be a1b1 and a1b2 respectively, and these siblings would share the same household identifier-suffix a1b. Women were assigned their husband's genealogical codes concatenated with an additional digit indicating whether they were a first, second, third or fourth wife. Figure 1, which records Josue Celliers and his descendants, shows the original state of the data with codes for his children.

The inclusion of spousal information was critical for enabling the linking of mothers to their children since the genealogical registers are recorded patrilineally (i.e. children appear in their father's household, and women appear as wives in their husband's households but are not directly linked to their own children. In cases where a man was only married once in his lifetime (94.5% of cases in our sample), matching mothers to their children is a relatively straightforward process using the individual and household identification codes that link individuals across and within generations. For

[8] Gouws (1987) and Cilliers and Fourie (2012) provide a more detailed description of the origin of the GISA data.

[9] Although several of these 'European' lineages have slave or Khoisan ancestors. See Heese (1985).

these men, we match their wives to all of their husband's children. We count the number of siblings who share a family identifier and link them to their father (by simply removing the last digit of the family identifier code). Cases where men married more than once require us to carefully distinguish children belonging to the first wife from children belonging to the second, third, or in some rare cases, forth wife. An algorithm using the previous wife's death date, subsequent marriage date, and the birth dates of all of the children, allows for the matching of the correct children to the correct wife.[10] In the event that there was more than one wife and a birth or death date was missing, a successful match cannot be made.

We limit this analysis to marital fertility since children born out of wedlock were rarely recorded in any of the source documents used by the genealogists who compiled the family lineages. We also do not consider women who had no recorded children. If a man had no descendants listed below himself in his genealogy, there were no children to match to his wife. We cannot claim that he and his wife had no children because it is unclear whether the individual had no descendants listed below him because he truly had no offspring or because he had migrated out of South Africa before his children were born meaning that the genealogists stopped following his lineage. We therefore limit the sample to married women who had at least one child.

To be included in the sample for this analysis, complete information must exist for the mother's birth date as well as the number of children she gave birth to during her fertile years. Female reproductive life is taken to be between the ages of 15 and 49, which means for this sample, childbearing covered the period 1715 to 1959. This is ideal for the purposes of examining fertility behaviour before and after the demographic transition. We follow 23,484 women born between 1700 and 1909, who gave birth to a total of 130 776 children during their reproductive years.

4. Genealogical data as a source for demographic analysis

Family lineages have long been used by demographers in their studies on past demographic behaviour. The common problems associated with the use of genealogical data in historical demography research are already well documented (Hollingsworth 1968, Willigan and Lynch 1982, Zhoa 2001). They are biased towards the fertile and the marriageable since by definition

[10] Divorce was incredibly rare in this context and we assume that men remarried exclusively in the event of his wife's death.

a genealogy is the written record of a family descended from a common ancestor or ancestors, and as a result, most genealogies are the records of members of surviving patrilineages. These families most likely experienced favourable demographic conditions which resulted in their survival. As a result, the use of these genealogies may not be representative of the history of the whole population in question (Zhoa, 2011 p. 181). Because the selective biases are largely observed in the first four or five generations after the start of a patrilineage, excluding these records from the genealogical data could effectively eradicate, or at least considerably reduce the main demographic biases from the analysis. Demographic rates obtained from these materials could then come very close to the average demographic experience of the entire population (Zhoa, 2001: 190).

In a retrospective genealogy, such as SAF, it can be expected that each step backwards is associated with a risk of being unable to make a non-ambiguous link. This selection effect means that individuals in a retrospective genealogy in the 18th century are likely to be separated by fewer generations from the present than was really the case. This creates a bias towards long generations (late marriage, re-marriage, late child-bearing, high fertility) and long life. In general, however, the greater the number of generations recorded, the smaller is the impact of the selective bias, so long as the genealogy does not suffer severely from other types of under-registration. If the genealogy is shallow in generational depth or the members of the first few generations consist of a large part of the population being investigated, the selective biases are more likely to affect the outcome. Otherwise, their influences can be negligible. Fortunately SAF benefits from great generational depth (see Table 1) and the first few generations constitute a relatively small part of the population being investigated. In addition, as a result of small population sizes (the entire free burgher population consisting of less than 1000 individuals before 1700) and even smaller sample sizes for the period 1652-1699, individuals born before 1700 are excluded from the analysis.

GISA asserts that the SAF registers are complete up until 1869 for all families and that they are only complete to 1930 for families with surnames starting with letters A-L. While the size and scope of the SAF data are its greatest advantage, not all entries contain complete information. Of the full data-set, which currently records over 670 000 individuals, many entries are empty save for a name and surname.[11] Close to two thirds of the entries

[11]The dataset is currently subject to constant revision as GISA attempts to produce more complete family trees.

contain a birth or a baptism date, while only one quarter contains a death date, and less than one fifth contains a marriage year. Table 2 presents this information. This calls into question the representativeness of the registers. Figure 2 plots the sample size[12] against the actual population size over the whole period. As shown in figure 3, for most of the period the sample size is approximately 30% of the total population (based on population estimates that may themselves be subject to error). By the early twentieth century, growth in the sample slows considerably relative to the total population, and by roughly 1912, the sample reaches a turning point and begins to decrease in size. We therefore choose 1910, the year of political unification between the two British colonies, the Cape Colony and Natal, and the two Boer republics, the Orange Free State and the South African Republic, as the appropriate year up to which this sample could be used as representative source of information on European settlers in South Africa. To further show the representativeness of our data we look to available census records.

5. Census comparisons

Before examining the demographic characteristics of our settler population, we provide a description of the sample and a comparison to various Cape censuses where possible. Table 3 compares the age profile of the 1875[13] and 1904 censuses with that of the sample for people alive in the sample and for whom we have complete information in 1875 and 1904 respectively. We see that the distribution of males and females in the SAF data closely mirrors the proportions reported in the censuses for every age group. We therefore do not believe that the SAF systematically under- or over-samples certain groups of the population with respect to age, and likewise appears to provide an accurate representation of the gender structure of the full population.

Next we consider the socio-economic structure of the sample, as proxied by the occupation of the household head[14]. Because the of nature of the

[12]Here sample size refers to the number of individuals who were alive in a given year. E.g. the sample size for 1770 is equal to the number of people whose birth or baptism year less than or equal to 1700 and who's death year was greater than or equal to 1700. Since year of death is required to calculate this figure, our sample size is significantly reduced as a result of the under-reporting of death dates in Cape Colony records.

[13]The census of 1865 does not provide a breakdown of gender and age by race that would allow for a suitable comparison to our sample. Additionally, no official censuses were taken prior to 1865 against which similar comparisons could be drawn for the earliest period under investigation.

[14]Husband's occupation was chosen here due to the fact that women rarely had reported

source materials (by and large marriage certificates) used by the genealogists to obtain individuals' occupations did not always mandate that occupations be recorded, occupation is only reported for between 20 and 30% of the sample. It is possible that the more educated or only those with higher earning occupations noted their occupation and we would therefore have a biased record of the development of socio-economic status over time. We again provide a comparison with the available census documents. As a result of some inconsistency in enumeration of certain occupations in the censuses over time, we re-categorize reported occupations into four broad skill groups: i) white-collar workers, ii) farmers iii) skilled and semi-skilled workers, and iv) unskilled labourers, for simplicity. Table 4 shows that are some differences between the occupations reported in the SAF and those in the censuses. In particular, the SAF seems to underreport the number of skilled workers while overreporting the number of white collar workers in the 1900 sample. This is however a turnaround from the reporting mid-nineteenth century. We therefore do not believe that we are systematically under- or over-sampling individuals from certain socio-economic classes and furthermore, for this analysis we do not rely on father's occupation and therefore are able to include people for whom no occupation is listed, thereby further removing any biases.

Table 5 shows the proportions of the sample for which we have information on region of residence, husband's occupation, husband's ancestry, home language, and wife's birth place. The table breaks this information down into 50 year time intervals. Our region measure uses the birth or baptism place of the first child or a couple's marriage place where a birth or baptism place is missing (Raper, 2004). We find a fairly uniform proportion of the sample has unknown data for each of the variables over time except for woman's birth place and region of residence. For all variables except husband's ancestry, home language and region of residence, the proportion that is unknown is higher than 50%. Around one third of the husbands in our sample can trace their ancestry to the Netherlands, with France as the second most common country of origin. We see an increase in UK ancestry from the 1800s onwards which coincides with the switch in governance at the Cape and the arrival of large numbers of British settlers. The increase in the proportion of British settlers also coincides with an increase in the proportion of people speaking English in the Colony, although this proportion never exceeds 20% in our sample reflecting the dominance of Afrikaans

occupations in both the genealogical data as well as in the censuses.

as a home language.

We see an increase over time in the proportion of women in the sample who were born in the Colony, reflecting the growth of the domestic population by natural means. The decline in the proportion of unknowns here also indicates an improvement in record keeping for the locally born population relative to the adult migrant population. Husband's occupation has a fairly high proportion of unknowns, which again, follows from the type of records used to construct the data. Over 50% of our sample were engaged in agricultural pursuits which is consistent with the occupational distribution of a pre-industrial society as well as with the frontier society of the Cape. This is also consistent with the region of residence variable which shows for the early years, the highest proportion of people for whom we have data, resided in the rural Cape interior which was dominated by farming activity. Over time as predominantly Afrikaans speaking settlers advanced beyond the borders of the Cape Colony, we see an increase in the proportion of people residing in the Other category, where farming also dominated. This increase in the sample beyond the Cape boundaries is encouraging in that it suggests a continuity of record keeping. We assume that record keeping was however, best in Cape Town itself, and that the quality of record keeping declines as one moves farther afield.

6. Settler demographic characteristics

We now describe settler demographic characteristics in order to provide a context within which to understand fertility changes in the next section. Figure 4, panels a - e, presents the age profile of each gender broken into fifty year intervals. As noted earlier in the paper, the first half of the eighteenth century witnessed an extremely skewed distribution of both genders, reflecting the nature of the Cape Colony at that time. This can be see in figure 4a, for individuals born between 1700 and 1749. The VOC's hiring preference for single young males is reflected by the high proportion of young adult males relative to older males and also teenagers. The proportion of women aged 20 and above is only 14% of all females in the sample. However, there is evidence of a natural increase in the population as shown by the high proportion of both males and females of very young ages. After 1750, the age distribution begins to balance out somewhat, taking on the distribution of a traditional pre-fertility transition society, that is, with a high proportion of children and then decreasing proportions of successive age groups. However, the proportion of adult females was still substantially lower than that of younger girls. For males, there were very few individuals above the

age of 60 and a disproportionate percentage of males were children during this period (see figure 4 b). This may reflect short life expectancy as well as high childhood mortality. By 1800 and 1850 as shown in panels c and d, we see a society that looks very similar to that of Europe before its fertility transition, with each successively younger age group representing a higher proportion of the sample. The two genders exhibit the same age pattern by 1800. Mortality rates in 1800 appear higher than those in 1850 as shown by the hyperbolic slope of the distribution particularly for males. This slope is steeper by 1850. What is noticeable for these two time periods is that the proportion of young children is higher than that of any other age groups for both genders. By 1900 there is evidence of a decline in fertility with a lower proportion of males and females aged 10 and under than in previous years. Barring any substantial increases in child mortality at this stage, the fertility transition should therefore be well under by this point in time, given that the proportion of small children is lower than the proportion of children aged 10 and over for both genders. Overall for 1900, as seen in panel e, the slope of the distribution is steeper suggesting an overall decline in mortality rates at each age group. We also see an increase in the proportions of men and women living to later years. We do not see evidence yet of the effects of the Boer War.

While the gender-age pyramids indicate an increase in life span as shown by ever increasing proportions of older men and women over time, we now look in further detail at the average life length individuals in the sample. Figure 5 shows a fairly steady length of life cohort of birth for both genders. The graph is a simple depiction of the length of life of those in the sample for whom we have death dates. It is not a depiction of life expectancy as we do not have sufficient information on childhood mortality to calculate this statistic. There is much fluctuation in the eighteenth century, however, the trend is steadily increasing from an average age of death in the mid-50s to an average age of death by 1800 in the mid-60s. Thereafter there is a decline in the average age at death throughout the early 1800s until around 1840 when average life length for each birth cohort begins to increase again ending at just under 70 years by 1900. The decrease in average age at death may be a result of improved reporting of deaths, or, of the adverse conditions as settlers migrated into the interior of South Africa or a reduction in infant mortality of the weakest individuals, we are at this stage unable to differentiate the causes. Considering the difference between males and females, we see that women born in the eighteenth and nineteenth centuries lived substantially shorter lives than males, with the gap beginning to close for those cohorts born from 1810 onwards. Both changes in the gender-age

distribution as well as changes in average life length will play important roles in our understanding of the settler fertility rates we discuss next.

7. Marital fertility in perspective

Figure 6 provides the first ever complete series of female fertility for settler South Africa over the period 1700 - 1910. It shows average parity of over seven for mothers born between 1700 and 1800. We see a slight decline for mothers born from about 1800 and then parity remains between six and seven children with only a gradual decline until we see the birth rates of mothers born in 1840. We then see a large dip in settler fertility for women born around 1850-60 who would have been having children from around 1870 onwards with average parity for women born by 1900 of three and a half children.

Table 6 provides a summary over time of the typical variables that have a bearing on fertility rates. The first column replicates the numbers from figure 100 and shows average parity by decade of mother's birth. There is a slight decrease in parity for mothers born early in the nineteenth century and then a more rapid decline for mothers born in 1850 and later. The third column shows that the decline in parity is certainly not due to increases in mother's mortality, in fact women born in the second half of the nineteenth century were living longer than their mothers a generation before. The slight increase in the age at marriage may well have to do with a shift in the gender balance as the Cape Colony became more established and the gender ratio equalised. Mother's age at first birth is also increasing over time. This is expected given the increase in age at marriage, there is however simultaneously an increase in the interval between marriage and first birth.

The trends in marriage and first birth ages point to an intention to practice some kind of birth control and reduction in the number of children born. Further evidence of explicit control of fertility comes from a decline in mother's age at the birth of her last child. Combining age at first birth with age at last birth gives us an indication of the amount of time during which settler women were fertile, we see a decline in the window of time during which women were having children.

The final column of table 6 shows average birth intervals across all children. Birth intervals remain constant until we reach the birth histories of women born in the late nineteenth century, around 1870. For this group and younger women we see an increase in the average years between successive children, a further indication of some form of fertility control.

Table 7 provides more detail on women's fertility by age and over time in our sample. We construct age specific fertility rates for women in our sample in 25 year intervals, where each cell is the number of children born per 1000 women for each of the age categories in the chosen years. The table is instructive as it shows the variation in age specific fertility rates over our 200-year period. In our earliest measurable year, 1750, fertility rates are highest for women aged 25-34 and this remains the case throughout. This is well known to be a woman's most fertile period. Until 1825 we see the fertility rate fluctuate over the 25-year intervals although the trend is generally an increase. The variability is most likely due to the smaller sample in the earlier years as well as the very skewed gender ratio in those earlier years as shown in figures 4 and 5. High fertility rates for slightly older women are most likely due to survival bias amongst these early progenitors. In 1850 there is an almost universal decline in the age specific fertility rates. The pattern is less clear by 1875. This year is perhaps the most interesting year from a fertility transition perspective in that it shows a decline in the fertility rates of women under the age of 30 while the fertility rates of women over age 30 are increasing. A plausible explanation for this observation could be that while the preferences for children by younger women are changing to fewer children in their younger years, health improvements at the same time are increasing the ability to have children for those over 30. By 1900 there is a universal decline in age specific fertility rates. Table 7 suggests that South Africa's settler fertility transition began to take place somewhere between 1875 and 1900.

Figure 7 depicts the data in Table 7 from 1825 onwards to remove the fluctuations present in the early settlement period when the population structure was less stable. There is a clear decline in the number of children for ages 20 - 34 from 1825 already. The age specific fertility rates in 1850 and 1875 are fairly similar after the drop from 1825. There is then a large drop again in 1900 which includes women born in 1850 onwards. This figure supports the evidence of a fertility transition taking place after 1875 but before 1900.

Table 8 breaks average parity, that is total average births, down by the age at which a woman had her first child, the age at which she had her last child and how long she lived by mothers birth cohort over our 200 year period. It is no surprise that over all the birth cohorts, the earlier a woman started having children the more children she had on average and also that the later she stopped having children the more children she had. Furthermore, the longer she lived, the more children she had. Regardless of the age at first birth there is a slow yet steady decrease in average parity. The

pace of decline appears to increase for women born by 1850, the youngest of whom would be having children by 1870 and this steeper decline continues with the later cohorts. The fertility transition therefore does not appear to be driven predominantly by one single age group. We see a similar pattern when looking at mother's age at last birth, a slow yet steady decline in average parity with the pace picking up in this case for women born by 1875. The final panel of Table 8 shows that for most life lengths, average parity was decreasing by successive birth cohorts with a notable drop happening for women born by 1850 and continuing for later cohorts.

Before further discussion of the timing of South Africa's settler fertility transition, we provide some evidence that our finding on the changing fertility rates is not simply due to changes in the recording of births in the interior of the country. Due to the nature of migration into the interior of the Cape colony and even beyond the borders of the colony there may be some concern that the decline in parity over the period is due to a decline in the recording of births as the establishment of towns and churches lagged the migration of the population. If this were the case then we should see a decline in our data of the parities of these rural communities only, especially those on the periphery. Figure 8 shows instead that the opposite is true. Firstly, couples in the rural areas had at least as many children as those in the urban areas right until the end of our data, that is including the period of extensive migration into the interior and secondly, the timing of the transition is slightly earlier in urban versus rural areas. The transition also appears to be steeper in the urban areas. We acknowledge that there is likely to be underrecording in the rural areas but this is not the likely cause of settler South Africa's fertility transition.

With respect to a comparison with previously existing South African data, our finding of slightly over seven children per woman until around 1820 is consistent with the completed fertility calculated in Gouws (1987) who finds, using a much earlier version of our data going only until 1819, that between 1735 and 1819 women had between 6.8 and 8.5 children over their lifetime. Gouws is the only comparison available for the pre-transition era. Simkins and van Heyningen (1988), using two waves of census data, 1891 and 1904, provide estimates of the crude birth rate in 1891-96, 1896-1901 and 1901-06 of 40.7, 35.0 and 29.9 showing, as we do, a fertility decline over the time period. In comparison, for the period before the transition, Gouws finds crude birth rates of between 45 and 49.2 for the period 1735-

1819 with 1819 being the lowest.[15] Simkins and van Heyningen date the start of South Africa's settler fertility transition to about 1890. Certainly comparing the Gouws and Simkins and van Heyningen crude birth rates it does not appear that a large decline took place between 1819 and 1891. With our new data, as shown in tables 6, 7 and 8 as well as figure 10, we however find the fertility transition starts earlier, possibly by 1875.

It is informative to compare the timing of South Africa's fertility transition to that of both established societies in Western Europe as well as other settler societies such as the USA, Canada, Australia, and New Zealand. Depending on which start date is taken for the European fertility transition and also for the settler societies, the Cape Colony's transition either started approximately 10-20 years before many of the European countries as well as earlier than the transitions in Australia and New Zealand (Coale and Treadway 1986 p.38 , Lesthaeghe 1977 p.4, Caldwell and Rizicka 1978, Pool, Dharmalingam and Sceats 2007 p.61) or at approximately the same time, for women giving birth from 1870 (Guinnane, 2011). If we take the Guinnane (2011) transition timing as the more correct then our transition occurs at essentially the same time as that of other settler societies that had not embarked on largescale industrialisation as well as the Western European experience that includes both industrialised and non-industrialised nations. Only the USA, Canada and France have substantially earlier start dates for the transition (Coale and Zelnik 1963; Gee 1979; Wrigley 1985; Bean, Mineau and Anderton 1990; Weir 1994). Crucially, given the Cape Colony's connections to both the Netherlands and to Great Britain, the Cape's fertility transition occurs earlier than that for both those countries in Caldwell (1999) but coincides well with that of England when looking at cohort fertility rates in Teitelbaum (1984, pg 76-77) and Guinnane (2011). Our finding ought to put to rest the argument that fertility transitions occur only with industrialisation and economic growth. We leave to future work an analysis of what the drivers of South Africa's settler fertility transition were.

8. Concluding remarks

We have introduced a unique genealogical dataset which, we argue, is a novel and representative source for new historical demographic research on

[15]The crude birth rate is the number of births per 1000 of the population of a given geographic area. future work

settler South Africa. We have been able to show for the first time the demographic characteristics of South African settlers over a two hundred year period, allowing for new insight into population dynamics, and individual behaviour related to fertility.

Estimates of completed fertility over time reveal that settler fertility was high and stable for the eighteenth and first half of the nineteenth century, with women having around 7 children on average. In the space of the next 60 years, this number halved, with women born in the first decade of the twentieth century having only 3.5 children on average. Importantly, we find that the fertility decline differed geographically, with urban mothers having lower levels of fertility on average than that of their interior counterparts. The fertility decline began later and proceeded at a slightly slower pace for settlers living in the interior regions of the Cape relative to the urban areas which may both be a result of less of a need to reduce fertility, more of an incentive to solve the labour supply problem and perhaps a later awareness of stopping techniques as they diffused from the urban areas to the countryside. The implication is that most likely, the causes of fertility transition and that the methods used to limit fertility in our context are similar to that of other settler societies. Further investigation of these channels through a life-course perspective, using this novel data source is the subject of future research.

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Table 1: Distribution of individuals across generations

Generation	**Frequency**	**% of sample**
1	33,295	4.96
2	67,114	10.00
3	58,804	8.76
4	68,661	10.23
5	85,307	12.71
6	109,675	16.34
7	124,518	18.55
8	82,876	12.34
9	31,871	4.75
10	7,824	1.17
11	1,245	0.19
12	168	0.03
13	12	0.01
Total	671,385	100

Table 2: Number of observations in the dataset for selected variables

Variable	**Female**	**Male**	**N/A***	**Total**
Individual ID	305,260	360,936	5,189	671,385
Date of birth/baptism	219,089	255,902	2,029	477,020
Date of death	40,978	98,894	459	140,331
Date of first marriage	67,602	94,115	119	161,836
Age at first marriage	57,213	77,434	67	134,714
Age at death	35,720	82,563	317	118,600

*Sex of individual unavailable/unable to be determined from original records

Table 3: Sample gender-age profile comparison with available censuses

	1875 SAF		**1875 census**		**1904 SAF**		**1904 census**	
Age	Males	Females	Males	Females	Males	Females	Males	Females
0-4	15.0	16.3	15.5	16.6	9.8	11.0	11.7	14.0
5-9	13.2	14.8	14.3	15.6	10.5	10.4	11.0	13.0
10-14	11.0	11.6	12.5	13.5	10.7	10.8	10.6	12.4
15-19	10.8	11.2	10.2	11.3	10.0	10.0	9.6	10.8
20-24	9.5	9.8	9.8	9.6	9.1	9.1	12.4	10.0
25-29	8.9	8.7	7.9	7.3	8.3	8.3	11.2	8.7
30-34	7.5	7.0	6.8	6.1	7.7	7.8	8.6	7.3
35-39	6.1	5.7	5.3	4.7	6.8	7.1	9.8	6.0
40-44	4.8	4.2	4.7	3.9	6.0	5.8	5.2	4.7
45-49	3.6	3.0	3.7	3.2	5.3	5.0	4.0	3.6
50-54	3.1	2.4	3.3	2.7	4.5	4.3	3.1	3.0
55-59	2.5	1.9	2.1	1.9	3.6	3.4	2.0	2.1
60-64	1.7	1.4	1.6	1.5	2.6	2.4	1.6	1.7
65-69	1.1	0.9	0.9	0.8	2.2	1.9	1.0	1.1
70-74	0.6	0.6	0.6	0.5	1.4	1.3	0.7	0.7
75-79	0.4	0.4	0.3	0.3	0.9	0.8	0.4	0.4
80-84	0.1	0.2	0.2	0.2	0.5	0.4	0.2	0.2
>85	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1

Source: Census of the colony of the Cape of Good Hope. March 1975 and 1904. Own calculations.

Table 4: Sample proportion socio-economic status comparison with available censuses

Household head SES	**1850 SAF**	**1865 census**	**1900 SAF**	**1911 census**
White collar	20.5	29.7	33.4	29.3
Farmer	64.4	55.3	49.8	47.8
Skilled/semi-skilled	8.4	7.5	13.9	19.0
Unskilled	6.8	7.5	3.0	3.8

Source: Census of the colony of the Cape of Good Hope. March 1965 and 1911. Own calculations.

Table 5: Sample proportions

	1700-49	**1750-99**	**1800-49**	**1850-99**	**1900-09**
Husband's ancestry					
Netherlands	0.32	0.32	0.32	0.29	0.25
France	0.26	0.22	0.18	0.14	0.10
Germany	0.06	0.10	0.10	0.09	0.07
UK	0.00	0.00	0.06	0.09	0.13
Other Europe	0.03	0.03	0.03	0.02	0.03
Unknown	0.31	0.32	0.31	0.37	0.43
Home language					
English	0.08	0.09	0.16	0.18	0.22
Afrikaans	0.85	0.84	0.77	0.74	0.66
Unknown	0.06	0.06	0.07	0.08	0.12
Woman's birth place					
Born locally	0.20	0.25	0.44	0.43	0.41
Born abroad	0.00	0.00	0.01	0.01	0.02
Unknown	0.80	0.75	0.55	0.56	0.57
Husband's occupation					
White collar	0.04	0.05	0.05	0.07	0.10
Farmer	0.16	0.14	0.17	0.18	0.12
Skilled/semi-skilled	0.01	0.01	0.03	0.02	0.01
Unskilled	0.02	0.01	0.03	0.02	0.01
Unknown	0.78	0.79	0.72	0.71	0.74
Region					
Cape urban	0.09	0.10	0.04	0.02	0.03
Cape interior	0.28	0.42	0.52	0.30	0.16
Cape exterior	0.00	0.00	0.09	0.07	0.03
Other	0.00	0.00	0.11	0.23	0.27
Unknown	0.63	0.48	0.24	0.38	0.51
Observations	477	2604	8621	17953	3759

Years represent year of birth of the father or mother

Table 6: Mother's characteristics by birth cohort

		Average parity		Life length		Marriage age*		Age at first birth	
Cohort	n	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1700	43	6,9	3,924	56,2	18,362	21,8	5,075	22,2	5,519
1710	65	6,6	3,339	52,9	19,754	21,9	5,276	23,1	6,254
1720	109	7,3	3,302	58,3	20,780	22,0	6,860	23,1	5,309
1730	108	7,6	3,697	57,4	22,804	20,2	4,455	21,7	4,470
1740	152	7,4	3,396	61,2	18,509	21,2	6,085	22,3	5,337
1750	270	7,2	3,962	59,5	21,711	21,4	6,188	22,8	6,336
1760	338	7,1	3,906	61,9	17,830	20,8	5,244	22,2	5,040
1770	476	7,3	3,686	62,1	18,002	20,1	4,839	21,6	5,224
1780	636	7,4	3,811	63,2	16,711	19,9	4,785	21,4	4,935
1790	884	7,3	3,582	61,8	16,814	19,7	4,517	21,0	4,570
1800	1053	6,6	3,678	60,4	18,617	19,9	5,001	21,3	5,070
1810	1431	6,3	3,745	58,6	19,168	20,1	4,704	21,8	5,015
1820	1655	6,6	3,892	59,3	18,539	20,2	5,046	21,8	5,319
1830	1900	6,5	3,797	60,2	18,934	20,4	4,914	22,0	5,204
1840	2582	6,4	3,799	60,9	19,100	20,3	4,767	22,0	5,209
1850	3002	6,1	3,647	62,5	19,711	20,5	4,540	22,3	4,942
1860	3413	5,5	3,385	64,3	19,737	20,8	4,562	22,9	5,230
1870	3601	4,7	3,081	65,9	19,732	21,6	4,714	23,7	5,389
1880	3908	4,2	2,733	67,7	18,355	22,6	5,036	24,8	5,412
1890	4029	3,7	2,467	69,6	17,558	23,4	4,780	25,1	5,074
1900	3458	3,5	2,197	70,1	16,597	23,4	5,428	25,0	5,151

*First marriage only.

Table 6: Mother's characteristics by birth cohort, continued

		Age at last birth		Fertile years		First birth interval*		All birth intervals**	
Cohort	n	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1700	43	34,1	7,916	14,7	8,460	3,1	5,286	2,4	1,635
1710	65	36,6	7,443	15,3	7,546	1,9	3,285	2,5	1,294
1720	109	36,2	7,211	14,9	7,289	1,4	1,146	2,3	1,259
1730	108	35,9	8,190	16,6	7,205	2,2	2,801	2,3	1,174
1740	152	37,3	6,865	17,0	7,191	1,6	1,292	2,6	1,878
1750	270	36,4	7,535	16,0	7,578	1,8	1,721	2,4	1,491
1760	338	36,2	6,969	15,8	7,773	2,1	2,438	2,6	2,003
1770	476	36,6	7,574	16,5	7,659	2,0	2,532	2,6	1,753
1780	636	36,1	7,502	16,3	7,393	2,1	2,832	2,5	1,645
1790	884	35,9	7,221	16,3	7,448	1,9	2,337	2,6	1,648
1800	1053	34,6	7,703	15,1	7,598	1,9	2,386	2,6	1,778
1810	1431	34,7	8,162	14,6	7,819	2,1	2,606	2,6	1,633
1820	1655	35,4	7,934	15,7	7,717	2,2	3,198	2,6	1,774
1830	1900	35,6	7,675	15,3	7,271	2,0	2,433	2,5	1,781
1840	2582	35,5	7,721	15,1	7,524	2,1	2,856	2,6	1,773
1850	3002	35,1	7,592	14,6	7,228	2,0	2,798	2,6	1,753
1860	3413	34,8	7,276	13,6	6,957	2,2	3,129	2,7	1,921
1870	3601	34,2	7,392	12,3	6,978	2,0	2,573	2,9	2,179
1880	3908	34,5	6,772	11,6	6,515	2,1	2,657	3,1	2,203
1890	4029	33,7	6,450	10,6	6,188	2,3	2,853	3,3	2,445
1900	3458	33,6	6,440	10,4	6,035	2,3	2,814	3,6	2,599

*Duration in years between date of marriage and the birth of the first child. **Inter-birth intervals for second and higher-order births. Years represent mother's birth decade.

Table 7: Age-specific fertility rates by 25 year interval

Age group	1750	1775	1800	1825	1850	1875	1900
15-19	56.60	140.24	88.82	114.67	108.74	72.55	26.76
20-24	241.38	309.52	343.97	339.51	286.87	269.88	175.38
25-29	346.15	340.43	309.86	386.18	316.81	291.52	223.57
30-34	351.35	376.81	286.55	306.76	260.05	280.62	200.33
35-39	225.81	271.19	220.86	208.79	200.28	221.02	156.40
40-44	100.00	150.94	176.83	111.84	112.98	121.54	89.43
45-49	40.00	51.72	7.94	42.55	16.46	38.02	12.92
Average	210.14	235.96	214.34	228.96	198.18	191.98	128.94
No. of women	276	623	1423	2935	5162	8506	12029

Includes only women with complete birth histories. Includes all women in the sample in those age groups in those years

Table 8: Average parity over time by age at which mother had first child, last child and by length of mother's life

Mother's age at first birth	1700	1725	1750	1775	1800	1825	1850	1875	1900
15-19	8.00	8.52	8.44	8.33	7.53	7.70	6.83	5.53	4.83
20-24	6.82	7.30	7.24	7.17	6.57	6.79	6.04	4.69	3.97
25-29	6.14	6.65	6.19	6.24	5.41	5.33	4.60	3.55	3.04
30-34	5.33	3.57	3.04	2.92	2.75	2.53	2.27	1.99	1.85
35-39	-	7.00	2.67	6.00	5.14	2.67	2.33	1.71	1.56
Mother's age at last birth	1700	1725	1750	1775	1800	1825	1850	1875	1900
15-19	2.00	1.71	1.19	1.56	1.48	1.62	1.43	1.56	1.23
20-24	2.57	2.40	2.21	2.38	2.20	2.10	2.02	1.81	1.74
25-29	3.74	4.04	3.65	4.04	3.78	3.71	3.33	2.51	2.36
30-34	7.35	7.29	7.41	7.65	7.02	6.81	6.11	4.57	3.89
35-39	8.94	9.80	9.85	10.39	10.16	9.63	8.96	6.92	5.92
Mother's life length	1700	1725	1750	1775	1800	1825	1850	1875	1900
15-24	1.50	2.50	2.00	2.00	1.73	1.75	1.63	1.71	1.50
25-34	4.50	3.80	3.63	3.56	3.86	4.24	3.65	2.90	2.48
35-44	6.27	6.71	6.11	7.00	6.20	6.34	5.82	4.38	3.36
45-54	6.50	8.19	7.55	7.45	7.19	7.42	5.65	4.19	3.17
55-64	9.14	7.00	7.66	7.35	7.20	7.29	5.84	4.25	3.65
65-74	7.07	9.06	7.53	8.19	7.63	7.57	6.33	4.32	3.55
>75	6.83	8.68	6.92	8.15	7.63	7.89	6.32	4.30	3.68

Includes only women with complete birth histories. Includes all women in the sample in those age groups in those years. Sample sizes and standard deviations available on request.

CELLIERS / CILLIERS / CILLIE

Josué Cellier * Orleans, Frankryk c. 1667 a. aan Kaap 1700 aan boord *Reygersdaal* met sy vrou, vestig aanvanklik te "Het Kruyspad", dist Brackenfell en Later "Orleans", Daljosaphat. Volgens Boucher is Josue Celliers moontlik die seun v Sarah Margaretha Josue Celliers en sy vrou Judith Rouilly. Hierdie egpaar het 'n seun Nicolaas in die kerk te Bazoches-en-Dunois laat doop. † " De Orleans", dist Drakenstein Okt. 1721 x Frankryk c. 1700, Elisabeth COUVERT * Orleans, Frankryk c. 1676 † c. 1743 (sy xx c. 1722 Paul Roux † Drakenstein 7.2.1723)

b1 Josué ≈ Drakenstein 2.1.1701 † dist. Drakenstein 19.4.1770, ongetroud

b2 Jan ≈ c. 1702 † c. 1755, burger v Drakenstein x Paarl 5.12.1728 Anna MARAIS * ≈ c. 1707 (wed. v. Gabriel Rossouw) † dist. Drakenstein 11.1.1765 d.v. Charles Marais en Anna de Ruelle

c1 Jan ≈ Paarl 9.10.1729 † dist. Drakenstein 6.6.1766 x Tulbagh 8.10.1751 Susanna MALHERBE ≈ Drakenstein 15.2.1733 † c.1754 d.v. Pierre Malherbe en Elisabeth Cellier xx Paarl 11.7.1756 Sara Margaretha ROSSOUW ≈ Drakenstein 5.8.1736 † Drakenstein 18.7.1821 d.v. Daniel Rossouw en Sara Hanekom

d1 Johannes ≈ Paarl 30.7.1752 † dist. Drakenstein 5.6.1816 x Paarl 12.10.1783 Anna Maria NAUDE ≈ Paarl 12.10.1760 † dist. Drakenstein 22.7.1809 d.v. Jacob Naude en Susanna du Toit

e1 Johannes Francois ≈ Paarl 19.9.1784 † dist. Paarl 10.9.1843 x Paarl 13.6.1806 Anna Magdalena ROSSOUW * 2.3.1788 ≈ Paarl 9.3.1788 † dist. Drakenstein 7.7.1822 d.v. Pieter Rossouw en Anna Cilliers xx Cradock 5.12.1824 Maria Magdalena BREED * 7.2.1807 ≈ Graaff-Reinet 26.4.1807 d.v. Johannes Augustus Breed en Johanna Venter

f1 Anna Magdalena * 12.7.1807 ≈ Paarl 9.8.1807 † Prince Alfred Hamlet 6.6.1873 x Paarl 5.4.1829 (Johannes) Cornelis Jeremias GOOSEN ≈ 10.9.1809 † 6.10.1892 s.v. Gideon Jacobus Goosen en Hester Catharina Malan

f2 Johannes Francois * 13.3.1810 ≈ Paarl 8.4.1810 † Paarl 31.10.1879 x Paarl 8.9.1835 Maria Johanna DU TOIT * c. 1815 † Paarl 9.6.1874 d.v. Daniel du Toit en Maria Elizabeth Marais

Figure 1: Excerpt from the primary data source: an SAF entry in text format.

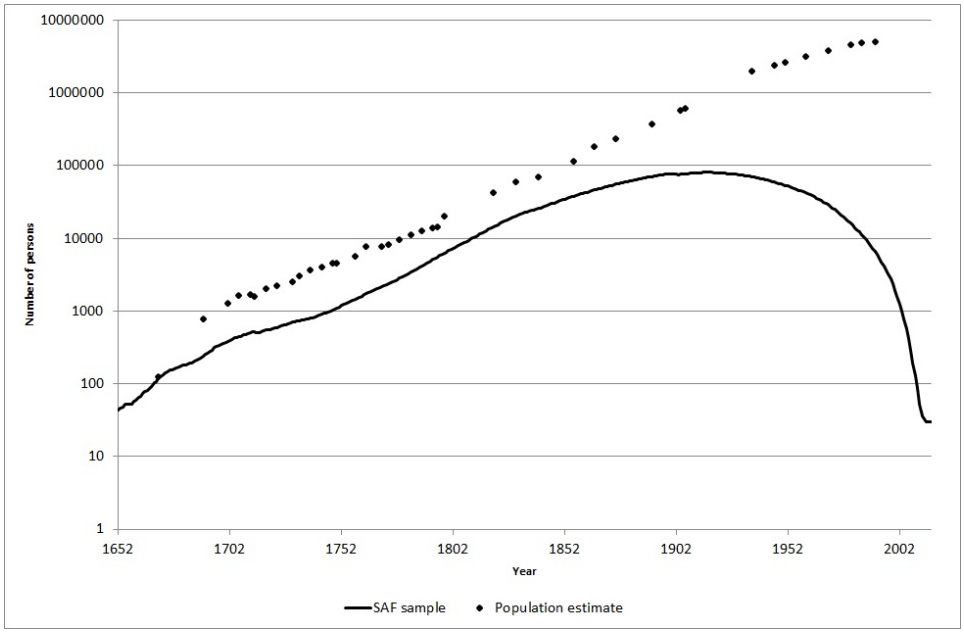

Figure 2: Trends in sample and settler population growth over time

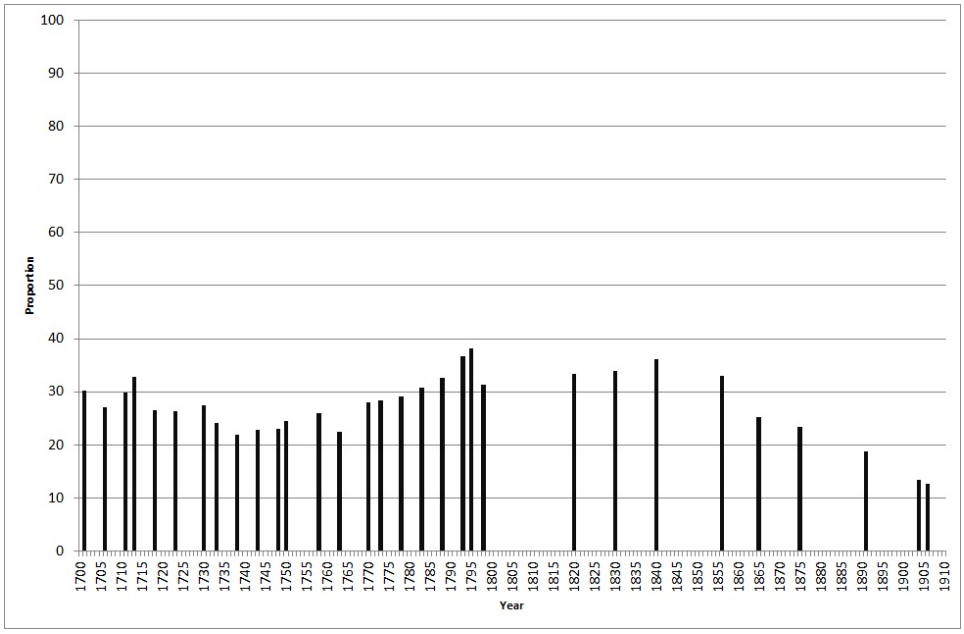

Figure 3: Sample as a proportion of the total settler population

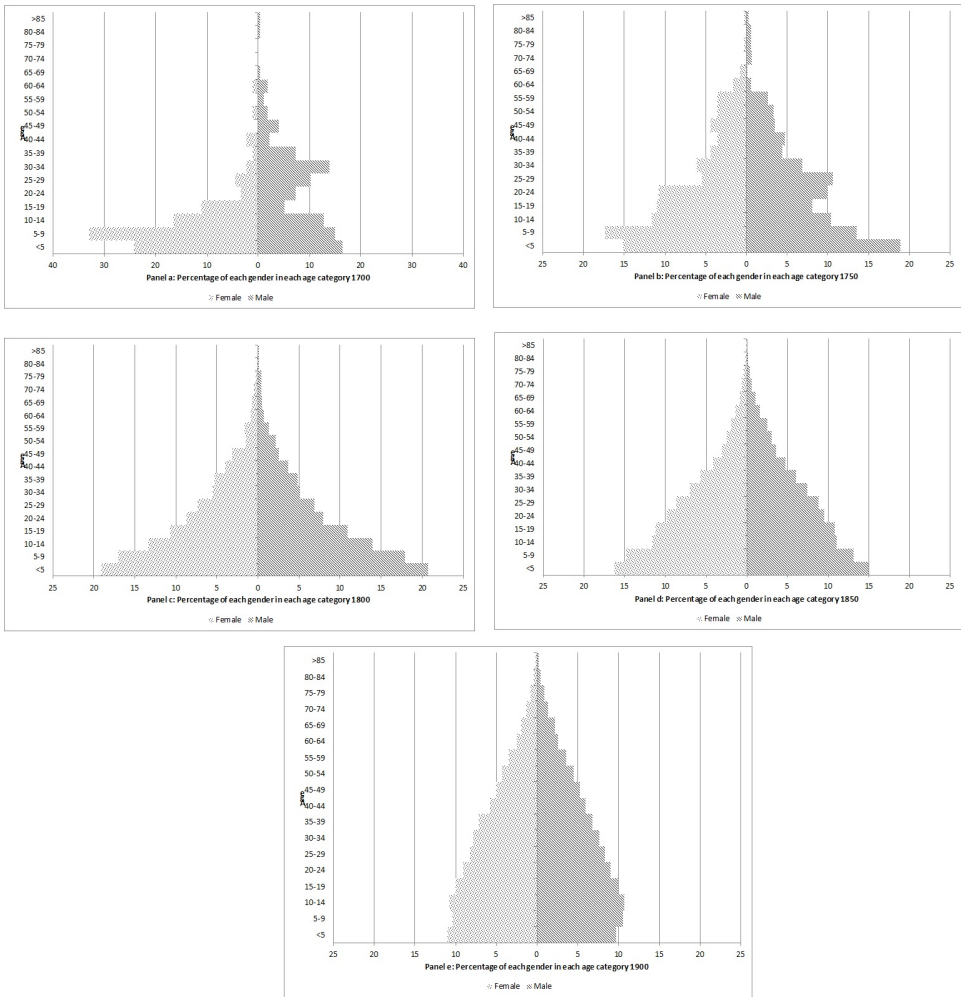

Figure 4: Gender-age pyramid of the sample, individuals born 1700 - 1900

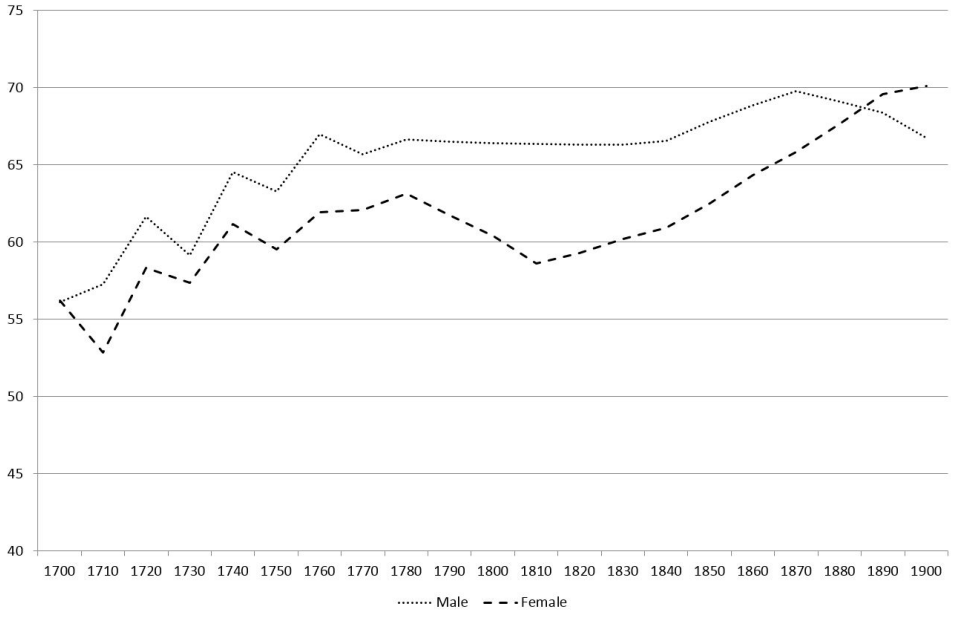

Figure 5: Mean life length for males and females by cohort of birth

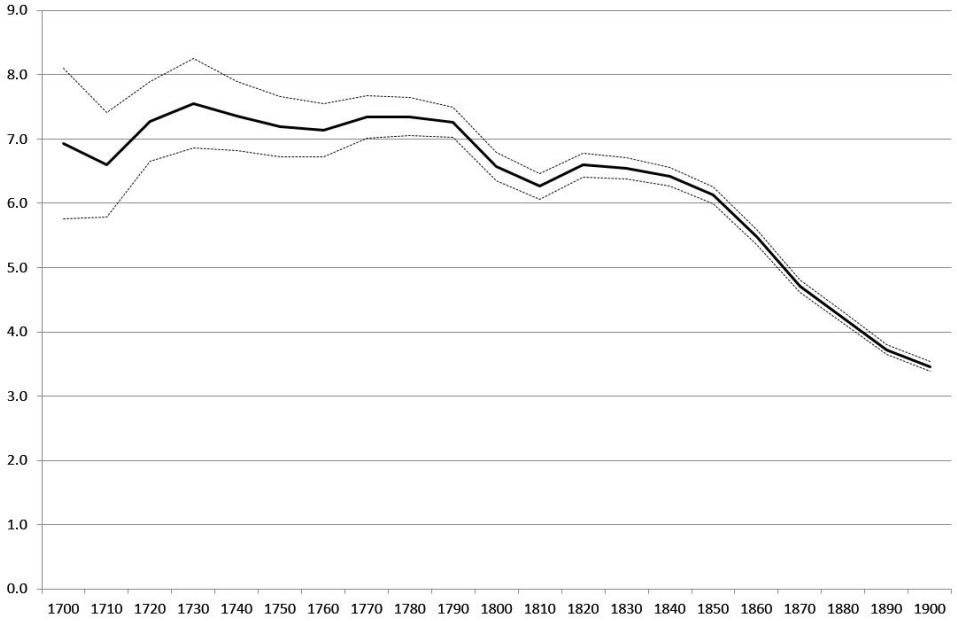

Figure 6: Average parity by mother's birth cohort, with 95% confidence bands

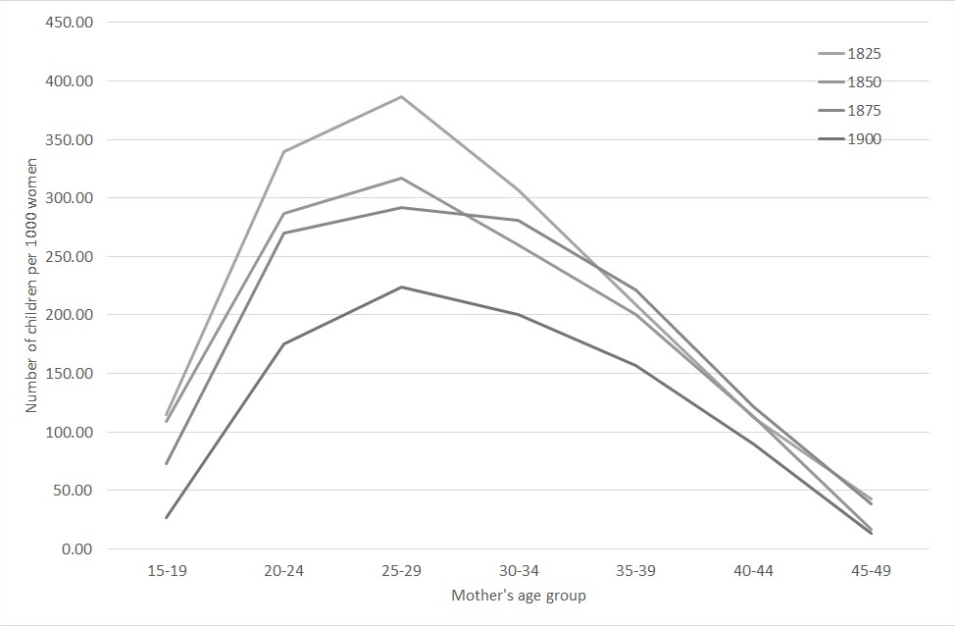

Figure 7: Age specific fertility rates, 1825 - 1900

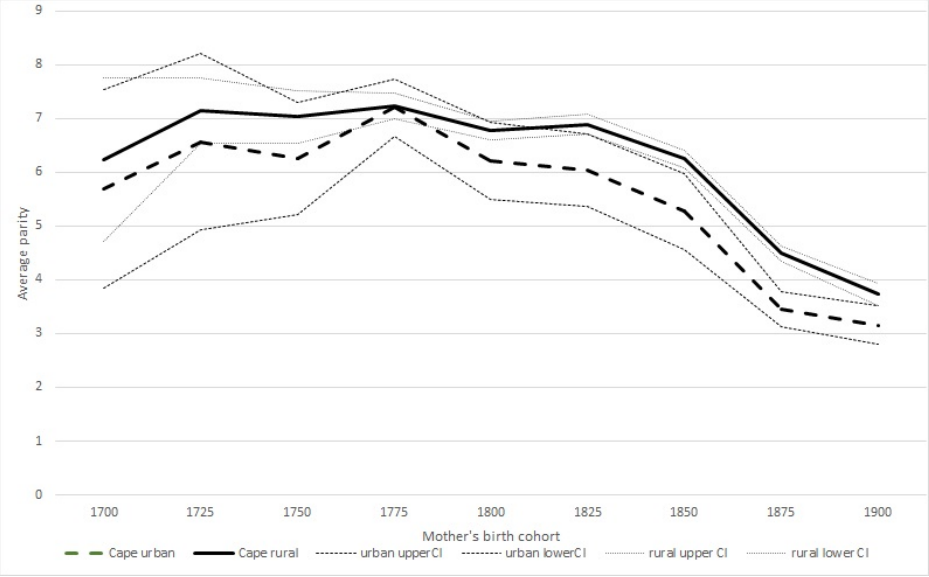

Figure 8: Average parity by mother's birth cohort, by region of residence, whether urban or rural