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Abstract

New estimates of GDP of the Dutch Cape Colony (1652-1795) suggest that the Cape was one of the most prosperous regions during the eighteenth century. This stands in sharp contrast to the perceived view that the Cape was an "economic and social backwater", a slave economy with slow growth and little progress. Following a national accounts framework, we find that Cape settlers' per capita income is similar to the most prosperous countries of the time – Holland and England. We trace the roots of this result, showing that it is partly explained by a highly skewed population structure and very low dependency ratio of slavery, and attempt to link the eighteenth century Cape Colony experience to twentieth century South African income levels.

Keywords: South Africa, slave, income, growth, GDP per capita, production

JEL Codes: N37, O47

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1. INTRODUCTION

The long-run determinants of a country's economic growth can only be identified once an accurate assessment of its economic performance is undertaken. Official South African gross domestic product (GDP) is available only from 1946, with some estimates dating back to 1910, the year in which the Union of South Africa was established. Very little is known about aggregate income or production in the period before this.

This dearth of aggregate measures of economic performance for the eighteenth and nineteenth centuries has resulted in few attempts to ascertain the long-run determinants of South Africa's economic progress. This is surprising, given the weight South African economic historians attach to the discovery of minerals as the catalyst for industrialisation and, presumably, economic take-off (Feinstein 2005). It is even more surprising, given the wealth of information available to economic historians of the eighteenth and nineteenth centuries.

Measuring income over long time-periods to ascertain the causal mechanisms that drive economic progress is now standard practice for most developed countries. Estimates of annual income per capita are available for most European and North American countries from as early as the seventeenth century, and measures of real wages – as a proxy for standards of living – date to even earlier periods (Maddison 2003). Not only do these estimates allow investigations into a region's growth determinants, but they also offer more conclusive evidence on the timing and rate of the great divergence, the process by which Western Europe and its New World offspring accelerated away from the Malthusian trap.

The Cape Colony, initially little more than a victualling station for Dutch ships passing between Europe and the East and later to become an extensive colony under British rule, is generally considered to have been relatively poor, subsistence economy. Feinstein (2005: 3), for example, remarked that before the 1870s "markets were small, conditions difficult and progress slow". This reflects De Kock's (1924: 39) earlier assessment that the early Cape Colony "advanced with almost extreme slowness". These views stand in sharp contrast to those of Van Duin and Ross (1987) and Brunt (2008) who found evidence of a more "dynamic" economy, and, according to Brunt, high nineteenth century growth rates as a result of a new system of property rights introduced by the British. As yet, no reliable estimate of GDP allow for testing of these different hypotheses.

This paper aims to fill the gap. We employ the System of National Accounts (SNA) to quantify income and production in the eighteenth century Cape Colony. The results provide first answers to questions such as 'how affluent was Cape society?', and allow a comparison of the Cape economy to those of other parts of the world at the onset of the Industrial Revolution. These results also begin to answer questions about the drivers of early Cape growth. Moreover, the Cape Colony was a society based on slave labour, which creates certain problems in conceptualizing GDP and its determinants. We will focus on these issues in order to better understand the determinants of income levels in such economies. Finally, we attempt to link our eighteenth century Cape economy results to twentieth century South African income estimates, providing a first estimate of 300 years of South African economic performance.

2. THE CAPE ECONOMY

When employees of the Dutch East India Company (*Vereenigde Oost-Indische Companjie*, or VOC) first arrived at the Cape in April 1652 with the intention to settle, the purpose of their settlement was to establish a refreshment or victualing station in Table Bay to service passing ships sailing between North-Western Europe and the East Indies. To this end, the VOC officials, the Company, and their employees, sailors and soldiers from across Western Europe, constructed a small fort in Table Bay and immediately planted a vegetable garden, experimented with crop farming, and undertook trade expeditions to barter livestock from the native Khoe.[1] These efforts to secure a constant supply of fuel and produce for the demand from the ships were less successful and in 1657 the commander of the settlement, Jan van Riebeeck, released 9 Company servants to become free burghers, farming for private gain but with severe economic barriers – farmers were only allowed to sell to the Company at prices set by them, manufacturing was prohibited and a set of monopoly contracts (*pachts*) was imposed that permeated all sectors of the tiny economy. Whereas Van Riebeeck had envisaged a European blueprint of small-scale agriculture, the Cape peninsula was soon covered by a handful of mostly pastoral farmers. This necessitated expansion into the interior, a process that would continue until the settlers met the isiXhosa approximately a century later at the Great Fish River.

Cape Town was the hub of economic activity in the Colony. Farmers brought their produce to the Company castle, which sold to the ships anchored in Table Bay. Other than replenishing supplies, the ships, stationed in Table Bay for an average of 27 days[2], required services offered by a number of traders, transporters, ship builders and general retailers working in the small town. In a survey of occupations undertaken by Governor La Fontaine in 1732, more than 60% of the population of Cape Town is active in secondary and tertiary industries. In fact, most villagers were, if not directly, then indirectly linked to the passing ships: Schutte (1980), for example, notes that according to seamen, nearly every house in Cape Town was a public house or inn.

Most of the fertile land to the immediate east of Cape Town (but west of the first mountain ranges) was granted to settlers by the turn of the eighteenth century. This area included Stellenbosch, added in 1679, and Drakenstein (today Paarl and Franschhoek), in 1685. While crop and stock farming was first adopted by the settlers, viticulture became an important industry after 1702 as production moved away from Company officials (notably Willem Adriaan van der Stel at Vergelegen) to free burghers. The early settlers in these regions were granted freehold land of 60 *morgen* (about 50 hectares) per farm with the Dutch system of inheritance dividing land equally between the spouse and children.

After 1710, the first free burghers began to settle beyond the first mountain ranges, first in search of pasture during winter time but later more permanently as pastoral farmers. Inexpensive land, a relative shortage of labour and low levels of resistance from the indigenous groups (who suffered huge losses from several small pox epidemics) combined to bring into existence a system of extensive loan farms, with high settler fertility rates

[1] The Khoe (Khoekhoe, or Khoikhoi) was a pastoral people with cattle their most valued assets. Another native group present at the Cape – the San – was a hunter-gatherer people and offered less trade opportunities for the arriving Europeans. The two groups together are referred to as the Khoesan or the Khoisan.

[2] See Boshoff and Fourie (2008)

pushing the boundaries first north and then east until meeting the isiXhosa late in the eighteenth century. By 1795, the year the VOC relinquished power of its Cape station to the British, the Cape Colony extended over a vast territory from Table Bay in the west, north to the Orange River and east to the Great Fish River, covering an area of almost 110 000 square miles with a population of around 50 000.

This population consisted of mainly four groups: the free burghers (or settlers), VOC officials and personnel, indentured Khoesan (a collective name for the pastoral Khoe and hunter-gatherer San) and slaves. The settlers were mostly former sailors and soldiers that requested to remain at the Cape after their contracts had ended. They were from the poorer parts of Europe, notably Germany after the end of the Thirty Years War, and brought little physical or human capital with them. The Company, through generous loans, often provided the initial capital for seeds and farm equipment and farmers also borrowed extensively from one-another.

A characteristic of the free burghers was the high fertility rate that was maintained throughout the seventeenth and eighteenth centuries. Even after European immigration was discouraged in 1717, the settler community continued to increase at rapid rates, expanding the territory under Company influence. This northward and eastward movement brought the settlers into direct contact with the Khoesan. Smallpox epidemics, particularly the one of 1713 which also killed a number of settlers, ravaged the Khoesan communities and reduced the cost of acquiring new territories for the Europeans. As the Khoesan was pushed back, they gradually became part of the settler economy. The Company did not allow indigenous tribes to be pilfered for slaves – mostly because it made trade difficult and would lead to retaliation – but the Khoisan, with little alternatives open to them, accepted labour on settler farms or often as herdsman in the interior, the farmers being keen to attract labour with knowledge of the veld. Only towards the second half of the eighteenth century would Khoesan be lured onto farms to supplement slavery, the predominant type of farm labour.

The Cape was a slave society, and for most of the eighteenth century slaves outnumbered the free Cape population. The first slaves were imported (from Angola) in 1658, although it is only at the beginning of the eighteenth century that slave imports became preferred over European immigrants. Slaves arrived through the Dutch network in the East Indies, primarily from four main destinations: the Indonesian archipelago, India (and Ceylon), Madagascar (and Mauritius) and Mozambique. Slaves permeated Cape society; of those settlers that left probate inventories, 65% owned at least one slave (Fourie 2012)[3], mostly concentrated on the wheat and wine farms close to Cape Town. Although colonial records offer evidence that some slaves were able to accumulate wealth, we assume here that the average slave lived just above subsistence level.

But what about the income of the average Cape inhabitant? For most of the twentieth century, the Dutch Cape Colony was seen as an "economic and social backwater", "more of a static than progressing community", a slave-based subsistence economy that "advanced

[3] According to the probate inventories, the average household at the Cape owned 5 slaves. When only slave-owning household are counted, this increases to 7. Using *opgaafrolle*, only 42% of households owned slaves. The discrepancy in numbers arises from the different definitions of what a household is. When considering only slave-owning households in the *opgaafrolle*, the average number of slave are nearly exactly the same as those in the probate inventories. See Fourie (2012) for a discussion.

with almost extreme slowness" (De Kock 1924: 24, 40; Trapido 1990). While close to Cape Town, pockets of wealth emerged during the eighteenth century (Guelke and Shell 1983), this relative affluence was overshadowed by the increasing poverty of the frontier farmer who, "living for the most part in isolated homesteads, gained a scanty subsistence by the pastoral industry and hunting" (De Kock 1924: 40).

This view of a stagnant and por Cape economy is challenged by several recent authors, relying on newly digitised statistical records of the Cape Colony. Van Duin and Ross (1987), using the *opgaafrolle* – censuses collected for purposes of taxation – find that the Cape economy is more "dynamic" than the static model previously envisaged. They construct time-series estimates of output for most of the key agricultural commodities: wheat (and a few less significant crops, like barley and rye), wine (and vines), cattle and sheep. They conclude that these sectors underwent "continual, if relatively gradual, expansion", which resulted in "a general increase in wealth in the Colony" (van Duin and Ross 1987: 89).

Unfortunately, Van Duin and Ross (1987) offer little support for their claims. They provide little evidence that per capita income has increased, and even simple calculations using their data show declining annual per capita income growth rates. Also, Van Duin and Ross (1987) fail to provide a comparable measure of gross domestic production, nor do they offer any satisfactory explanation for the general increase in wealth. Brunt (2008) begins to address this concern, extending the Van Duin and Ross (1987) estimates to investigate the role of property rights in the Cape Colony. Brunt (2008) hypothesises that the extension of freehold property rights to loan farmers in the nineteenth century had a significant impact on output. While growth was retarded in Brunt's eighteenth century Cape, he finds tentative evidence to suggest the nineteenth century saw rapid improvements in living standards and per capita income.

Most recently, De Zwart (2011), Du Plessis and Du Plessis (2012) and Fourie (2012) have echoed the Van Duin and Ross (1987) hypothesis that the average Cape settler was more affluent than previously thought. De Zwart (2011) uses eighteenth century real wages to show that Cape wages, in contrast to those in England and Holland, were increasing, so that Cape wage earners become more affluent over time. However, he acknowledges that this is growth off a low base; at the start of the century, Cape wages were only slightly above subsistence levels while at its end the rivalled those in England and Holland, the richest countries at the time. Du Plessis and Du Plessis (2012) also find evidence of an affluent but highly stratified society, with increasing levels of prosperity over the period. However, both these studies rely on wage data. Given that most settlers were landholders and employed relatively few wage labourers, the extent to which these wage trends reflect the prosperity of the Cape population is not clear.

Fourie (2012) uses probate inventories to calculate the household wealth of Cape settlers during the eighteenth century. Household wealth increased until the 1750s, declined somewhat over the next two decades and then increased again to reach wealth levels higher than most other regions for which similar data exist; in fact, probate records suggest that, apart from urbanised regions in London – one of the first regions to benefit from the Industrial Revolution – Cape settlers' attained similar or even higher average levels of wealth than households in Holland, rural England, and the Chesapeake region of North America.

The historiography that viewed the Cape as a poor and backward economy was based entirely on qualitative evidence which included letters from farmers describing their own impoverished situation and traveller accounts noting the abject poverty of some frontier farmers. As Van Duin and Ross point out, "it has been too commonly assumed that the farmers' own complaints on their poverty and on the absence of markets reflected economic reality". While informative, these grievances do not provide a balanced view of the living standards maintained by the average Cape settler. Van Duin and Ross conclude: "The Cape farmers, like all entrepreneurs at all times, did not believe that they were operating in the best possible economic climate. But, in the circumstances within which they did have to act, as a body they found reason to expand and opportunity to flourish."

To improve our understanding of the nature and size of the Cape economy, and to reflect on its comparative performance, we construct gross domestic product for the Cape Colony using an extensive list of quantitative records within the framework of national accounting. A more accurate picture of the early Cape economy will not only inform our historical understanding of the trajectory of South African economy development, but will begin to unlock answers to the more fundamental questions of the causal mechanisms that were responsible for its long-run progress or retardation.

3. MEASURING ECONOMIC GROWTH AT THE CAPE

The VOC was a highly bureaucratic organisation which kept detailed records of its activities and which taxed almost all branches of the Cape economy, in particular its agriculture. As a result we do not only have detailed sources about the incomes earned by the employees of the VOC in Cape Town, but also many sources – including periodic censuses and annual tax records – which cover agricultural capital stock and output. Van Duin and Ross (1987) study these sources carefully, assess their reliability and often give correction factors for possible underreporting. Since their pioneering publication, a number of authors have added new sources and insights based on their analysis (Shell 1994; Brunt 2008; Fourie and Von Fintel 2010).

Van Duin and Ross (1987), however, only consider the agricultural sector. The attempt here is to provide a measure of production across all industries, which necessitates that we follow a different approach. Fortunately, the wealth of sources is such that the Cape Colony is one of the regions in the world about which we are best informed – the quality of the resulting estimates of GDP is comparable to what is known about England or Holland in the same period. A more extensive discussion of the methodology and data used is available in the appendix.

The first set of estimates relate to the population of the Cape (Figure 1). It grew from about 4,500 individuals in 1701 to almost 50,000 in 1795. Slaves formed almost half the population, an average of 40% consisted of VOC employees and free burgers, and the remaining 10% were Khoesan. The total population of Khoesan must have been much larger; Feinstein (2005) estimates that there may have been 200,000 in 1650. However, we restrict our estimates to those Khoesan who were taking part in the Cape economy. Qualitative sources also suggest that from about the 1740s onwards, Khoesan became increasingly involved in agricultural activities, in particular on the frontier (Penn 2005; Green 2010).

Population estimates are used as baseline to establish the size of the various sectors. While the VOC sector (contributing about 20% to GDP) and agriculture (about 60%) are very well covered by the data, it is more difficult to measure the contribution of the secondary and the rest of the tertiary sector. Fortunately, a detailed labour force survey, undertaken in 1732 under the auspices of Governor Jan de la Fontaine, lists the occupations of the heads of households in the various districts of the colony. To this we add what is known about the distribution of the slaves over the occupations: the number of slaves employed by the VOC, those enumerated in the *opgaafrolle* and active in agriculture, and the 'rest'; we assume that the other slaves were working in industry and services. The result is that almost 60% of the labour force is active in agriculture, 11% in industry and 29% in tertiary activities (of which more than half was employed by the VOC).

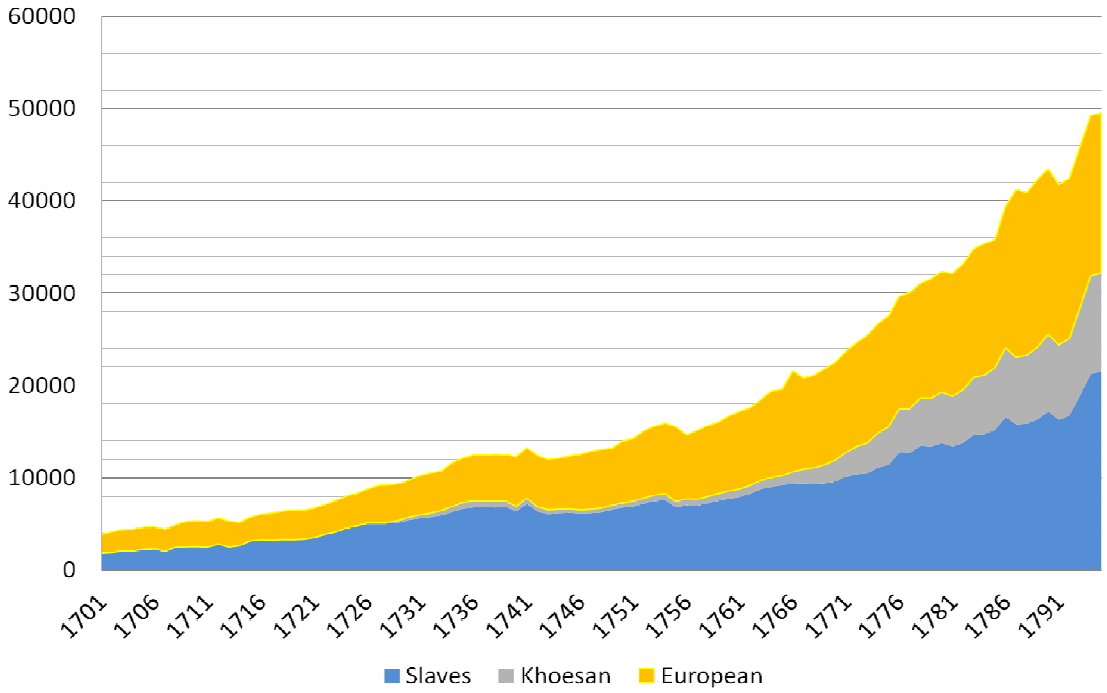

Figure 1. Population of the Cape Colony, 1701-1795
Sources: See text.

Total GDP is estimated via the output approach and is the sum of value added in agriculture, the VOC sector (which consists of the government and the main trading body in the colony), and 'the rest': industrial activities (such as beer brewing, construction, etc.) and 'other' services not included in the VOC. Total GDP in current prices increased from more than 600,000 guilders in 1701 to 3.2 million guilders at the end of our period. Some fluctuations did occur, as is clear from Figure 2: the early 1780s were severely depressed as a result of the British-Dutch war of 1780-1784 (in fact the depression already started after 1776 with the American Revolution). This is in contrast to Neumark's (1956) account that the 1770s and 1780s was "a long period of great prosperity" but validates Van Duin and Ross's (1987) account of generally poor harvests between 1782 and 1787, with 1786 being particularly disastrous to the extent that wheat had to be imported from the United States (Van Duin and Ross 1987: 31). Thereafter (1789–1793), production returned to and exceeded former levels, with 1793 recording the highest volume of wheat production. Neumark (1956)

argues that the boom was driven by the market for meat and wine and would continue into the early 1790s until the British took control of the Colony in 1795.

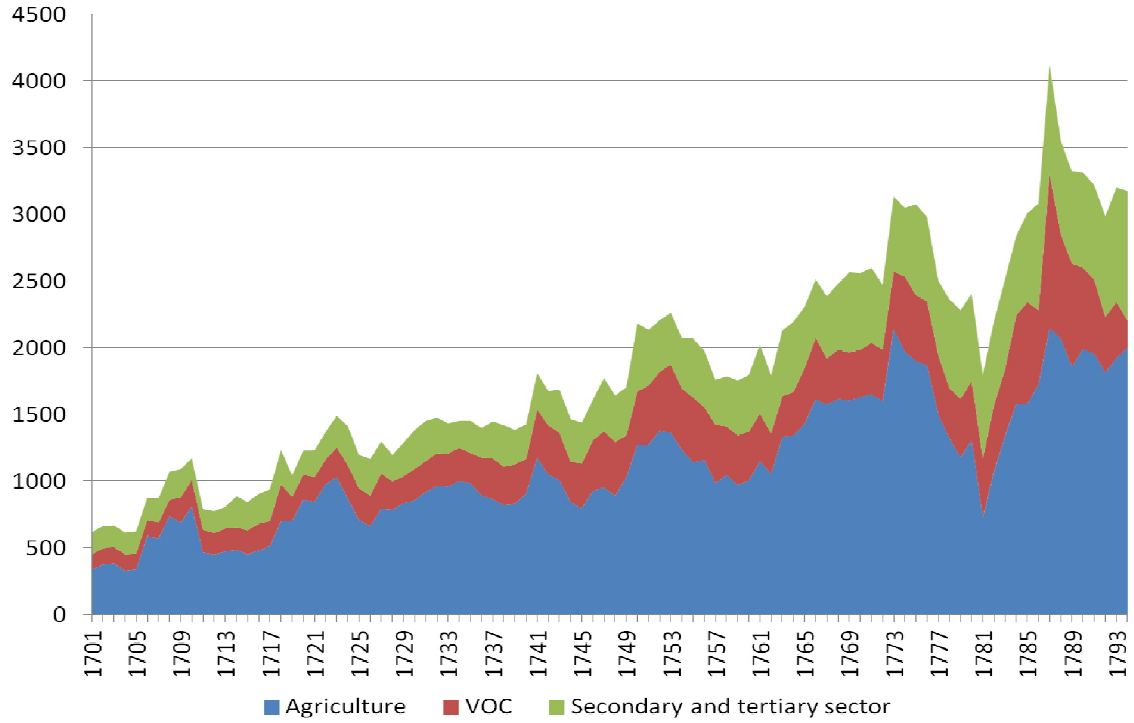

Figure 2. GDP in current prices, 1701-1795 (in thousands guilders)

The early 1710s was another difficult period, due to a combination of international warfare (ending with the Peace of Utrecht of 1713) and the smallpox epidemic of 1714/15 (see also figure 4 below). Sleigh (1993: 15) also report a number of poor wheat harvests over this period, especially in the Stellenbosch district. Figures 2 and 3 support Neumark's (1956:45) statement that "the 1740s marked the turning point from depression to prosperity in the economic life of the colony", even though Van Duin and Ross (1987) note that, following a reduction in the official price of wheat, there were numerous complaints from farmers about their precarious financial position. However, this period coincided with "the first meat boom" at the Cape, owing to the culmination of the 1744-1748 French-English war in India. English warships entered Table Bay requiring fresh meat, live animals and other animal products – including butter, tallow and tail fat. Even after peace was concluded at the end of 1748, an English fleet "consisting of 26 men-of-war and transports put into Table Bay", "the most powerful fleet that had ever appeared on the Indian Ocean", further boosting demand (Neumark 1956:46).

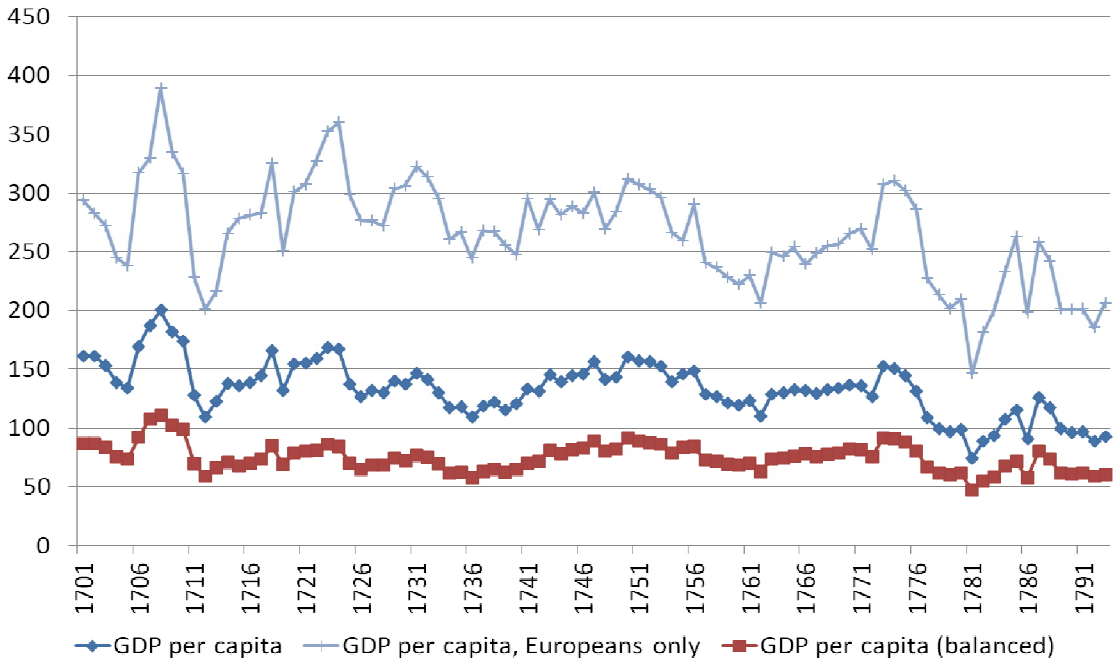

Figure 3. GDP per capita in constant prices (guilders of 1701)

The fluctuations of this economy become even more pronounced when the GDP series is deflated (1701 is taken as the base year) and recalculated on a per capita basis (Figure 3). We concentrate on the GDP per capita series here (the middle curve, the other two curves are discussed in the next section). Average income levels show a slightly declining trend, from about 150 guilders at the beginning of the century to about 100 guilders at its end. During the first half of the century the trend was still more or less flat, but in particular after 1775 (when the decline of the VOC really set in until bankruptcy in 1799) the trend was clearly negative. Because we have only one census of occupations, for 1732, we can only speculate about the development of labour productivity in various sectors of the economy, but if we assume a stable structure of the labour force, it appears that labour productivity in the VOC sector was stagnant, and that in agriculture labour productivity tended to decline (causing the decline in real per capita income). In sections 4 and 6 below we will try to explain this declining trend in agricultural productivity.

An even better picture of the business cycle of those years can be acquired by looking at the share of net investment in GDP, a series dominated by the agricultural sector (investments in livestock, vines and cultivated land) and by construction (investment in buildings).

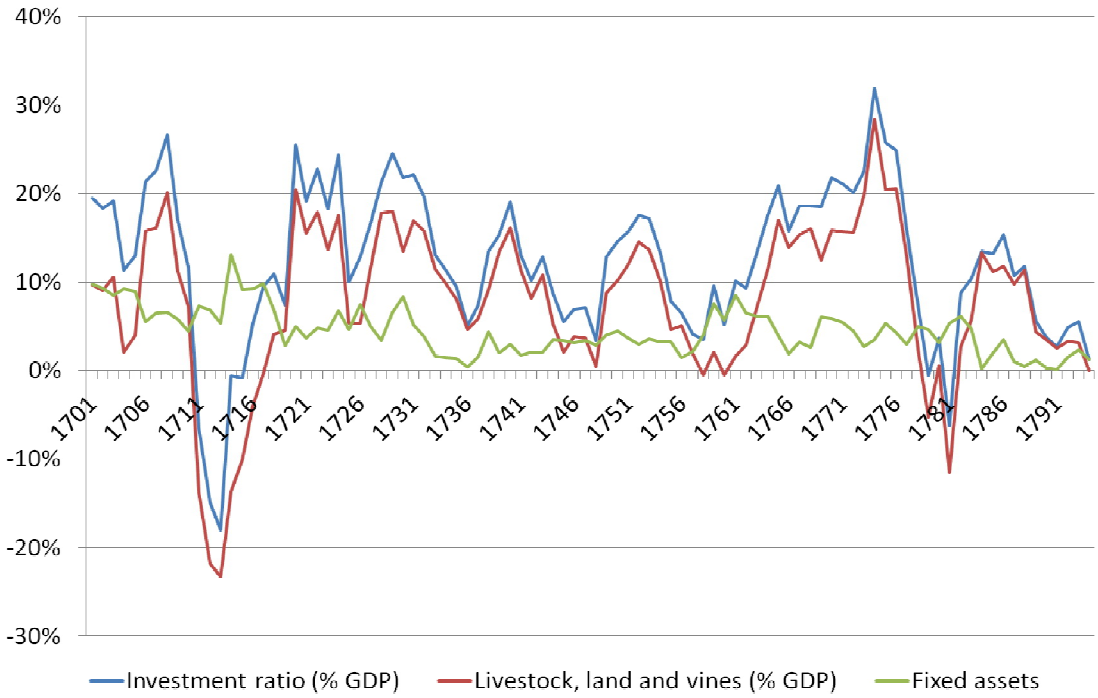

Figure 4. Share of net investment in GDP, 1701-1795

The crisis in the early 1710s is very clear in agriculture, but not present in the construction activities; the same applies to the crisis of the early 1780s. The 1760s and first half of the 1770s seem to have been the Indian summer of the VOC-economy, with remarkable high levels of investment.

4. A SLAVE-BASED ECONOMY

The system of national accounts more or less assumes that all economic transactions are carried out via the market by economic actors who engage in them voluntarily. In pre-industrial societies such assumptions are sometimes problematic: subsistence production may be very important, and forms of coercion – such as slavery – are often an integral part of these societies. Recent research points to a highly commercialized economy at the Cape, but there is no doubt that it was also a slave-dominated society. Contemporaries saw slaves as part of the capital stock, and invested a large part of their wealth (up to a quarter and more, see Fourie (2012)) in slaves: to increase production and – much less important – as a form of leisure or even luxury consumption (slaves as servants).

That the Cape Colony was a slave society therefore has a number of consequences for the analysis of its economic performance. In the previous section we analysed the investment ratio of this economy, but we should perhaps have included investment in slaves as well, which would have strong effects on the share of investment in GDP. It underlines the point that this economy – as many other slave-based economies – was highly capital intensive, much more so than the other pre-industrial societies. This helps to explain the fact that GDP per capita of those slave economies often seems to have been much higher than that of other pre-industrial economies (Sokoloff and Engerman 2000: 219).

This raises another issue: when the slave labour force is transferred from 'labour' to 'capital', the question arises what the relevant 'population' is to deflate total GDP with. This question has been addressed by Ransom and Sutch (1977) in their research on economic development in the plantation economies of the south of the USA in the 19th century. They developed the slave-economy concept of GDP, which 'treats slaves as capital assets and consumption by slaves as intermediate input into production'. This means that the increase in the stock of slaves is added to GDP, and that consumption of slaves (and in our case also the Khoesan) is subtracted (Sutch 2006). This income concept is then divided by the relevant population, which is the number of European settlers and VOC employees. We have estimated the real GDP of the free settler population[4] living in the Cape Colony using the assumption that the slaves and the Khoesan only earned a subsistence income (as estimated by De Zwart 2011); after subtracting this subsistence income from GDP, we divided the rest by the European population to get a series estimates of GDP per capita 'Settlers only' (see the upper line of Figure 3).

Slave societies are also characterized by a highly skewed age structure of its population. The labour force is dependent on a constant supply of new slaves from abroad, who are usually men in the age group between 15 and 30 years. Men in productive age groups are therefore over represented, and women and children underrepresented. This was also clearly the case in the Cape Colony. During the eighteenth century the share of adult slaves in total slave population was 65-70%; only after the cessation of the slave trade in the early nineteenth century did this share start to fall, resulting in a more or less 'normal' demographic structure during the 1830s (Figure 5). Moreover, the labour force employed by the VOC had a similar age structure, dominated by adult men, although these men gradually began to have (local) wives and children (Figure 5). Among the free burgers, a rapidly growing population with a normal age structure, the share of adult men was about 30%, less than half the share of adult men among VOC employees and slaves.

[4] This may include free blacks who themselves owned slaves.

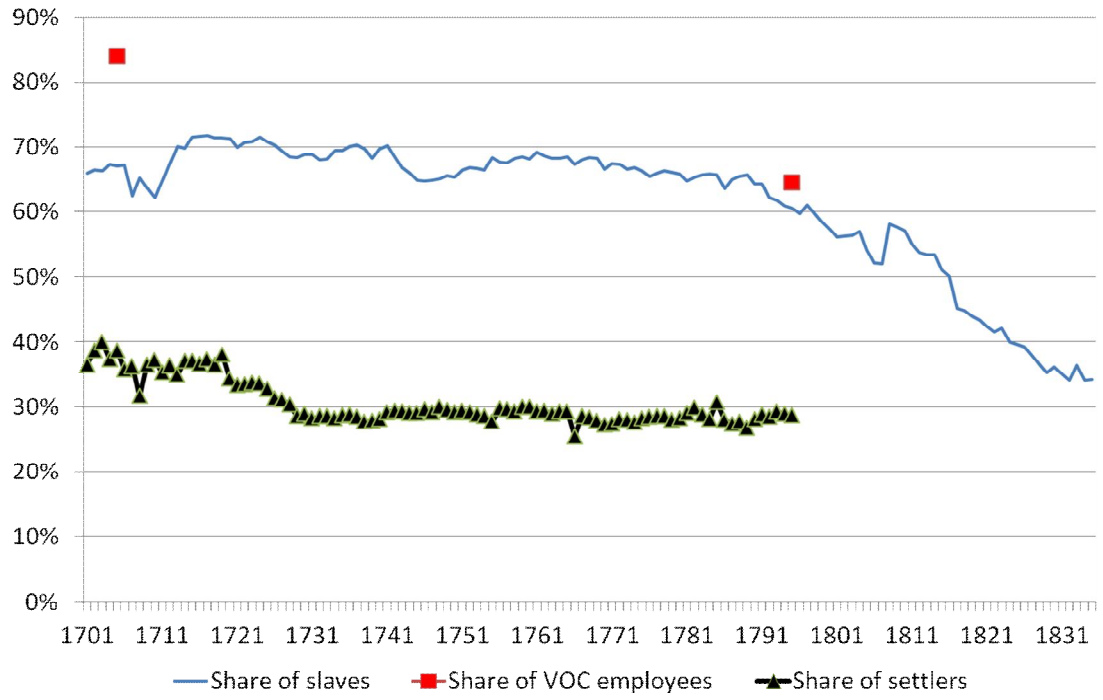

Figure 5: Share of adult men in total population of slaves, of free burgers, and of VOC employees, 1701-1834

The high level of income generated by the Cape Colony (and by slave societies in general) is therefore partly explained by the low dependency ratio; among free burgers every adult male had to earn an income for about 3 people, among slaves and VOC employees this ratio was about 1.5.

We have tried to control for this by estimating the size of a 'balanced' population, assuming a share of 30% for adult men. This 'balanced' population is clearly much larger than the actual population of the Cape Colony; the ratio between them fluctuates at about 1.9 during the first half of the century, to decline somewhat to about 1.5 during the second half of the period. The gradual change in the population structure – in particular as a result of the growth of the VOC-dependent population – can therefore help to explain part of the decline of real income that occurred between 1750 and 1795. The result, a much lower GDP per capita, is presented in Figure 3 (bottom line).

5. INTERNATIONAL COMPARISONS: HOW AFFLUENT WAS THE CAPE?

Next we compare the income levels of the Cape with those in other parts of the world, notably the countries of Western Europe. The estimates presented here are expressed in guilders as used in the Cape Colony, which were 'light guilders', somewhat lower in value than the 'heavy guilders' used in the Netherlands.[5] We, therefore, use purchasing price parity (PPP) to express the income estimates in Dutch guilders or English pounds.

[5] Twenty guilders were equal to one Rijksdaalder (Rix-dollar) at the Cape, while sixteen guilders equalled a Rijksdaalder in Holland.

Fortunately, such PPPs have already been constructed by De Zwart (2011) in his study of real wages of the Cape. Using mainly sources from the VOC records, he estimates the total costs of a standard basket of consumption goods in Cape Town (the 'barebones' basket taken from Allen 2001 and Allen et.al. 2011). Because we know the costs of the same basket of consumption goods in Holland and England in these years, we can construct PPPs and make comparisons with these two countries.

We convert the three PPP series into grams of silver, because silver-based money was the standard in the 18th century. Figure 6 demonstrates that in the first half of the 18th century the three prices levels of these economies were very close, but in the second half of the century prices in Cape Town had the tendency to decline a bit, whereas in Holland and England they went up. Because our estimates for the Cape are expressed in constant guilders of 1701, the PPPs for this year are close to parity (in 1701 the price level in Holland was less than 1% and in England less than 4% higher than in Cape Town).

The series of Dutch and British GDP are not only known in current prices of these years (which makes it possible to do the PPP-comparison), but also in international dollars of 1990, the benchmark used by Angus Maddison for comparing international levels of GDP per capita in the world economy. This makes it possible to also convert (via the Dutch ratio between current prices of 1701 and international dollars of 1990) the estimates of the Cape Colony into dollars of 1990, to put the results of our study into an even broader perspective.

The results, presented in Figure 7, show that at the beginning of the 18th century, real incomes in the Cape were at par with those in Great Britain, and only somewhat lower than in Holland, at the time probably the wealthiest region in the world. British GDP per capita shows a consistent rising trend, however, whereas real incomes in the Cape decline after about 1770. In 1790, when British incomes reach the 2000 dollars threshold, incomes in the Cape were about half of this level, 1000 dollars (in 1990 prices). However, real incomes of the European population at the Cape were much higher than the British level (and at times even higher than the Holland level), which supports the relative high standard of living of Cape settlers documented by Fourie (2011).

Considering GDP per capita for comparison purposes is perhaps not entirely fair, however. Economic growth – the increase of total GDP – was much more spectacular at the Cape than in Holland or England. The obvious difference was population growth. Trend growth (estimated as a fitted regression line) of GDP was 2,1% per year, while the trend in population growth was slightly higher at 2,5%. The population of Holland was falling during much of the 18th century, its GDP per capita grew at a rate of only 0,03% per annum (Van Zanden and Leeuwen 2012). British growth was more impressive: GDP per capita increased by about 0,2% per annum and population by 0,7% per annum, which gives a growth of total GDP of 0,9%, still less than half the rate of growth achieved at the Cape (Broadberry, Campbell et al. 2011). Perhaps this is why Adam Smith (1776: IV.7.23), in his 1776 treatise, wrote:

> "The colony of a civilised nation which takes possession either of a waste country, or of one so thinly inhabited that the natives easily give place to the new settlers, advances more rapidly to wealth and greatness than any other human society."

Both the level of GDP per capita and its growth rate were impressive achievements. One of the factors behind the high level of GDP was the 'favourable' age structure of the slave population, dominated by adult men. If we control for this by dividing total GDP by the estimated 'balanced' population total, we get a much reduced level of GDP per capita fluctuating between 600 and 1000 1990 dollars, or the per capita income of a European middle-income country (such as Spain, Germany or Sweden) in the same period.

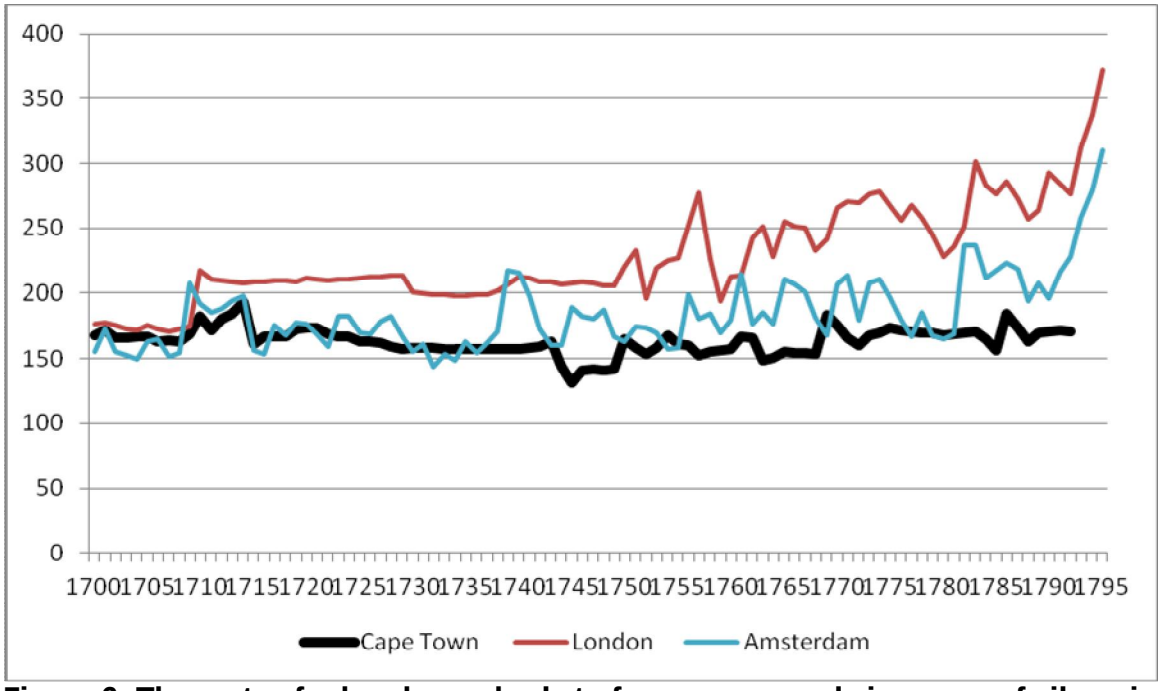

Figure 6. The costs of a barebones basket of consumer goods in grams of silver, in Cape Town, London and Amsterdam, 1700-1795.
Source: De Zwart 2011; Allen et.al. 2011.

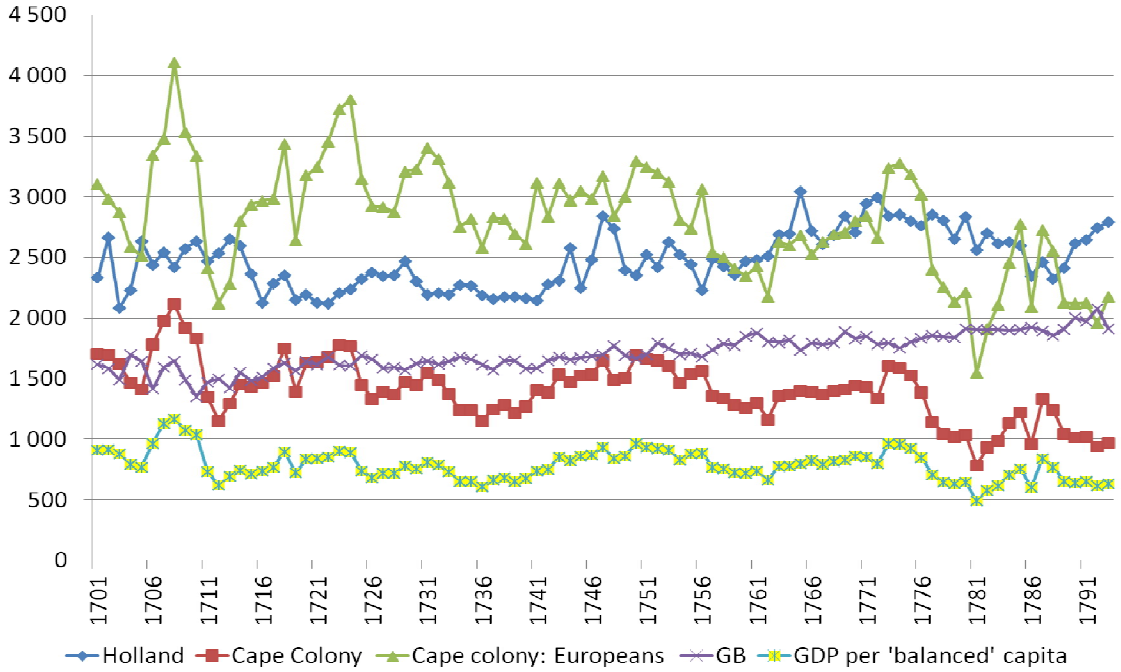

Figure 7. Estimates of the GDP per capita in the Cape Colony (total population and Europeans only) compared with Holland and Great Britain, in international dollars of 1990, 1701-1795
Sources: Van Zanden and Van Leeuwen 2012; Broadberry et.al. 2011; own calculations.

6. THE EMERGENCE OF THE CAPE ECONOMY, 1652-1701

Our analysis above begins at the turn of the eighteenth century, yet the first Europeans had already settled Table Bay in 1652. And only five years later, in 1657, did the expansion of the area under European influence begin, with the release of nine Company servants to become farmers. Why not begin the analysis earlier? There are several reasons for choosing 1701 as starting point: Van Duin and Ross's (1987) series begin in 1701 which is the only source with reliable, annual data on various agricultural and VOC activities; even less information exist for the period before 1701 about the size of non-agricultural sector such as VOC employment and secondary and tertiary industries; due to its small size, the variation in the size of the Cape population results in large – and unlikely – fluctuations in early estimates of GDP levels and growth; and, most importantly, a large amount of the early agriculture at the Cape was conducted not by free settlers but, illegally, by Company officials for their own pocket. Only at the start of the eighteenth century, after a petition by the free burghers to the Lords XVII in Holland, did these practices stop (through the recall of Governor Willem Adriaan van der Stel, the main culprit).

Regardless of these concerns, though, the high level of GDP per capita at the beginning of the eighteenth century needs explaining. What allowed Cape settlers to prosper so rapidly, given their initial low levels of income?

The first commander of the Cape station had a European blueprint of arable agriculture in mind when he requested the Lords XVII to allow the settlement of free burghers along the Liesbeeck River. These farmers, being mostly ex-Company servants who had lived at the

Cape for some time, would supply the crops needed for running the Cape station and for replenishing the passing ships. To do this, they had received most of their initial capital – seeds, cattle and horses – on loan from the Company, and each received a small plot of freehold land (roughly the size of what they could cultivate within the first three years). Schoeman (2010) notes the relatively attractive prospects of farming for Company employees at the Cape during the early years of settlement; most of them came from the bottom echelons of European society and had little opportunity of land ownership in Europe, while the slower economic progress in Holland after 1650, the bad wheat harvests of 1659-1662 and harsh European winters of 1658-1660 probably also increased their reluctance to return home.

The vision of a tightly knit community of crop farmers soon dwindled. Few had adequate knowledge of agriculture, and the notorious South-Easterly in the Cape often destroyed promising crops. In addition, several skirmishes with the Khoe made arable farming a risky venture. Many farmers, therefore, reverted to pastoral farming and hunting as primary source of income, or escaped on ships returning to Europe.

This fluctuating initial free burgher population is reflected in some of the early *opgaafrolle* available for this period.[6] The first nine farmers of 1657 increased to 25 by 1660 and to 50 by 1663 but fell to 44 by 1670. However, with a new commander in Simon van der Stel, the territory expanded East; Stellenbosch was founded in 1678 and in 1685 Drakenstein was also settled. A group of French Huguenots augmented settler numbers by nearly a third (and particularly the number of women in the Colony), so that by 1692 settler men numbered 394, women 168 and children 238 (a total of 800 individuals).

Household labour on farms was complemented by slave labour and European *knechts*. To keep farmers' input costs low, the arrival of slaves was encouraged by Cape commanders from early on; after the first noteworthy shipload from Angola, Shell (1994) documents that slave numbers increased from 10 to 89. Most of the slaves were initially used for Company activities, often on the properties of the wealthy Company officials; while Shell (1994) notes 245 slaves in the Colony in 1670, the *opgaafrolle* – tax records of the free burgher population only – recorded only 47 of them on settler farms. For Company servants, *knecht* employment was often a relatively easy way for these servants to acquaint themselves with Cape agriculture before venturing on their own. While *knechts* played a relatively minor role in the eighteenth century, their contribution was significant during the initial agricultural expansion – increasing in numbers from 42 in 1663, 83 in 1678 and 72 in 1692. Yet, farmers soon realised the benefits of slave labour vis-a-vis expensive European labour, and slave numbers on farms increased significantly over the last three decades of the seventeenth century to total 860 in 1700, greater than the number of settler and *knecht* men combined.

The early availability of *knecht* labour was largely the result of the growing size of the Company establishment. During the first three decades, the majority of the European population at the Cape was concentrated in and around the fort in Table Bay, so that the "Cape economy" nearly equated with Company activity. The number of Company servants varied considerably according to the ship arrivals and recuperating seamen. For example, records show 126 individuals in 1652, 170 in 1654 and 124 in 1660 (Schoeman 2010). The

[6] These *opgaafrolle* were transcribed and digitised by Hans Heese in the 1970s. See Fourie and Von Fintel (2009) for an overview.

size of the Company establishment increased roughly three-fold in the five decades before the eighteenth century, an important local market for the produce of the first farmers.

In addition to the growing local market, the passing ships provided a large, export market for Cape goods. This benefit was also perceived by Adam Smith, who wrote:

> "The Cape of Good Hope … is the half-way house, if one may say so, between Europe and the East Indies, at which almost every European ship makes some stay, both in going and returning. The supplying of those ships with every sort of fresh provision, with fruit and sometimes with wine, affords alone a very extensive market for the surplus produce of the colonists" (Smith 1776, Book IV.7.186).

Boshoff and Fourie (2008) find that between 1652 and 1700, an average of 32 ships per year anchored in Table Bay, and calculate a total 894 ship days per year (the total number of days a ship was stationed in the harbour). At least 6000[7] sailors and soldiers must have arrived annually at the Cape in search of food, drink and entertainment, less than the 9000 to 11000 proclaimed by earlier historians, but certainly enough to provide an extensive "export" market for local produce.

This export market fit the "staples thesis", first proposed by Harold Innis for the Canadian economy (Innis 1956). Innis argued that the growth of the Canadian economy was based on the growth of its staple exports, cod fish, furs and timber, to Europe. The same principle applied to the North American colonies, exporting wheat, furs, rice and tobacco, and sugar in the colonies of the Caribbean. While the Cape did not produce exports for the European market[8], the European ships created an export market that, because of geography, only Cape farmers could serve, producing predominantly wheat, meat and wine (Boshoff and Fourie 2010). And even though the Company acted as a merchant middle-man, skimming off what would have been very high profit margins, low input costs and relatively low transport costs (at least during the end of the seventeenth century and beginning of the eighteenth century when most agriculture occurred was west of the first mountain ranges) most certainly allowed the average farmer to earn positive profits. With these, settlers imported European manufactured goods or reinvested on the farms, often in the form of slaves, as is evidenced in the probate inventories these settlers left behind (Fourie 2011).

7. LINKS TO THE 20TH CENTURY: WHAT HAPPENED BETWEEN 1795 AND 1910?

In order to get the 'big picture' of long term economic progress in South Africa, we link our eighteenth century estimates to the figures of GDP per capita of South Africa today. For the period after 1946 the South African Reserve Bank has published a set of estimates of the national accounts, covering the whole period 1946-2009 (SARB 2011). For the period before 1946 the estimates are already somewhat problematic. In 1960 the Bureau of Census and Statistics published a jubilee issue containing an overview of statistics for the period

[7] 71% of all ships arriving in Cape Town were of the "Spiegelschip"-type, carrying an average of 200 passengers.

[8] Some produce were later in the eighteenth century exported to markets in the East, but rarely to Holland. The only exception was Constantia wine, which was much sought-after in Europe.

since the Union of 1910, which has a set of estimates of nominal GDP for the 1910-1960 period, but no series in constant prices (Bureau of Census and Statistics 1960). It also contains a consumer price index, but when this is used to deflate GDP, an implausibly large deterioration of GDP per capita between 1910 and the mid 1920s is found. For the period 1910-1924 we therefore rely on the estimates of GDP per capita published by Schumann (Schumann 1938) in his pioneering book on business fluctuations in the South African economy.

Before 1910 we enter still largely uncharted territory. Fortunately, new archival research by Greyling, Lubbe and Verhoef (2010) has provided first estimates of GDP of the Cape Colony between 1850 and 1910, which can be linked to the estimates for the twentieth century.[9] For the first half of the nineteenth century we use data on agricultural output, the structure of the population and urbanization to get a first, very tentative idea about changes in GDP. After 1795 the new regime(s) continued to collect detailed information on the output of the agricultural sector (for, as usual, tax purposes), and on the size and structure of the population. For a number of years (1804-1822, 1826, 1829, 1831, 1840, 1843, 1847 and 1850) we could collect this information, and estimate output of the largest sector of the economy in the same way as we did for the 18th century. The rest of the economy was estimated on the basis of the population of Cape Town and on the share of industry and services as sources of employment in the rest of the colony (found in the population censuses).[10] While the estimates for the nineteenth century are still preliminary, they do offer the opportunity to link our eighteenth century measures with those of the modern South Africa. Figure 8 provides a first snapshot of more than 300 years of per capita economic growth in the Cape Colony and South Africa in 1990 dollars.

Figure 8 reveals a steady decline in the per capita income until roughly the discovery of diamonds in the 1860s. Thereafter, rapid expansion occurs in the Cape Colony until Union in 1910. The South African GDP per capita is slightly below the level of Cape Colony GDP per capita in 1910, which is to be expected, given the longer period of capital formation in the Cape. South African GDP per capita, on the back of large increases in the value of gold, increased rapidly after the 1930s until the period of international isolation in the 1970s. After a new democratic dispensation in 1994, per capita growth resumed.

[9] The Geyling, Lubbe and Verhoef (2010) estimates use the expenditure and (partially) the output approach; we adjust their estimates to make them consistent with our output-based estimates for the 19th century, and use the CPI by De Zwart (2011) to deflate the series.
[10] Sources: NA SA, opgaafrolle I/5, no. 442; Neumark (1956), and from the mid 1830s onwards the Bluebooks of the Cape Colony.

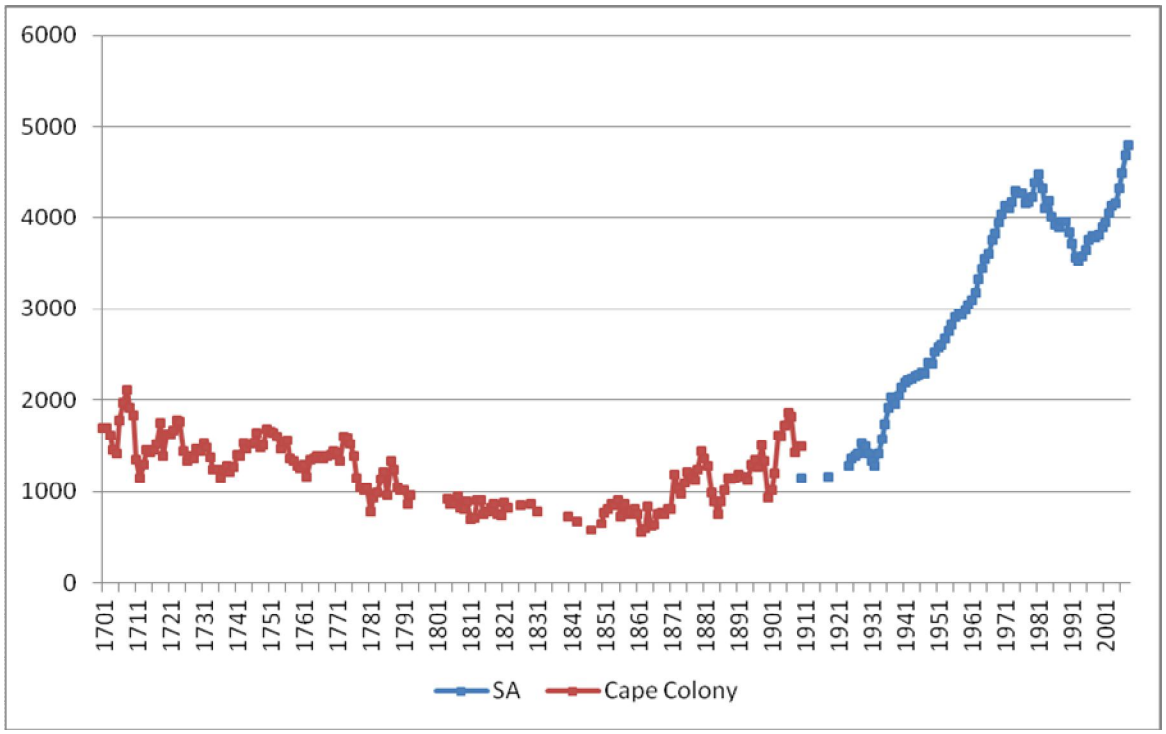

Figure 8: GDP per capita of Cape Colony (1701-1910) and SA (1910-2009) in 1990 dollars

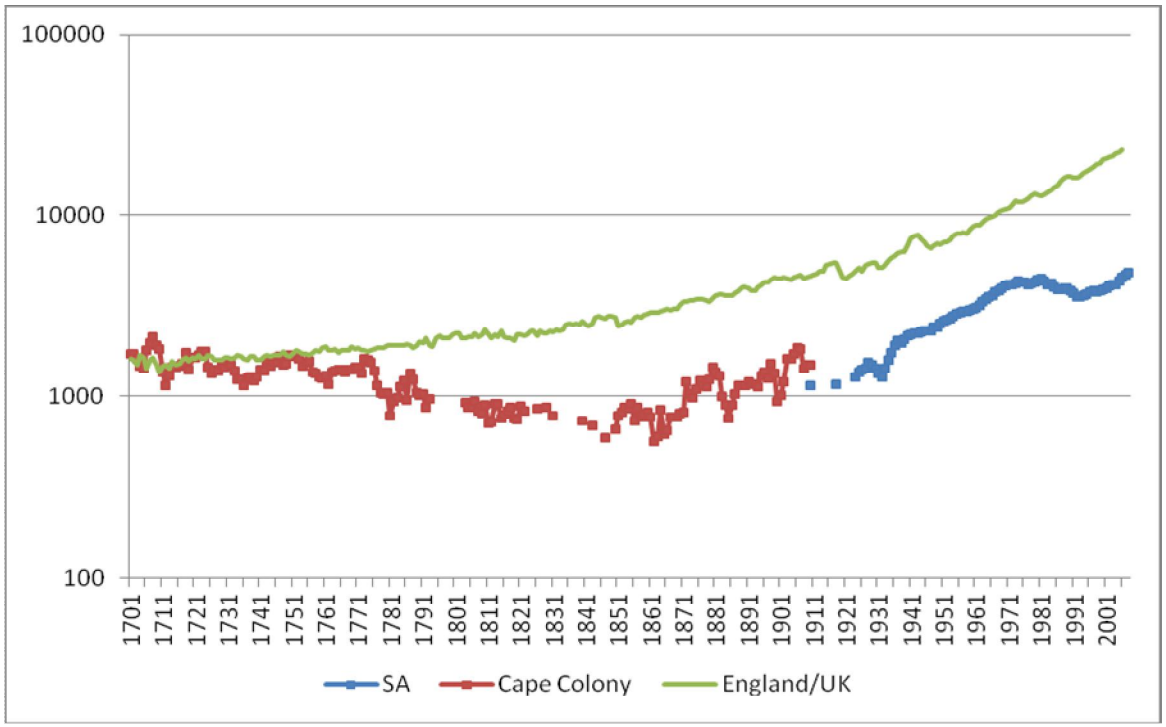

Figure 9: Comparing Cape Colony/South African GDP per capita with that of England/UK

Sources: This study and Maddison 2003 and his website at http://www.ggdc.net/MADDISON/oriindex.htm

Figure 9 plots the GDP per capita of South Africa with that of England/UK (taken from Maddison 2003). While initial GDP per capita levels seem to equate or even surpass that of the English, the relative decline in Cape Colony's GDP per capita for the century from 1770 to 1870 resulted in a large divergence between the two series. After the discovery of minerals in South Africa's interior, GDP per capita levels seemed to narrow the gap until the 1970s, when Apartheid policies and international sanctions derailed South Africa's convergence trajectory.

Compared to the BRIC countries (Brazil, Russia, India and China) for which data are available, South Africa maintained a higher level of GDP per capita until the mid-twentieth century (Figure 10). The Soviet Union overtook South Africa during the 1940s and Brazil during the 1970s, while China only managed to do so in 2002.

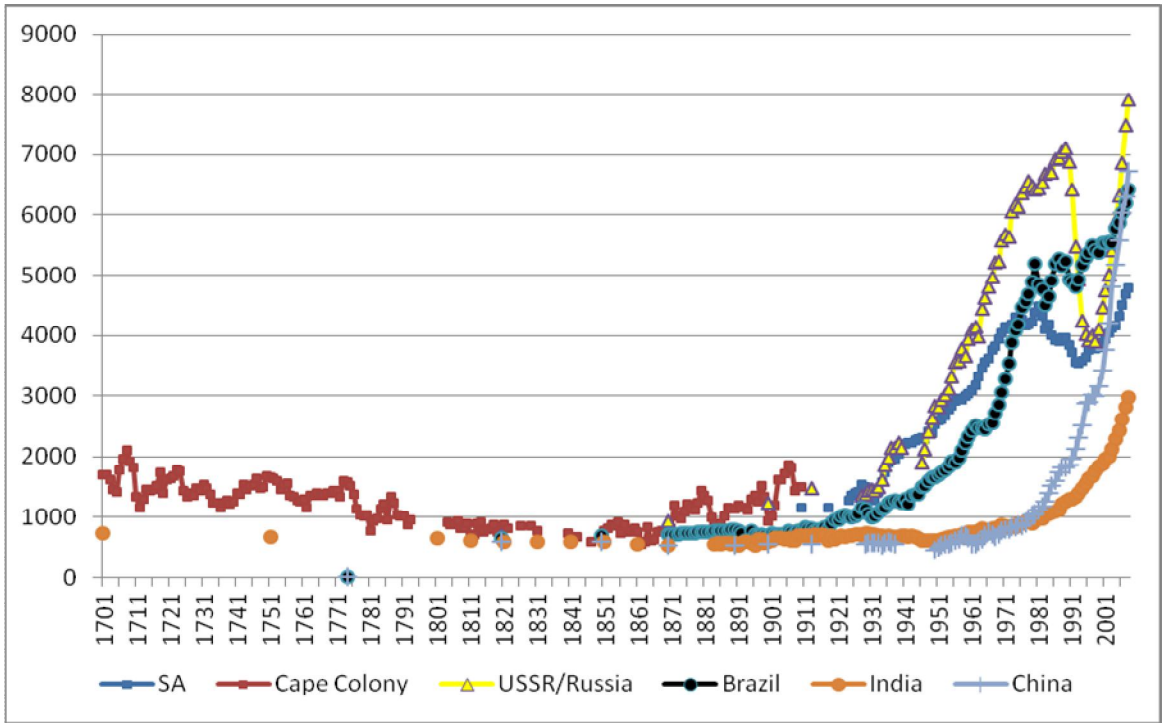

Figure 10: Comparing Cape Colony/South African GDP per capita with the BRIC countries
Sources: this study and Maddison 2003 and his website at http://www.ggdc.net/MADDISON/oriindex.htm

8. CONCLUSION

The Dutch Cape Colony offers a wealth of quantitative sources that allow the estimation and comparison of eighteenth century incomes per capita. The results reported here show that the average Cape inhabitant (including slaves and those Khoe that participated in the settler economy) reached a high level of GDP per capita comparable to the most affluent societies of the time: Holland and England. The reason for this was twofold: a strong demand for Cape products by the passing European ships in Table Bay, and a large slave society that increased productivity and caused a low dependency ratio. Comparative figures into the

nineteenth century, however, show that the Cape was unable to maintain its high levels of per capita income; in fact, for the century following the Industrial Revolution in England, the Cape economy declined in per capita terms. The reasons for this decline in per capita levels remain less well understood. The use of slave labour with little incentive or ability for technological innovation and spill-over, and with direct consequences for the distribution of income and the evolution of economic institutions, may begin to explain the lower growth trajectory and the eventual divergence from other affluent eighteenth century societies.

REFERENCES

ALLEN, R. (2001). "The Great Divergence in European Wages and Prices from the Middle Ages to the First World War." Explorations in Economic History **38**(4): 411-447.

ALLEN, R., J.-P. BASSINO, D. MA, C. MOLL-MURATA and J.-L. VAN ZANDEN (2011). "Wages, Prices, and Living Standards in China,1738-1925: in comparison with Europe, Japan, and India." Economic History Review, 64(s1), pages 8-38.

BOSHOFF, W. H. and J. FOURIE (2008). "Explaining the Ship Traffic Fluctuations in the Early Cape Settlement: 1652-1793." South African Journal of Economic History **23**: 1-27.

BOSHOFF, W. H. and J. FOURIE (2010). "The significance of the Cape trade route to economic activity in the Cape Colony: a medium-term business cycle analysis." European Review of Economic History **14**(3): 469-503.

BROADBERRY, S., B. CAMPBELL, A. KLEIN, M. OVERTON, B. VAN LEEUWEN. (2011). British economic growth, 1300-1850: some preliminary estimates, Presented at the workshop Quantifying Long Run Economic Development in Venice, 22-24 March 2011.

BRUNT, L. (2008). Property Rights and Economic Growth: Evidence from a Natural Experiment. CEPR Discussion Papers No. 6404. London, Centre for Economic Policy Research.

BUREAU OF CENSUS AND STATISTICS (1960). Union Statistics for Fifty Years: jubilee issue. Pretoria.

DE KOCK, M. H. (1924). Economic History of South Africa. Cape Town, Juta.

DE ZWART, P. (2011). Real wages at the Cape of Good Hope: a long-term perspective, 1652-1912. Stellenbosch, Economic Society of South Africa conference.

DU PLESSIS, S. and S. DU PLESSIS (2012). Happy in the service of the Company: the purchasing power of VOC salaries at the Cape in the 18th century. *Economic History of Developing Regions*. Forthcoming.

FEINSTEIN, C. (2005). An Economic History of South Africa. Cambridge, Cambridge University Press.

FOURIE, J. (2012). The remarkable wealth of the Dutch Cape Colony: measurements from eighteenth century probate inventories. *The Economic History Review*. Forthcoming.

FOURIE, J. and D. VON FINTEL (2010). "The dynamics of inequality in a newly settled, pre-Industrial society: Evidence from Cape Colony tax records." Cliometrica **4**(3): 229-267.

GREEN, E. (2010). Slavery and 'free' labour: Critical reflections on labour relations on wine and wheat farms in 18th century Western Cape. San Fransisco, African Association's annual meeting.

GREYLING, L., E. Lubbe and G. Verhoef. (2010). Savings and economic growth in South Africa, Paper presented at ERSA/FRESH Conference, Stellenbosch November 2010.

GUELKE, L. and R. Shell (1983). "An early colonial landed gentry: land and wealth in the Cape Colony 1682-1731." Journal of Historical Geography **9**(3): 265-286.

INNIS, H. (1956). Essays in Canadian Economic History. Toronto, University of Toronto Press.

MADDISON, A. (2003). The World Economy: Historical Statistics. Paris, OECD.

NEUMARK, S. D. (1956). Economic influences on the South African frontier, 1652-1836. Stanford, Stanford University Press.

PENN, N. (2005). The Forgotten Frontier: Colonist and Khoisan on the Cape's Northern Frontier in the Eighteenth Century. Chicago, Double Storey Press and University of Ohio Press.

RANSOM, R. and R. SUTCH (1977). One Kind of Freedom: The Economic Consequences of Emancipation. New York, Cambridge University Press.

SOUTH AFRICAN RESERVE BANK (2011). Quarterly Bulletin, South African Reserve Bank.

SCHOEMAN, K. (2010). Die Bosmans van Drakenstein. Persoonlike dokumente van die familie Bosman van Drakenstein, 1705-1842. Pretoria, Protea Boekhuis.

SCHUMANN, C. G. W. (1938). Structural Changes and Business Cycles in South Africa, 1806-1936. London, P.S. King and Son.

SCHUTTE, G. (1980). Company and colonists at the Cape. The Shaping of South African Society, 1652-1820. R. Elphick and H. Giliomee. Cape Town, Longman Penguin Southern Africa.

SHELL, R. C.-H. (1994). Children of Bondage: a social history of the slave society at the Cape of Good Hope, 1652-1838. Hanover, Wesleyan University Press.

SLEIGH, D. (1993). Die Buiteposte: VOC-buiteposte onder Kaapse Bestuur, 1652-1795. Pretoria, HAUM.

SMITH, A. (1776). The Wealth of Nations. E. Cannon. London: 1904, Methuen & Co., Ltd.

SUTCH, R. (2006). National Income and Product. Historical Statistics of the United States: Earliest Time to the Present. S. B. Carter, S. S. Gartner, M. R. Haineset al. New York, Cambridge University Press.

TRAPIDO, S. (1990). "From Paternalism to Liberalism: The Cape Colony, 1800-1834 " The International History Review **12**(1): 76-104.

VAN DUIN, P. and R. ROSS (1987). The Economy of the Cape Colony in the 18th Century. Leiden, The Centre for the Study of European Expansion.

VAN ZANDEN, J. L. and B. VAN LEEUWEN (2012). "The Character of Growth before Modern Economic Growth: The GDP of Holland between 1347 and 1807." Explorations in Economic History, 49, 2, 119-130.

DATA APPENDIX

Estimates of GDP of the Cape Colony, 1701-1795

The availability of sources for estimating the national accounts of the Cape Colony in the 18th century are almost all the result of the activities of the Dutch East India Company (VOC) there. The VOC was a large bureaucratic organization, which kept detailed records of its activities and also tried to tax its subjects in order to raise revenue for the local (VOC) government. In the Cape they were quite successful in implementing all kinds of taxes on, for example, agricultural output and assets (such as livestock). Moreover, these sources have been studied very carefully by many (economic, social and political) historians; for reasons that are not entirely clear, interest in the eighteenth has been much larger than in the (first half of the) nineteenth century. In particular the work by Van Duin and Ross (1987) should be mentioned here, because they ask the same questions as we do in this paper (how much did the economy grow during the eighteenth century?), but without putting their data into the framework of national accounts, or using the concept of GDP. But we have profited enormously from the data they collected and the discussion of their reliability and limitations of the sources concerned.

The approach used for estimating GDP is via the output-side of the economy: we have tried to estimate the value added in agriculture (by far the largest sector of the economy), industry and services (the VOC and 'other services'). The first step is, however, to establish the size of the population and the structure of the labour force.

POPULATION

There are reliable series of European population (Van Duin and Ross 1987) and of the number of slaves (Shell 1994: 444-447). The number of Khoesan active in the economy of the Cape is more difficult to establish, as they were not officially enumerated during the 18th century. From 1817, however, the 'Hottentots' are included in the annual *opgaafrolle* (see NA SA, *opgaafrolle* I/5, no. 442). Their number then was 22,760, compared with 31,373 slaves, and a total population of 93,279. Qualitative sources suggest that they were hardly integrated into the Cape economy during the first half of the 18th century, but that they began to play a larger role after about 1740 or 1750. This is confirmed by the records of the Cape Court of Justice records. The number of Khoesan appearing in the Court of Justice in Cape Town increased significantly after the 1750s, suggesting their increased participation in the Cape economy. We use the share of Khoesan over the total number of individuals appearing in the Court of Justice records as a proxy for their labour force participation. Figure 1 in the text highlight this contribution.

OUTPUT: Agriculture

The Cape Colony mainly produced three commodities: wheat, wine and meat, all taxed and regulated by the VOC. These three commodities covered a very large part of agricultural output; for example, no wool was produced, and only in the nineteenth century did the production of tallow, candles and soap (made from the fat of sheep) become more important. There was a small production of butter, which we also included in the estimates (for the period after 1754 exports of butter are given by Van Duin and Ross, which have been included in the output estimates). The evolution of these three sectors has already been analysed by Van Duin and Ross (1987). They also suggest a number of corrections for under registration of the tax-related sources, which we have adopted.

OUTPUT: Wheat

We constructed two series: (1) using the output estimates published by Van Duin and Ross (1987), including the correction factors they estimated (this series also includes the rather marginal output of barley and rye), and (2) estimating the demand for wheat on the basis of the population estimates (adults were assumed to consume 2.5 mud per capita, children 1.25 mud), the number of ships visiting Cape Town (assuming that they bought 40 mud per ship), and the exports of wheat, again from Van Duin and Ross (1987). Both series show the same trend; we took their average to estimate net wheat output.

OUTPUT: Wine

Van Duin and Ross (1987) produce a series of wine output in *leggers*, but also make the point that this only included wine marketed in Cape Town and/or sold to the VOC, not consumption in the countryside. We calculated average consumption of wine of the inhabitants of the city between 1748 and 1795 (for which data on exports of wine are also available): the average for this period was .38 *leggers* per capita per year (about 221 litres). We assumed that consumption in the countryside was lower, at .30 *leggers* per year (174 litres), and added rural consumption to the net production estimates to get total output of wine.

OUTPUT: Meat

Again two approaches are possible: the output can be estimated on the basis of the development of the number of livestock (cattle and sheep), corrected for under representation of the *opgaafrolle* via a comparison with the number of cattle and sheep as registered in the Inventories (see Fourie 2011 for a discussion of the discrepancy between the *opgaafrolle* and the inventories). Van Duin and Ross (1987) also present (for 1780 and 1790) estimates of the consumption of meat (of mutton and beef) based on a number of sources. This method (assuming constant consumption per capita and constant exports of meat per ship visiting Cape Town) can also be used to create a series of meat consumption. The data for 1780 and 1790 show that almost 80% of meat output consisted of mutton, and that an average sheep weighed/produced 42 pounds and an average cow 300 pounds. Our best guess estimate for meat output was again the average of the two series (output and consumption).

Capital formation in agriculture: livestock, land, vines

The fourth part of the output of the agricultural sector consists of the increase in the number of livestock (including horses), the cultivated area (sown with wheat or other crops) and the increase in the number of vines. Detailed data for all three are given by Van Duin and Ross (1987) and we used the same correction factors to amend for under-registration as used in the estimates of meat production.

Prices of agricultural commodities

We used prices as received by farmers: meat prices (from Van Duin and Ross 1987), wheat prices (Van Duin and Ross 1987) and wine prices as registered in the inventories (Fourie 2011). More problematic were prices of livestock, vines and land. We assumed that the prices of an extra 'mud' of land that was added to the cultivated area was twice the value of the seed that was used in it (Van Duin and Ross give detailed figures of yield ratios and amounts of seed used in wheat production). The cost of investing in vines was derived from the 'business model' of a wine farmer presented by Barrow (II, 113-123) – we had to

assume that this price remained the same during the 18th century. The value of the investments in cattle and sheep was derived from the value of the meat.

VOC sector

VOC income consisted of (1) wages and salaries earned by VOC employees (2) the income in kind received by such employees and by the slaves working for the VOC (3) the income earned by those employees from their own trading activities and (4) the income earned by the VOC from imports and exports to the Cape Colony. Data for (1) are readily available (Van Duin and Ross 1987). On the basis of the estimated costs of a budget of a Cape Town labourer the income in kind could also be estimated. It is more difficult to estimate the proceeds from other activities carried out by VOC employees, but we do know how much money they transferred back to the Netherlands (in the form of *wissel* transfers); these *wissel* transfers increased a lot during the 18th century, a trend commonly attributed to the increase in semi-legal activities by VOC employees. We have therefore assumed that 50% of the *wissel* transfers resulted from semi-legal incomes they acquired, and have to be added to their income (the other 50% may be related to agricultural activities – investment in houses or land or vineyards – the total value of the *wissel* transfers should therefore not be included here). The final part of the VOC income can be estimated on the basis of what is known about VOC sales in the Cape and VOC exports from the Cape (Van Duin and Ross 1987); we assume that the value added of the VOC station is 10% of gross imports and 10% of gross exports.

Rest of the economy

The rest of the economy consists of a variety of activities: (1) trade not covered by the VOC, mainly the slave trade. (2) A very large sector was the sale of wine and other consumption goods to visiting sailors and the population of Cape Town. We can estimate the difference between the price of wine as received by the farmer and as charged to the consumer (the latter series from De Zwart 2011), which can be multiplied by the estimated amount consumed in the city. (3) We also assume that bakers and butchers added 10% value to the domestic consumption of wheat and meat. (4) Construction activity was quite important in this rapidly growing economy: we know the number of new applications for leases from 1712 onwards (but during the first years numbers are too high – probably due to a backlog in applications), which gives information on new farms set up in the countryside; we can also estimate population growth in Cape Town, which gives an indication of rising demand for houses there; combining those indices gives a very rough proxy of building activity (which has also been included in the estimates of the level of investment). The rest of the economy consisted mainly of craftsmen (as the census of 1732 shows); we estimated their income as the wage income that would be earned by similar craftsmen employed by the VOC.

Deflator of GDP: weighted average of (1) price index of three agricultural cmmodities (wheat, wine and meat) and CPI as constructed by De Zwart (2011); CPI represents VOC and 'rest of the economy', agricultural price index represents agriculture. Base year 1701=10. Results are: GDP per capita series in constant prices of 1701. Also estimated: average income per European, assuming that Khoe and slaves only receive a subsistence minimum-income (as calculated by De Zwart 2011).

Comparison with European (Holland, England) income levels

We now know the income per capita in Cape guilders in 1701-1794. We can also compare the purchasing power of the Cape guilder with the Dutch guilder (or the English pound),

because we know what the costs are of a minimum basket of consumption goods in the three countries from research by Allen (2001), Allen et al (Allen, Bassino et al. 2011) and De Zwart (2011). We use these implicit PPPs of the real wage literature to convert the purchasing power of Cape guilders into that of the Dutch guilder, making possible of a direct comparison of their real income levels. Moreover, the Dutch series is continuous until 2009, and can be expressed in dollars of 1990 (using the Maddison framework).

Table 1: Gross domestic Product per capita (1990 international Geary-Khamis dollars) for the Cape Colony and South Africa

Year	Cape colony	Year	Cape colony	Year	South Africa	Cape colony	Year	South Africa
1701	1702.7	1801		1901		1008.5	2001	3950.3
1702	1699.5	1802		1902		1204.0	2002	4048.0
1703	1618.6	1803		1903		1613.4	2003	4129.6
1704	1463.4	1804	917.1	1904		1612.8	2004	4156.1
1705	1411.4	1805	869.1	1905		1721.4	2005	4315.9
1706	1783.8	1806	869.4	1906		1858.8	2006	4502.7
1707	1973.3	1807	942.5	1907		1824.3	2007	4689.1
1708	2112.1	1808	825.3	1908		1431.9	2008	4793.3
1709	1919.5	1809	806.4	1909		1500.0		
1710	1831.9	1810	891.4	1910	1151.1	1500.0		
1711	1347.5	1811	707.0	1911	N/A			
1712	1150.9	1812	716.1	1912	N/A			
1713	1293.3	1813	901.7	1913	N/A			
1714	1451.8	1814	913.0	1914	N/A			
1715	1432.7	1815	758.7	1915	N/A			
1716	1464.2	1816	791.0	1916	N/A			
1717	1521.8	1817	822.3	1917	N/A			
1718	1749.7	1818	872.3	1918	1162.6			
1719	1394.2	1819	754.5	1919	N/A			
1720	1630.9	1820	745.5	1920	N/A			
1721	1637.4	1821	879.8	1921	N/A			
1722	1677.4	1822	820.8	1922	N/A			
1723	1775.0	1823	N/A	1923	N/A			
1724	1764.6	1824	N/A	1924	1277.7			
1725	1448.0	1825	N/A	1925	1362.0			
1726	1333.6	1826	849.1	1926	1397.5			
1727	1392.5	1827	N/A	1927	1424.7			
1728	1369.8	1828	N/A	1928	1533.1			
1729	1474.5	1829	860.8	1929	1497.1			
1730	1448.1	1830	N/A	1930	1413.1			
1731	1543.6	1831	780.4	1931	1334.6			
1732	1491.0	1832	N/A	1932	1284.0			
1733	1372.2	1833	N/A	1933	1422.7			
1734	1238.2	1834	N/A	1934	1577.0			
1735	1242.0	1835	N/A	1935	1746.5			
1736	1149.9	1836	N/A	1936	1912.2			
1737	1248.3	1837	N/A	1937	2038.1			
1738	1283.8	1838	N/A	1938	1956.1			

1739	1213.4	1839	N/A	1939	2053.3
1740	1269.0	1840	735.5	1940	2144.6
1741	1403.4	1841	N/A	1941	2202.1
1742	1386.9	1842	N/A	1942	2226.0
1743	1534.1	1843	684.9	1943	2231.6
1744	1469.3	1844	N/A	1944	2265.1
1745	1527.0	1845	N/A	1945	2278.3
1746	1534.7	1846	N/A	1946	2311.0
1747	1650.7	1847	588.2	1947	2287.7
1748	1488.9	1848	N/A	1948	2414.1
1749	1507.3	1849	N/A	1949	2396.0
1750	1692.0	1850	654.0	1950	2534.8
1751	1658.9	1851	774.4	1951	2591.1
1752	1646.9	1852	812.0	1952	2619.0
1753	1606.4	1853	871.9	1953	2674.9
1754	1468.7	1854	847.6	1954	2763.3
1755	1539.7	1855	910.2	1955	2830.1
1756	1565.5	1856	733.1	1956	2913.8
1757	1358.5	1857	867.9	1957	2951.1
1758	1335.9	1858	759.3	1958	2939.0
1759	1280.0	1859	783.7	1959	2994.7
1760	1258.4	1860	811.9	1960	3041.5
1761	1299.3	1861	764.4	1961	3091.6
1762	1162.0	1862	563.0	1962	3178.6
1763	1355.3	1863	601.5	1963	3321.0
1764	1370.6	1864	839.5	1964	3449.9
1765	1396.3	1865	618.3	1965	3559.4
1766	1390.2	1866	642.6	1966	3615.0
1767	1365.6	1867	761.3	1967	3760.4
1768	1396.1	1868	769.4	1968	3818.9
1769	1409.0	1869	760.4	1969	3946.2
1770	1438.6	1870	807.3	1970	4045.1
1771	1432.0	1871	809.4	1971	4134.9
1772	1335.1	1872	1192.8	1972	4109.4
1773	1606.7	1873	1027.8	1973	4175.2
1774	1589.1	1874	979.5	1974	4299.4
1775	1524.3	1875	1091.9	1975	4270.9
1776	1384.7	1876	1220.9	1976	4267.1
1777	1144.1	1877	1151.0	1977	4155.3
1778	1046.8	1878	1123.3	1978	4174.1
1779	1020.4	1879	1245.1	1979	4231.6
1780	1038.2	1880	1438.9	1980	4390.0
1781	782.7	1881	1359.7	1981	4480.5
1782	932.9	1882	1288.0	1982	4323.0
1783	987.3	1883	990.3	1983	4111.9
1784	1133.5	1884	897.4	1984	4185.8
1785	1218.6	1885	758.0	1985	4006.5
1786	955.5	1886	895.0	1986	3911.7
1787	1331.0	1887	1021.3	1987	3897.3
1788	1237.4	1888	1151.8	1988	3964.0

1789	1045.2	1889	1140.0	1989	3955.6
1790	1011.3	1890	1148.4	1990	3833.8
1791	1021.3	1891	1195.9	1991	3715.9
1792	869.9	1892	1166.8	1992	3566.1
1793	958.7	1893	1155.9	1993	3534.0
1794	N/A	1894	1123.3	1994	3583.9
1795	N/A	1895	1293.4	1995	3645.5
1796	N/A	1896	1350.8	1996	3752.0
1797	N/A	1897	1263.5	1997	3801.0
1798	N/A	1898	1516.8	1998	3777.2
1799	N/A	1899	1332.3	1999	3807.7
1800	N/A	1900	937.2	2000	3890.1

Source: See appendix.