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# What drove the profitability of colonial firms?

## Labour coercion and trade preferences on the Sena Sugar Estates (1920–74)

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**Abstract:** The magnitude of returns to colonial-era investments in Africa has been addressed in an extensive literature, as have the nature and legacies of extractive colonial institutions. However, the link between these institutions and the profitability of firms remains unclear. We reconstruct the annual financial records of Sena Sugar Estates in Portuguese East Africa (today's Mozambique) over the period 1920–74 to probe the contributions of forced labour and preferential trade arrangements to the performance of the firm. We show that Sena Sugar Estates achieved stable and solid returns to capital, comparable in size to a range of domestic UK firms. Counterfactual simulations suggest that the firm's profitability was highly dependent on sustained access to cheap labour, but generally was not so dependent on trade preferences. At the same time, a production function analysis suggests that higher reliance on rents from forced labour was associated with lower total factor productivity at the Estates. This helps explain why extractive institutions did not translate into 'super-profits'.

**Key words:** Mozambique, sugar, forced labour, trade preferences, colonial era

**JEL classification:** J24, N77, N87

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# 1 Introduction

> Could the incomes expended in the Home Counties and other large districts of Southern Britain be traced to their sources, it would be found that they were in large measure wrung from the enforced toil of vast multitudes of black, brown or yellow natives. (Hobson 1902: 159–60)

Scholarly debates over the rationale and economic returns to investments in colonial enterprises overseas can be traced back at least to Hobson (1902) and Lenin (1917). Sidestepping questions of fidelity, a stylized version of 'Hobson–Lenin' goes as follows: by the late 19th century, elites in Western Europe had accumulated significant investible savings; declining domestic returns on these savings, coupled with the prospect of higher returns elsewhere, made the overseas export of capital attractive; the need to secure these investments and stabilize returns stimulated the extension of political and military power abroad, evolving into 'full' colonialization after the Conference of Berlin; exercise of sovereign power in the colonies in support of metropolitan interests included establishing surplus-extraction institutions such as land expropriation, labour coercion, and monopolistic trade concessions; in turn, this permitted investors from the metropole to realize sizeable returns on their colonial interests. Or, even more simply: capital exports + extractive colonial institutions = higher returns to capital overseas than at home.[1]

One line of critique of this thesis concerns the magnitude of returns to colonial investments. A large number of studies have sought to test Hobson–Lenin by comparing returns received by external investors in colonial enterprises with those from domestic (metropolitan) enterprises. Many of these find that colonial equities did perform better than comparable domestic stocks, but their returns were not extraordinarily high and often were accompanied by higher volatility. In fact, when the considerable number of failed colonial ventures are accounted for, some scholars conclude that colonial investments did not materially outperform comparable domestic assets, at least after the late 19th century (Davis and Huttenback 1988; Rönnbäck and Broberg 2019).

The moderate performance of colonial investments stands in tension with the proposed availability of rents associated with colonial institutions, such as labour coercion.[2] Despite significant attention within economics and history to the nature and legacies of such colonial institutions (e.g., Austin 2010; Grier 1999; Mamdani 2018; Nunn 2007; Thomas 1973; Weeks 1971), it remains unclear precisely how they affected the profitability of colonial firms in different sectors. Largely reflecting data limitations, the vast majority of existing studies of the economic performance of colonial firms rely on returns to equity holders across a cross-section of publicly listed firms. As we argue, these external returns constitute a noisy measure of underlying profitability and are not directly informative about specific drivers of financial performance.

To shed light on the sources of profitability of colonial investments, we adopt a firm-level perspective. We focus on Sena Sugar Estates (SSE), located in Portuguese East Africa (today's Mozambique) over the period from its inception in 1920 to the final complete year of colonial rule in 1974. SSE was one of the most successful and long-running sugar companies in the region. It was a significant source of raw sugar to Portugal, assured through preferential trading

[1] For versions of this thesis and discussion see: Cain 1985; Clemens and Williamson 2004; Eckstein 1991; Etherington 1982; Fieldhouse 1961; Gallagher and Robinson 1953; Harvey 2003; Stokes 1969; Winch 1965.

[2] Where 'rent' can be defined as income surplus to that which recipients would have received under competitive conditions.

arrangements. In line with experiences elsewhere in the Portuguese colonies (Anderson 1962; Keese 2012), for most of the period SSE also benefited from access to forced labour, which was legally abolished only in the early 1960s.

In this context, we ask three questions: (1) How profitable was SSE relative to other firms or asset classes?; (2) To what extent did extractive colonial institutions contribute to its profitability?; and (3) To what extent were these same colonial rents offset by higher costs or lower productivity? To answer these questions, we reconstruct the financial accounts of SSE using both original archive material and secondary sources, covering the main components of production costs (e.g. factor inputs) and revenues (e.g. prices and sales quantities). This allows us to estimate time series of various measures of external and internal profitability, such as the return on capital employed (ROCE). Compared with returns obtained by other firms and asset classes over the same period, we show that SSE's financial performance was solid and relatively stable over time, achieving an average annual direct real return on investors' capital of 4.1 per cent. This compares with average real returns of 7.0 per cent in 'risky' UK assets or under 1 per cent in 'safe' UK assets over the same period (from Jordà et al. 2019).

Next, we undertake a series of counterfactual simulations in the spirit of Toms and Beck (2007), varying specific factor prices and tracing their subsequent effects on profitability. These exercises show that in scenarios characterized by the absence of forced labour, SSE would have been (at best) significantly less profitable than it was in reality. And, while its profitability would not have been as significantly damaged on average by the absence of trade preferences, it would have been unlikely to survive without them in either the 1930s or the 1960s.

Finally, we undertake an econometric analysis of SSE's productivity. As argued elsewhere in economics, opportunities for rents may have a negative effect on productivity growth, such as by de-incentivizing innovation or encouraging flight to less productive activities. Austin and Uche (2007), for instance, show that sustained collusion between colonial banks in British West Africa reduced innovation around products offered to the local population. Meanwhile, low costs (high prices) in one area of the business may offset higher costs or risks elsewhere, implying no net benefit overall. Our production function analysis confirms that such mechanisms may have been operative. We find that higher rates of dependence on forced labour and, complementarily, a higher level of dependence on costly European labour were associated with lower overall multi-factor productivity at the firm.

SSE is a single case study; hence its findings cannot readily be generalized. Nonetheless, we conclude that in the context of Portuguese imperialism, rents based on colonial institutions were critical to the profitability and survival of the firm. In our case study, rents from labour institutions dominate. Moreover, the impact of these rents on firm-level productivity appears to have been perverse. This dual-faced character of colonial rents goes some way to explaining the moderate performance of SSE relative to domestic UK firms, as well as its rapid failure on Independence.[3]

## 2 Returns to colonial capital

Historical rates of return to capital fall into two overlapping but distinct categories: (1) corporate profits earned by firms, which comprise net earnings on employed capital valued at par (for the

[3] We recognize that many other factors played a role in SSE's demise, but the absence of a cadre of black Mozambican managers and technical staff was one of them.

evolution of this definition see Toms 2010); and (2) returns to investors and others with residual claims on these firms. The latter include some returns deriving directly from corporate profits, such as dividends and fixed payments made to holders of interest-bearing securities; but they also include, and may even be dominated by, returns from changes in the prices of corporate stocks and/or bonds traded on secondary markets. Thus, returns to firms and to investors in them can be regarded as first- and second-order measures, respectively—i.e. all the elements of the second type either derive directly from or in some other way reflect the actual or anticipated future magnitude of the first.

Perhaps as a result of British economic historiography's pre-occupation since Cairncross (1935) with foreign investment's (or Empire's) overall balance sheet, and therefore with returns in their totality, the scholarly literature has been heavily dominated by studies of second-order returns.[4] While differing considerably in sample size and sampling methods, these second-order studies generally employ broadly similar sources (mainly London Stock Exchange records) and measures (including monthly or annual share price changes) and report results comparing colonial- and domestic-oriented companies using similar formats (deflated arithmetical or geometric means). From Lehfeldt (1913) onward, almost all note that returns to investors in the colonies were higher. But few reported spreads (differences in the magnitude of prices/returns) are spectacular, and in some cases they are not even statistically significant.[5] Similarly, studies comparing returns for investors on the Brussels Stock Exchange from Holland- or Belgium-based and Dutch or Belgian colonial companies also confirm higher returns to colonial versus metropolitan firms.[6]

The presence of a causal relationship running from colonial institutions to prices in local factor markets on to investor returns in colonial stocks has been proposed in a number of contributions (e.g. Beulens and Frankema 2016; Beulens and Marysse 2009).[7] However, the evidence base here is largely circumstantial. A key challenge is that, even if we assume that colonial firms efficiently took advantage of colonial rents (see Clarence-Smith 1985), the latter's impacts would be directly observable only in internal profits. Any pass-through to returns on individual stocks would be mediated at two levels. First, any pass-through of company profits to dividend payments would

[4] For reviews of studies covering first-order returns to colonial firms see Hopkins (1976, 1987) and for an outstanding recent contribution see Afrifa Taylor (2006).

[5] Lehfeldt (1913) gives 1905–09 rates of 3.6 per cent for UK annual returns and 3.9 per cent for colonial ones; Frankel (1967) gives 1919–63 rates of 5.3 per cent for UK annual returns and 7.4 per cent for South African mining investors. Davis and Huttenback (1982) give 1860–1912 rates of 10.8 per cent for UK annual returns and 13 per cent for British Empire ones; Grossman (2015) gives 1869–1928 rates of 7 per cent for UK annual returns, 11 per cent for those from 'Asia', and 14 per cent for those from 'Africa'; Rönnbäck et al. (2022) give a 1890–1969 rate of 7.8 per cent for UK annual returns in British Malaya, while a rate for investment in the UK over the same period, using the same sources as employed in Rönnbäck and Broberg (2019), would be 5.1 per cent. Similarly, but using Bank of England and UK Board of Trade data for 'net earnings abroad', Svedberg (1982) finds that in 1938–57, UK investors earned a return from less developed sterling-area countries around three times higher than from non-sterling ones—a spread that vanished in 1958–74. The only study showing higher or broadly similar UK returns over a prolonged period is that of Rönnbäck and Broberg (2019), who give 1900–69 rates for UK annual returns as 5 per cent vs. 3.9 per cent for African ones.

[6] Beulens and Marysse (2009) give 1889–1955 rates of 2.1 per cent for investor annual returns in Belgium and of 4.7 per cent in the Congo, while Beulens and Frankema (2016) give 1919–38 rates for investors on the Brussels Stock Exchange of 2.2 per cent for companies in the Netherlands and 5.4 per cent for those in the Dutch Indies. Two non-comparative studies calculate returns to Dutch investors in colonial Indonesia at an average annual rate around 17.5 per cent (1910–40) (Linblad 2018) or in average annual cash terms at around £9m (1926–38) (van der Eng 1998) but in neither case are their time series continuous.

[7] Rönnbäck and Broberg (2019) (and Rönnbäck et al. 2022) explain higher returns on colonial investments as a form of risk premium. However, they also link this to colonial rents, presumably as one source of risk. Limits on length prevent us from considering this argument in this paper.

be subject to company-specific policies and investment needs. Second, pass-through of dividend payments and other company results into stock prices would be influenced by the prices of other asset classes and general market conditions (sentiment).

In the more recent literature on second-order returns to colonial capital, a common justification for disregarding first-order sources is the problem of availability at scale of UK company historical profit/loss accounts and balance sheets—i.e. large, continuous, and standardized databases are not available. The only public databank for UK corporate financials before 1990 has no records from earlier than 1948.[8] Continuous corporate records for any length of time prior to this are probably confined to just a few hundred UK companies economy-wide and, as no comprehensive list exists, even tracing these is difficult.

A second justification for the focus on external returns is that, even where full records are available, frequent changes in financial disclosure rules and accounting conventions make problematic the construction of meaningful time series for certain variables, even for single companies. Yet, where they are available, reconstructing pre-1948 accounts in post-1948 terms is laborious rather than intractable (see below). Overall, though, neither this nor the existence of a comprehensive post-1948 database really compensates for the patchiness of earlier records. Any project to replace studies of returns to colonial capital based on second-order data by one based on first-order data is likely to capture only the final years of British colonialism.

In sum, both as a reflection of the overriding interest in the magnitude of returns and the limited extent to which second-order measures accurately reflect underlying profitability, existing literature has not explicitly considered the extent to which the existence of extractive colonial institutions affected firm profitability. Our point of departure is that this can only be clarified by quantifying the financial contribution of specific rents against alternative counterfactuals. To do so requires not only considering different types of rents but also opening the 'black box' of first-order returns and of specific factor markets and prices. Because of the paucity of literature directly related to this objective, case studies are perhaps the most useful starting point.

Before proceeding, we note that colonial rents and their consequences are addressed in a largely separate literature within economics, that on the colonial origins of comparative development (e.g., Acemoglu and Robinson 2012; Acemoglu et al. 2001; Akyeampong et al. 2014; Nunn 2007). At least some of this literature's approach bears a resemblance to a stylized Hobson–Lenin thesis. In both cases rent-generating colonial institutions, including labour coercion, are seen as the source of colonialism's central economic legacy, whether this is 'superprofits' or 'low productivity equilibria' (see also Clemens and Williamson 2004). In both cases, again, the counterfactual is an idealized capitalist formation—for a stylized Hobson–Lenin, a free market characterized by competitive profits; and, for a stylized 'Acemoglu–Nunn', a liberal regime with secure property and good (non-racial) governance. For Hobson–Lenin the counterfactual is located in the metropole while for Acemoglu–Nunn it is found in those (few) colonies where low population density and a favourable 'disease environment' favoured settlement promotion as opposed to rent extraction. Furthermore, as with the literature on investment returns, studies of the colonial origins of comparative development tend to take a macro-level (aggregate) perspective and rarely make an explicit connection between rent-extracting institutions and firm dynamics (private profitability).

[8] The ESRC/University of Essex Databank of Company Accounts (originally called the Cambridge/DTI database) 1948–90, currently hosted by UK Data Service.

## 3 Colonial rents in Portuguese East Africa

We now turn to the specific historical context of our study, colonial Mozambique. Corresponding to Amin's (1972) observation regarding the tripartite division of Africa, private direct investors in Portuguese Africa benefited from rents deriving from a range of (partially) administered markets. However, as noted by Alexopoulou and Juif (2017), different tax–benefit regimes were applied in different regions of colonial Mozambique; and the extent of benefits from rents was therefore uneven across classes of companies and periods (Svedberg 1982).

### 3.1 Land rents

The Portuguese authorities recognized two categories of private direct investment: senior and junior concessions. Senior concessions were granted to a small number of approved direct investors in mining and transport, as well as later in energy and utilities. Mozambique's two 'sovereign' companies, the Mozambique and Niassa Companies, obtained a special category of senior concession—each covering two provinces—that included full judicial powers, rights to levy taxes, and obligations to settle Portuguese farmers and provide a wide range of public goods. All senior concessions had to operate as Portuguese entities, headquartered and liable for tax and other levies in Lisbon, irrespective of their ownership (da Silva and Neves 2020). Companies with junior concessions could be directly granted rights to occupy smaller areas (*prazos*) and could also negotiate sub-concessions from senior concessionaires. In these areas, they could levy taxes and generally carried over the obligations of seniors, but had no wider sovereign rights. Correspondingly, they could be foreign domiciled as well as owned, and (at least until 1954) remit abroad their profits in full (Mata 2007).[9]

In common with most colonial systems, the only landowner in Portuguese Africa was the metropolitan state; and, in all cases, concessions could be abrogated if obligations to the state were not met. Senior concessionaires had to pay for their concessions at rates of 40 per cent and upward of their assessed income. In Angola, Diamang initially paid a profit tax of 40 per cent, rising to 50 per cent in 1937, as well as from 1946 having to supply the Portuguese state with a permanent line of credit (Cleveland 2015). Sovereign companies appear to have had to remit a similar level of their assessed head/hut tax income to the state. Junior concessionaires gained the same income source and paid around the same rate when obtaining concessions directly (Vail and White 1980: 121).[10]

The peculiarities of this land market were twofold. First, the basis for the magnitude of ground rent was the size of the taxable population rather than natural soil fertility and 'improvements' (although these played a role in some circumstances). Second, participation was restricted to designated investors. The market otherwise functioned according to supply and demand. Land market 'rents'—in the sense of exploitation as opposed to ground rent—arose from tax farming, where concessionaires collected income in cash, kind, or labour but failed to uphold part or all of their other obligations.

Under Salazar the market in concession land was formally abolished through the abrogation of the Niassa Company concession (1926), the ending of the *prazo* system (1930–34), and the abolition

[9] Portugal taxed SSE's Mozambique operations for the first time in 1954 (SSE Report & Accounts [henceforth R&A] 1954) and it is assumed that this was general for junior concessionaires.

[10] When leasing them from senior concessionaires, they were charged this rate plus a mark-up of 10 per cent (Mata 2007). When sub-leasing them on a third-hand basis from other junior concessionaires, it seems likely that there was a further mark-up.

of the Mozambique Company's sovereign status (from 1932). By the mid-1930s all land formally reverted to the state, which also began direct collection of head/hut tax (*mussoco*). However, for those participants in the concession land market primarily motivated by access to labour, concessions were allowed to continue as *de facto* corporate labour reserves. Indeed, between 1928 and 1935, while SSE was classified in Lisbon as a junior concessionaire of the Mozambique Company[11] (Mata 2007), it doubled the size of its concession areas.[12]

### 3.2 Labour rents

Exploitative labour rents arose from obtaining labour at costs below those that would have applied in a competitive labour market. Such a market only became generalized in Mozambique in the wake of the abolition of forced labour in 1961, and even then imperfectly (Guthrie 2017). Prior to this, it represented either a residual means of obtaining labour (1890–1961) or a weak superimposition on forced labour institutions (ca. 1942–61). Forced labour was not unique to Mozambique (Cooper 1996), but its structural role and longevity were.

The legal basis for forced labour was established during the 1890s as the metropolitan government attempted to balance a perceived need for cheap labour against the international abolition of slavery (Jerónimo and Monteiro 2012). Its main plank was establishing a moral and legal duty to work for indigenous peoples (*os indígenas*). Concessionaires were granted the right to levy half of their *mussoco* in direct labour from 1892, and a legal obligation for African males aged 14 and over to work for private employers was introduced in 1899 (Vail and White 1980: 131–37), against payment at a nominal rate and subject to certain time limits and exclusions from eligibility covering perhaps 5 per cent of the population.

The part of *mussoco* payment levied in labour was typically *chibalo* (corvée), often worked off by women to fulfil concessionaires' public works obligation. The part paid in cash mostly derived from *contrato*—male forced labour for private employers, until the 1940s paid at rates that district administrations fixed against *mussoco*. In the 1926 and 1930 Labour Codes the minimum daily wage was benchmarked at between 1.0 and 1.5 per cent of the annual tax liability (see Table 1)—a rate that had applied from 1899 in Zambézia (Serra 1980). Thus, given standard contract lengths for paid work, not only *chibalo* but also a large part of *contrato* was unpaid.

Table 1: Relation between minimum wages and native taxes, SSE production areas

| | 1924 | 1930 | 1940 | 1950 | 1960 |
|---|---|---|---|---|---|
| Annual native (head) tax obligation | 0.85 | 1.55 | 1.45 | 1.75 | 2.00 |
| Daily minimum wage (MW) | 0.010 | 0.015 | 0.018 | 0.052 | 0.053 |
| Standard contract lengths at SSE | 156 | 78–104 | 156 | 156 | 156 |
| No. days at MW to fulfil native tax | 87 | 103 | 81 | 34 | 38 |

Note: financial values are stated in nominal decimalized GB£; native tax is *mussoco* (hut and/or head tax) in 1924, then total native tax (*mussoco* plus certain surcharges and personal tax on international migrant workers) for 1930–60; minimum wage is for male adults for Sofala (1924) and Zambézia (1930–60); standard SSE contract lengths are for Mopeia and Caia (Sofala) in 1924, and Luabo, Zambézia, otherwise.

Source: authors' construction based on Havik (2013: 191, graph 10), Head (1980: 91), and Vail and White (1980: 252).

The main components of the forced labour system remained constant between 1892 and its abolition in 1961. Most were identified by Ross (1925: 50–57) in his survey of native employment

[11] Along with the Luabo Company, the Buzi Company, and the Gorongoza Company, amongst others (Mata 2007).

[12] From 112,000 to 238,000 ha (SSE Register of Concessions, Hornung Papers [henceforth HP] Box 45).

in central Mozambique for the League of Nations, namely: censuses counting households by locality; regulations imposing annual *mussoco* obligations; round-ups for *contrato* and *chibalo* by police and chiefs; assembly of those captured into *ensaca* (consignments) at administrative posts; written contracts between labour conscripts and employers (or labour recruitment agents) witnessed by administrators; a deferred payment system;[13] and state punishment of evaders. Within a year of Ross's visit the last piece of the jigsaw, *cadenetas* (pass books disclosing whether the bearer had performed six months' contract labour in the previous year), were issued to all adult males (Cahen 2013).

The incidence of *contrato* changed over time. In Zambézia prior to 1928 the number of *contratados* never approached a majority of those legally obligated (Cahen 2013; Zamparoni 2007: 126). It was to rise steeply in 1928–31 before falling back until about 1939, after which it again rose steadily until in 1957, when over 93 per cent of Zambézia's obligated workers were recruited by private employers (Head 1980: 138). The second prolonged rise reflected a sustained wave of labour demand from Mozambican plantation agriculture, settler maize farms, tea estates, cotton concessions, mines, railways, construction, and sawmills. To facilitate its fulfilment, district administrations took over coordination of the forced labour supply from private labour recruiters, and introduced more systematic record-keeping and permanent employment of chiefs to tighten enforcement. Growth of labour demand and elimination of forced labour recruitment as a mainly private function was accompanied in 1942 by a law allowing *contratados* assembled at administrative posts to choose between potential employers. Implemented unevenly, this law nevertheless indirectly transmitted rising labour demand to wage levels and led to minimum wages now being set at levels calculated to dampen wage competition.[14]

Another class of labourers, *voluntários*, were also present. These were differentiated by entering contracts, presenting for employment, and receiving pay outside the *contrato* system, and usually by working distant from home. Often, their employment was associated with higher wages, specialization, repeat contracts, and creeping stabilization. Even in the early days, this group was small but important—e.g. making up a minimum of 5 per cent of Zambézia plantation labour from 1890 to 1910 (Vail and White 1980: 357). As competition for forced labour increased over time, so did their workforce share (Vail and White 1980: 314). However, most commentators from Anderson (1962) onwards have claimed that the main motivation for voluntary work was to meet *mussoco* obligations and avoid *contrato*, implying that associated wages remained below those that would have been found in a fully-free labour market. Essentially, as one colonial insider put it in 1947: 'Today, the native is not bought—he is simply rented from the Government, though he may have the status of a free man.' (Galvão 1947).

### 3.3 Rents from prices for goods

When discussing rents from prices of goods, Amin (1972) referred to those extracted through monopsony control over peasant cash crop exports and monopoly control over consumer goods imports. But in Portuguese East Africa, with its general suppression of peasant cash crop production, the main rents from trade devolved to plantation companies, chiefly those producing sugar exported to metropolitan Portugal. These exports occurred under a preferential import regime that included a ban on sugar beet production in Portugal (Clarence-Smith 1985: 151) together with tariff rate quotas (TRQs) and guaranteed Tejo (Lisbon) prices.

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[13] This involved partial or full remission of workers' pay to district administrations to meet *mussoco* liabilities.

[14] das Neves (1998: 79) describes an earlier Mozambican example of this principle guiding wage-setting.

Prior to 1939, the main trade benefits derived from TRQs. Until 1928, the level of protection Portugal offered colonial sugar was low by international standards, the external tariff ranging between 2 per cent (1920) and 62 per cent (1925) of the world price but with a 50 per cent rebate for imports falling within the TRQ. As the world market moved into surplus in 1928, external protection increased to a level comparable to that in the UK, Germany, France, and the Netherlands (over 110 per cent of the world price; see League of Nations 1929: 28) and the TRQ rebate increased to 60 per cent, conditional on carriage in Portuguese vessels (Decreto 15829/1928).[15]

During the 1930s, sugar's protection was consolidated as a result of the world price falling while the external tariff remained constant in cash terms. Imports from outside the empire accounted for only 2.1 per cent of total Portuguese sugar imports in 1932–46 (Decreto 38701/1952). However, Salazar tinkered with the colonial TRQ's internal distribution at Mozambique's expense. In 1927, before he became Finance Minister, Mozambique contributed 80 per cent of colonial sugar imports and was given a corresponding TRQ share (Decreto 14241/1927). But Salazar prioritized Angolan production, which, unlike SSE, was Portuguese-owned. Decreto 18021/1930 established equal TRQ shares for Mozambique and Angola for 15 years, resulting in an immediate reduction in the Mozambican TRQ by around 15,000 tonnes.[16] Although the aggregate colonial TRQ rose after 1945, its equal distribution was retained (Decretos 34594/1945 and 35845/1946), despite Angola no longer being able to fulfil its quota share—resulting in non-colonial imports climbing to 23.7 per cent of the total during 1947–50 (Decreto 38701/1952). Only in 1949–50 (Decreto 37456/1949) could Mozambique finally take over Angola's unused quota share. There is a suggestion that the delay was due to Salazar maximizing revenue from tariff receipts in this period.[17]

After WWII, further protection came through direct incentive pricing. By 1952, Lisbon was worrying that, following the 1948–49 jump in world prices, colonial exports were being diverted onto the free market as a result of administered prices in Lisbon failing to keep pace. Thus, a guaranteed colonial CIF price was set (Decreto 38701/1952), which, while below both UK and US–Cuba preference prices, exceeded the free market price for 12 of the following 15 years—thus restoring rents. In 1966, under Decreto 47337, this trade regime was renewed, and it continued to apply until 1981.[18]

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[15] From 1952 it rose further, to 70 per cent, but in 1966–67 it was in effect abolished.

[16] See below, SSE (1945), and Clarence-Smith (1985: 151–52) for further details.

[17] The spread between the external and TRQ duty rates in 1947–50 (not controlling for differences in degrees of refining) was £33.85 per tonne (Decreto 38701, 1952).

[18] Arguably, a rent also existed in the Mozambican sugar market for producers of 'plantation white' sugars following this market's effective closure from external competition by the introduction of foreign exchange controls in 1932 (Clarence-Smith 1985: 152). The Mozambique ex-factory price for this grade of semi-refined sugar was set at the same level as the Lisbon CIF price for a grade deemed equivalent (*cristal branco*)—at first oligopolistically by the only three domestic producers and then, from 1952, administratively by the Governor. Thus a local rent was created that was equivalent to the cost of transport and insurance from the Mozambican factory to the dockside in Lisbon.

## 4 Sena Sugar Estates 1920–74

### 4.1 Structure and organization

SSE was incorporated and listed on the London Stock Exchange (LSE) in 1920 in order to finance the consolidation of J. P. Hornung's control over three sugar plantations along the Lower Zambezi and a refinery in Lisbon (see Lapperre 2020 for a detailed history). Hornung had been involved in sugar in Mozambique since 1889, when he founded the Companhia de Assuçar de Moçambique (CAM) at Mopeia, in Prazo Maganja d'aquem Chire. He was connected through marriage to a settler family controlling this *prazo*, and was familiar with the largest British sugar broker, J. C. Czarnikow, and through him with the London merchant bank Schroders.

Around a third of SSE's initial GB£1.2m paid-up ordinary share capital was carried forward from an earlier venture in which Czarnikow, with support from Schroders, had invested in 1906. Much of the remainder came from Hornung's personal fortune, made in the bull sugar market of 1916–17 (Lapperre 2020: 93, 100). Schroders was to become SSE's merchant banker, with permanent representation on the Board (see R&A 1937).[19] By 1974, SSE's paid-up ordinary share capital was over GB£5m—its growth entirely financed by capitalization of reserves. From time to time, Schroders underwrote public offers of coupon-bearing debentures or preferential shares to UK institutional investors, although their value never contributed more than GB£1.3m to equity at any one time. In 1968, when leading shareholdings were first disclosed in UK company reports, three Hornung family members on the Board owned 19 per cent of the ordinary shares. Other family members almost certainly controlled another large stake.[20]

SSE was a vertically integrated company and never seriously diversified outside sugar, in contrast to other UK-owned sugar producers (Booker and Tate & Lyle).[21] Its Mozambique business had several sidelines, but these were mostly spin-offs from sugar or undertaken to reproduce SSE's labour or, in the case of its cotton concession (1936–61), its labour supply (Vail and White 1978). A London office represented SSE's organizational apex, where Directors made choices about levels and composition of output, direction of sales, and technology, and where sales outside the Portuguese empire were negotiated. In Lisbon, there was a Refinery Manager and an office dealing with Portuguese trading partners and authorities. But, after the 1920s, sales outside the Portuguese empire were the exception, while relations between London and Mozambique were mostly conducted remotely.[22] SSE never had a Managing Director, and General Managers in Mozambique had considerable latitude.

### 4.2 Data sources

To appreciate how the financial performance of SSE evolved over time, we reconstruct detailed accounts. The primary sources of our data are the Hornung and Oury archives, as well as H.

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[19] Schroders started economic life as a sugar trader, as did its first representative on the SSE Board, Albert Pam. Its relation with Czarnikow and its successor ventures dated from 1884 and was very close. For a long period Czarnikow and SSE were Schroders' two main clients among UK non-financial firms (Roberts 1992: 98–99, 119, 128–30, 163, 269–70).

[20] On the eve of Independence in 1974, Hornung family board members held 13 per cent of shares (R&A 1974).

[21] The Hornung family itself diversified into tea in Mozambique by creating a Portuguese company (SCO) without ties to SSE. Some records of this company are in HP, Box 47.

[22] In most years, a Hornung family member visited Mozambique—usually for 4–6 weeks.

Bakker's ledger: *Cane supplies and field costs: provisional estimates 1967–71*.[23] After collating and digitizing this material, where possible distinguishing between the various estates, product grades, and production locations, we supplement it with information from a variety of secondary sources. In particular, we rely on Head (1980), Lapperre (2020), and Vail and White (1980), all of whom had access to additional primary material, since lost.[24] These additional secondary sources help us fill out and cross-check a number of our core variables, particularly those pertaining to local labour usage and plantation cost components. To complement these series we also draw on SSE's own occasional publications (SSE 1932, 1945, 1955, and 1956; SIDUL 1954) and a number of public sources, particularly as regards sugar tariffs and prices, taken from Portuguese legal archives (digitized at www.dre.pt) and historical statistics (e.g. Valério and Tjipilica 2008). For information on labour-related issues, we consulted reports and correspondence, mostly based on correspondence relating to SSE or local inspections, in the Mozambique National Archives.

Taken together, this exercise yields a total of 86 separate variables, of which 61 are observed in each year of interest (55 observations from 1920 to 1974), 16 are incomplete but non-missing for more than half of all periods, and 9 are incomplete and observed in less than half of all periods. In some cases, incomplete variables are 'correctly' missing in the sense of reflecting zero values, such as years of zero cotton sales. However, in other cases, missing variables reflect material gaps in the data. To ensure uninterrupted time series analysis and (equivalently) to avoid attributing sub-period means to a select number of observations, we impute non-zero missing observations econometrically. Concretely, we regress the incomplete series on relevant complete variables and latent trends, in turn replacing missing observations with their fitted (predicted) values. For instance, total sugar production costs are observed only for the periods 1930–61 and 1968–71. Using these observations, we calculate the cost of production per ton of raw sugar and regress the derived series against the total area harvested, raw sugar production, capital, labour inputs, a price index, and a latent time trend.[25] Given that we have the complete set of observations on production quantities, this permits us to complete the series of total production costs.

Table 2 summarizes the cleaned dataset, reporting decadal averages. Panel (a) describes key input and output quantities, focusing on sugar production (the dominant activity); panel (b) states the asset/liability position of the consolidated group; and panel (c) reports key revenue and cost components. To facilitate comparison over time, all financial values are stated in constant 1950 thousands of pounds sterling, based on a synthetic price series calculated as the geometric mean of the UK, Mozambican, and Portuguese consumer price indexes (representing the main locations in which SSE undertook business). We draw on these statistics in the brief chronology of the firm below.

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[23] The uncatalogued Hornung Papers (West Sussex County Record Office) contain ledgers with detailed sales, production, employment, and cost data from 1930 to 1961, as well as less systematic records from the 1920s and 1970s and diaries and correspondence of SSE directors, all apparently from SSE's London office. The Oury Papers (Borthwick Institute, York) contain a full set of published SSE annual reports and accounts and additional financial documentation made available to directors. Bakker's report was kindly loaned to us by Paul Lapperre.

[24] Vail and White and Head were given access in 1974 to SSE's archives at Luabo. Shortly afterwards, part of this archive was dispatched to Maputo for deposit in the National Archives but it was lost in transit (Vail and White 1980 and personal communication, Paul Lapperre); the remainder was destroyed when Renamo sacked Luabo in 1985. Lapperre worked for SSE from 1965 to 1974.

[25] Throughout, we follow SSE convention and use imperial measures, except where citing data from Portuguese decrees. Prices are converted accordingly, as needed. Escudo:sterling exchange rates are based on Clarence-Smith (1985: appendix 2).

Table 2: Summary of SSE operations and performance, decadal averages

| | 1920 | 1930 | 1940 | 1950 | 1960 | 1970 |
|---|---|---|---|---|---|---|
| (a) Quantities of production, sales and manpower | | | | | | |
| Harvested area (ha) | 9,268 | 12,054 | 11,551 | 13,805 | 16,053 | 15,992 |
| African workers (av./day) | 12,281 | 12,190 | 11,603 | 16,047 | 16,246 | 11,842 |
| Raw sugar (tons) | 41,087 | 50,684 | 48,904 | 81,983 | 117,737 | 137,851 |
| *sold into Portugal* | *21,379* | *24,955* | *20,901* | *46,978* | *70,946* | *71,666* |
| *sold into Mozambique* | *0* | *3,024* | *13,114* | *21,282* | *39,791* | *56,298* |
| *sold onto free market* | *12,898* | *2,707* | *3,746* | *1,001* | *633* | *5,864* |
| SIDUL refined sales (tons) | 21,190 | 30,972 | 24,913 | 40,688 | 65,382 | 73,089 |
| (b) Assets and liabilities (constant prices, thousands of GB£) | | | | | | |
| Liabilities | 5,907 | 4,722 | 3,045 | 4,826 | 7,319 | 9,138 |
| *Equity* | *2,856* | *2,512* | *1,278* | *1,460* | *2,719* | *2,436* |
| *Short-term debt* | *1,026* | *415* | *640* | *1,726* | *2,370* | *3,230* |
| *Long-term debt* | *1,350* | *1,440* | *872* | *781* | *527* | *648* |
| *Accumulated reserves* | *675* | *356* | *255* | *860* | *1,703* | *2,824* |
| Assets | 5,907 | 4,722 | 3,045 | 4,826 | 7,319 | 9,138 |
| *Capital and equipment* | *3,802* | *3,567* | *1,606* | *1,827* | *3,081* | *4,013* |
| (c) Profit and loss (constant prices, thousands of GB£) | | | | | | |
| SIDUL | | | | | | |
| Revenues | 1,226 | 2,343 | 1,378 | 2,383 | 3,802 | 3,645 |
| Expenses | 1,188 | 2,305 | 1,348 | 2,318 | 3,713 | 3,544 |
| *Sugar purchases* | *409* | *462* | *395* | *833* | *1,418* | *1,562* |
| *Import duties* | *21* | *53* | *43* | *86* | *297* | *805* |
| *Refining (all)* | *758* | *1,789* | *909* | *1,399* | *1,999* | *1,176* |
| African operations | | | | | | |
| Revenues | 1,852 | 923 | 1,176 | 2,423 | 3,600 | 5,512 |
| *of which, sugar* | *1,813* | *889* | *1,102* | *2,300* | *3,535* | *5,380* |
| Expenses | 849 | 941 | 1,029 | 2,478 | 3,405 | 2,842 |
| *African labour* | *324* | *340* | *290* | *724* | *1,001* | *747* |
| *European labour* | *248* | *292* | *218* | *541* | *621* | *377* |
| *Sugar production* | *4* | *141* | *284* | *695* | *1,002* | *729* |
| *Other* | *273* | *169* | *236* | *519* | *781* | *989* |
| SSE (consolidated) | | | | | | |
| Total revenue | 2,610 | 2,775 | 2,132 | 3,737 | 6,307 | 7,246 |
| EBITDA | 531 | 292 | 339 | 825 | 1,015 | 1,297 |
| Profit (after tax) | 249 | 124 | 170 | 347 | 437 | 434 |

Note: table summarizes quantitative performance of SSE from 1920 to 1974, based on annual data; all financial values are stated in constant 1950 thousands of pounds sterling; panel (c) separates profit and loss associated with the SIDUL refinery in Portugal and remaining operations in Mozambique, but final rows give consolidated performance for the group.

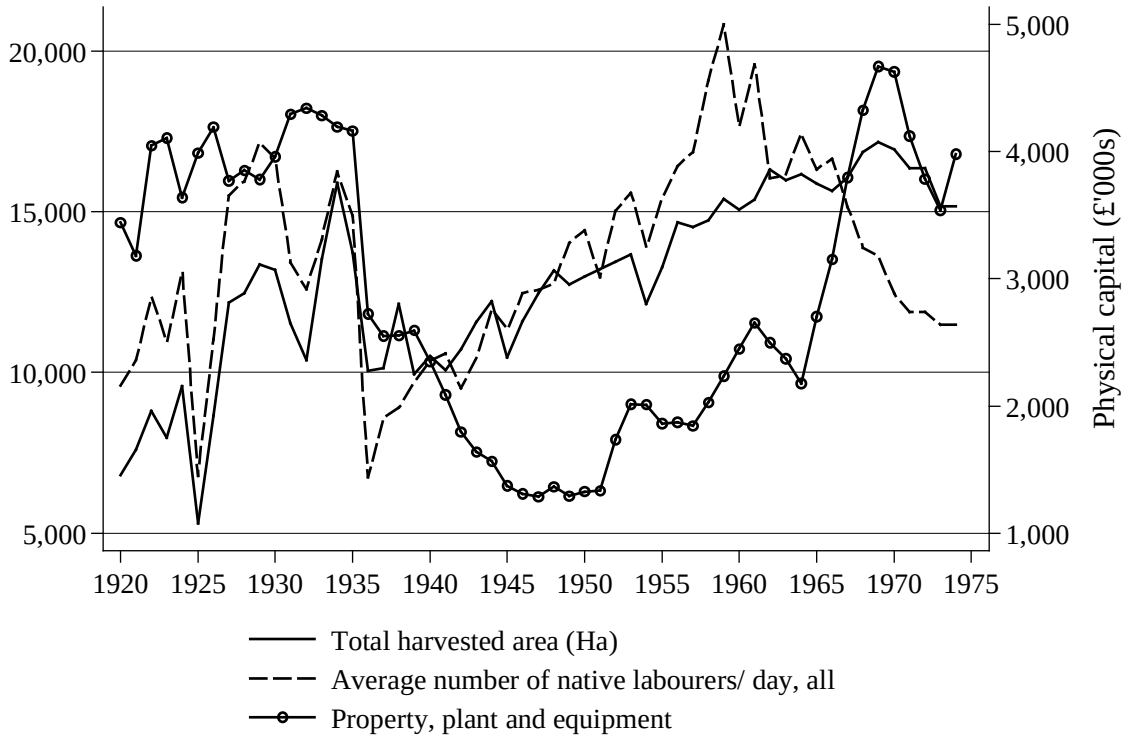
Source: authors' estimates from SSE R&As; SSE (1932, 1945, 1955, 1956); SSE ledgers and expenditure books (1930–61), HP uncatalogued material; SSE 'Sales, sugar duties, prices, production and African river levels 1923–49', HP Box 44; SSE 'Estates yearly production of sugar', HP Box 45; SIDUL 'Lisbon refinery sales', HP Box 44; SIDUL files, HP Box 58; and Bakker (1967).

### 4.3 Period 1: Bloody expansion (1920–29)

Hopkins (1976) sketches three stages in the evolution of imperial big businesses in Africa from 1870 to the end of colonialism. In Mozambique, SSE passed through the first two of these, although in time-frames slightly later than proposed. Hopkins's first stage (1976: 280) is that of 'freebooters and frontiersmen who excelled at a type of slash-and-burn' in seizing land and other resources with limited capital. In Portuguese Africa this stage was more prolonged than elsewhere, sustained by continuing seizure of labour.

For SSE, labour seizure in the early 1920s aimed at meeting the needs of surging capital investment, itself inspired by several years of world sugar prices above GB£20 a ton. By 1925, J. P. Hornung had consolidated his Mozambican sugar interests, opened a fourth plantation, and linked two of them to the Beira railway, and was building a second refinery in Lisbon to absorb the output of his Mozambican mills. These reached an annual capacity of 75,000 tons of raw sugar in 1927, of which 93 per cent was utilized by 1929. SSE's harvested area and production had by then both doubled since 1920 (Figure 1; see also Table 2a).

Figure 1: Trends in factor input quantities, 1920–74




Note: LHS axis relates to area and workers; RHS axis refers to real value of physical capital net of depreciation.

Source: authors' construcion.

The new plantation's mill was state-of-the-art (Lapperre 2020: 117) and a few petrol tractors were introduced in 1927, but otherwise SSE's technology remained far from advanced: steam ploughs at least 30 years old were widely relied on; there was limited gravity irrigation at two legacy plantations and none at all at the others; all agricultural tasks other than ploughing were performed

by hand; chemicals were hardly used;[26] and SSE's only seed variety (Uba) was that first adopted by J. P. Hornung in 1889.[27]

Average daily labour demand increased in the 1920s in line with area and output, reaching around 15,600 by the end of the decade (Figure 1). Because of seasonal employment variations, high levels of 'wastage', and high turnover due to legal limits on the duration of *contrato*, around 50,000 men were working for SSE over the year at this time. In order to meet this employment level, SSE (sub-)leased up to 30 concessions in Zambézia and Manica provinces, whose combined population probably approached 300,000; they also secured direct contracts with the government (the 'Hornung Contract' of 1921) and the Niassa Company (1922) to each supply 3,000 men each year at GB£2 a head. The government recruited from 'Anguru' areas in northeast Zambézia (100–300 km away), while the Niassa Company recruited from Mozambique province, further away still.

Plantation management in the 1920s, including labour management and recruitment, was carried out by J. P. Horning's brothers-in-law, Arthur, Ignacio, and Thomaz Raposo, who 'behave[d] and live[d] like kings'.[28] The despotism embedded in recruitment also characterized supervision, while payment and ration systems were plagued by fraud. Worse, 'many (workers) died in the bush while trying to escape or snare small birds or trap rats'[29] and, of the 3,011 men provided under the Hornung Contract between January and June 1922, 289 died—mainly from dysentery and dropsy—while 1,823 were deemed too sick to work.[30] Both it and the Niassa Company contract were cancelled by 1926, after which labour recruitment relied on private agents.

### 4.4 Period 2: Bureaucratization and retrenchment (1930–51)

Hopkins (1976: 283) notes a gradual transition in imperial firms toward bureaucracy, tracing it to owners becoming more risk adverse as their scale of operations grew and as their external environments became less uncertain. He goes on to connect bureaucratization to: 'a type of commercial involution [… I]nnovations […] were (henceforth) rare and when introduced served essentially conservative purposes', adding that there was 'a more generalized quest for steady, unspectacular returns in an era of reduced competition.'

At SSE the immediate reason for the 1931 appointment of its first professional manager, Max Thurnheer, was a desire to control costs in a situation of falling prices. The world price had fallen below the Lisbon TRQ price in 1929 and SSE's owners were hopeful that Mozambique's large quota share would guarantee SSE's continued profitability without major structural change. However, Decreto 18021's revision of quota shares in 1930, followed shortly afterwards by a parcelling of the Mozambican quota between local producers, seems to have dashed these hopes.[31] Indeed, SSE's Portuguese quota was then fixed at around 20,000 tons, against an output of 50–60,000 tons.

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[26] Despite trials dating back to 1921, described in A. Raposo to J. P. Hornung 04-09-21 (HP Box 47).

[27] Uba was described by Timoshenko and Swerling (1957: 56) as 'fibrous, low-yielding and intractable to milling'. SSE's average yield in the 1920s was 3.8 tons raw/ha (AR&As 1920–29). Assuming a 9:1 cane:raw ratio, the median yield across seven other countries in 1909–13 was 4.8 tons raw/ha (Bosma and Knight 2004: fn. 31).

[28] CBR Hornung in May 1925, quoted in Lapperre (2020: 131).

[29] C. Spellar in 1924, quoted in Vail and White (1980: 255).

[30] Mozambique National Archive, DSNI.Cx643 24-09-22.

[31] For details see SSE's (1932) appeal to the Minister for the Colonies; and SSE (1945).

Thurnheer introduced some short-term economies including a reduction in European employees and a rationalization of African labour recruitment, which henceforth depended on bribing administrators and chiefs,[32] to recruit lower-cost local labour for short-term contracts coupled with quasi-stabilization of part of the long-distance migrant workforce on longer ones (Head 1980: 101–119).[33] Yet over-capacity remained. SSE's owners prevaricated until 1936 before finally closing two plantations, reducing annual output to around 40,000 tons—an amount it was calculated could all be sold on Portuguese metropolitan and imperial markets or on nearby geographically protected African ones.[34] Only at this stage was the African workforce retrenched, with average daily employment falling to 9,227 by 1940–42 (see Figure 1 and Table 2a).[35]

Output remained around 40,000 tons until 1943–46, when the wartime UK government bought whatever sugar SSE could produce over this figure (R&A 1943). Thus, by 1946, production had recovered to around 50,000 tons, where it remained until 1949, with domestic Mozambican replacing UK demand. The period was characterized by almost complete technological stasis until 1947–48, when Uba seeds began to be replaced by newer varieties (R&A 1947) and the first caterpillar tractors were introduced for ploughing and ridging (CBR Hornung Diary May–July 1948, HP Box 46). The timing of these changes again significantly lagged behind technological progress, as described by Timoshenko and Swerling (1957: 134).

These years also saw a more pragmatic style of labour management, with attention focused upon incentives to squeeze more from less, rather than punishment. An indulgence pattern was established, whereby *contratados* could complete 'tickets' (thirds, sixths, or twelfths of contracts) without having to work consecutive days, but were rewarded with a bonus if they did. Against increases in individual daily tasks or gang size reductions it offered further bonuses (Head 1980: 169, 172, 179). SSE also paid for completed contracts of 3 months and over *in situ* rather than through the deferred payment system, making it easier for workers to avoid *mussoco* and other deductions imposed by administrators (Head 1980: 112).

Together with daily wages somewhat above the minimum (see below), these policies made SSE a *relatively* attractive destination for both forced and voluntary labour. Impacts on productivity are harder to detect. While SSE succeeded in gradually increasing the daily cutting task from 3 tons/man to 4 tons/man between 1930 and 1952 (Head 1980: 168), annual per capita output rose only from an average of 4.6 tons raw during the 1930s to 4.8 tons in 1945–52.[36]

### 4.5 Period 3: Extensive followed by intensive growth (1952–74)

In the wake of the de facto increase in Mozambique's TRQ and the new sugar regime of 1952, a period of sustained output growth dawned, directed to the now expanding metropolitan and Mozambican markets. Annual production in the 1950s averaged 82,000 tons, while the average daily workforce rose to just under 16,000. Although crude labour productivity rose, growth over the decade depended increasingly on expansion of the harvested area. This is consistent with the

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[32] 'Every administrator is being paid by us, it cannot be helped as we would not get a boy otherwise' (CBR Hornung Diary May–July 1948, HP Box 46).

[33] Resulting in the share of *voluntarios* in SSE employment rising from about 10 per cent to 40 per cent.

[34] Assets were written down and ordinary share capital reduced from GB£1.2m to GB£0.7m, with some of the proceeds used to cover five years of arrears in preference share dividends (SSE Scheme of Arrangement 22-01-36, OP SSE files).

[35] Uncatalogued expenditure ledger, HP.

[36] Number of workers measured as annual daily workdays divided by 312.

still modest character of technological change during the 1950s, confined to an increase in the number of caterpillars and their adaptation from 1958 to ditching and planting (Vail and White 1980: 374), as well as the apparent absence of further changes in labour recruitment or management methods.

In the 1960s, against the backdrop of the continuation and renewal of the 1952 sugar regime, as well as a further acceleration in sugar consumption in Portugal and Mozambique, output rose spectacularly to an annual average of 118,000 tons. Unlike previous increases, this was based mainly on new technologies—some of which were aimed primarily at increasing output (e.g. installation of a GB£1.7m overhead irrigation system at the Luabo plantation, together with more and better planned application of chemical fertilizer, herbicides, and pesticides), while others were aimed at labour saving, notably the adoption of mechanical loading at the Marromeu plantation (Bakker 1967). These changes were concertinaed between 1962 and 1967 in the context of a plan to increase milling capacity to 170,000 tons,[37] with the Luabo plantation dedicated to raw sugar for the Portuguese market and Marromeu reserved for semi-refined and (from 1968) granulated production for the Mozambican market.

The background to such labour-saving efforts was the formal end of forced labour in 1961–62. The main contours of changes in labour recruitment and management following this reform are clear, despite details being hazy. Average daily employment by the end of the 1960s fell to about 12,500. SSE's worker compounds—which by the late 1950s spontaneously 'Africanized' around semi-stabilized voluntary workers, with declining ethnic segregation and growing numbers of wives, children, and retirees—were now increasingly a reserve for recruiting female and juvenile labour. The voluntary male Angoni (Tete) and Anguru (Zambézia) backbone of the pre-1960s workforce was reduced and, where retained, redeployed—with Angonis becoming a labour aristocracy and Angurus replacing them as cutters. Dependence on labour from SSE's old local concessions along the lower Zambezi increased (Head 1980: 360–70). Yet, as the workforce shrank and became more localized and feminized, the premium above the minimum wage that SSE workers had enjoyed for decades was retained.

SSE's 1960s investments in science, chemicals, and machines brought it closer to the technological frontier. Although their crude labour productivity was higher, British sugar producers in Jamaica, Trinidad, and Guiana were no longer more technically advanced (cf. Chalmin 1990: 336, 362, 504–05; Seecharan 2005: 458 and ch 22).[38] SSE's owners continued to evince confidence in the early 1970s, despite the death of Salazar and acknowledgement of the presence of 'terrorists in comparatively small and remote areas of Mozambique' (R&A 1970).[39] Yet, in September 1974, 3,000 machete-bearing workers chanting '*matar os gordos!*' (kill the fat ones!) descended on SSE's offices at Luabo, where they were dispersed by machine-gun fire. Two months later, most workers at Marromeu deserted, leaving the remaining crop to rot in the fields. 'The thunderstorm that had been building up (unobserved) for some years had broken out' (Lapperre 2020: 229).

[37] This increased further to 215,000 tons in 1973 (R&A 1973).

[38] In the Caribbean, adoption of mechanical loading was slowed and mechanical cutting blocked during the 1960s as a result of trade union opposition.

[39] In 1973, these were still said to be 'mostly centred on the territory around the great Cabora Bassa Dam and hydro-electric scheme' (R&A 1972).

## 5 Assessing the profitability of SSE

### 5.1 Comparative analysis

We assess the profitability of SSE over the full period. Panel (c) of Table 2 provides a summary of the main components of its profit and loss account. Following the racialized organization of the company, we distinguish between: African labour costs, defined as the total costs of wages, rations, and recruitment of local workers; and European labour costs. With respect to European labour costs, original data are patchy and the only information on wages and numbers of employees and dependants is available from different sources for specific years. Nonetheless, we extrapolate from these observations and further assume that the non-wage costs associated with European labour—e.g., provision of transport, housing, social facilities, and schooling (arguably, essential elements associated with expatriate lifestyles in colonial Africa)—were at least equal in magnitude to the direct wage costs.

Unclassified costs, effectively a residual, refer to expenses associated: in Mozambique mainly with agricultural inputs, storage, local and international freight, insurance, spare parts and maintenance, and non-sugar operations (including cattle ranching—although African workers were fed only meat harvested by game hunters until the end of the 1950s; see Head 1980: 221); in Portugal with sugar stock financing, as well as the cost of third-party sugar, raw sugar import duties, and refining costs; and in London with sales and management agency and directors' fees. Unclassified costs increased substantially in the last two decades as output and technological sophistication increased and international transport costs rose.

The same panel also reports the real value of operational profits (equal to revenues minus operational costs), from which we calculate earnings before interest, tax, depreciation, and amortization (EBITDA), as well as final post-tax profits. These reveal that the group was able to sustain positive returns in each decade, on average. This is not to say that SSE was continuously in the black—losses were recorded in 6 of the 55 years, but notably never after the closures of the mid-30s. Furthermore, the ratio of post-tax profits to both total turnover and total assets remained broadly stable over time, particularly after the mid-1930s, being equal to around 7 per cent and 5 per cent, respectively. The refinery operation in Lisbon (SIDUL) made a small but steady contribution to this (at around 11.5 per cent) but overwhelmingly SSE's profit derived from sugar operations in Mozambique.

As noted previously, to assess investment performance the historical business literature has generally followed two distinct paths. Following construction of the first historical database of international securities prices by Chicago University's Booth Business School in 1960–63, the more common metric focuses on returns to equity owners as a proportion of initial costs. This type of *external* return combines both indirect returns via changes in market capitalization and direct returns, such as through dividend payments. The basic conventional expression for the nominal annual return (e.g. Dimson et al. 2002) is thus:

$$\text{External}_t = \frac{(p_t — p_{t-1} + d_t)}{p_{t-1}} \quad (1)$$

where $p$ is the available share price and $d$ is the (total) dividend payment per share in year $t$.

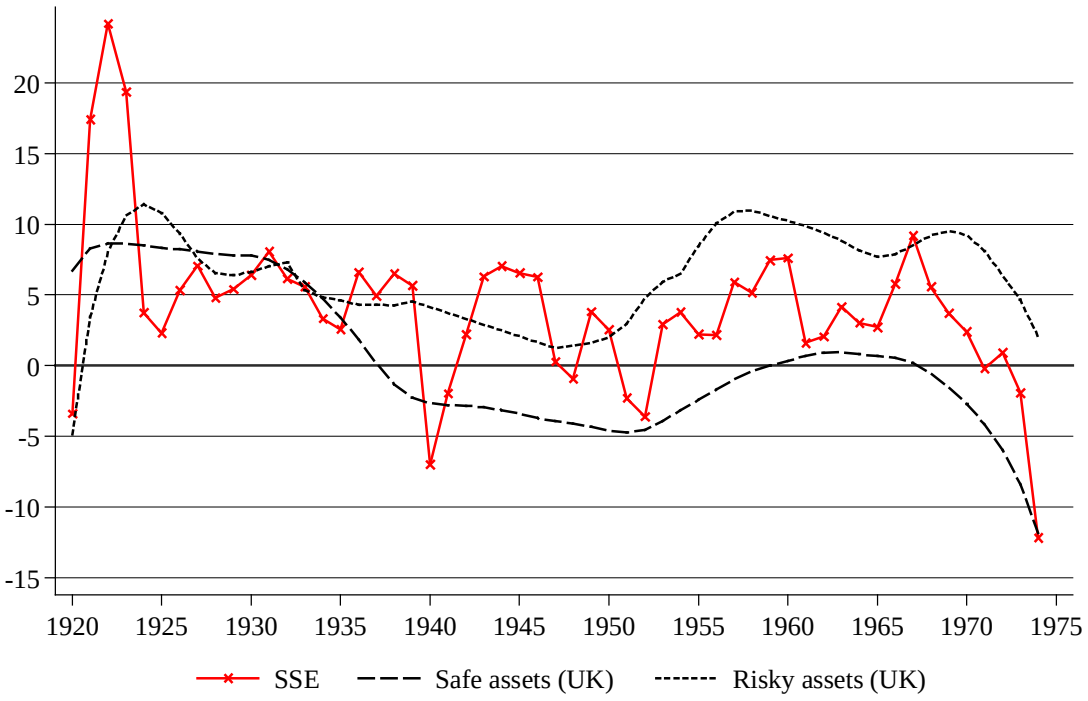
For the case of SSE, we modify equation (1) to include not only ordinary and preference share dividend payments, but also interest payments on debentures, which varied over time between 4.5 and 7.7 per cent. However, we are not able to account for (indirect) capital gains since information

on the market value of the various share types is unavailable. Thus, we simply assume that the price change component in the numerator is zero; and we estimate the return as the sum of all dividend and interest payments to shareholders in a given year, divided by the current book value of issued equity.[40]

Figure 2 illustrates the evolution of inflation-adjusted returns to SSE equity investors over time, compared with smoothed annual real returns to both risky and safe assets calculated from Jordà et al. (2019). With respect to the latter, panel (a) shows returns to all UK assets, while panel (b) shows returns to 'global' assets, calculated as the annual cross-country median of returns to the two asset classes, weighted by aggregate real GDP in international dollars.[41] We adjust for inflation using local price indices; but for SSE, reflecting the predominant investor base, we only adjust for inflation in the UK. These results indicate that SSE's performance was virtually always positive, but—in line with the literature—by no means extraordinarily high. In most years, the external return to SSE shareholders fell between those of both the UK and global risky and safe asset classes, being equal to 3.4 per cent on average per year over the full period, versus 6.9 per cent and 1.4 per cent for global risky and safe assets, respectively.

Figure 2: Comparison of external returns, SSE vs risky and safe assets

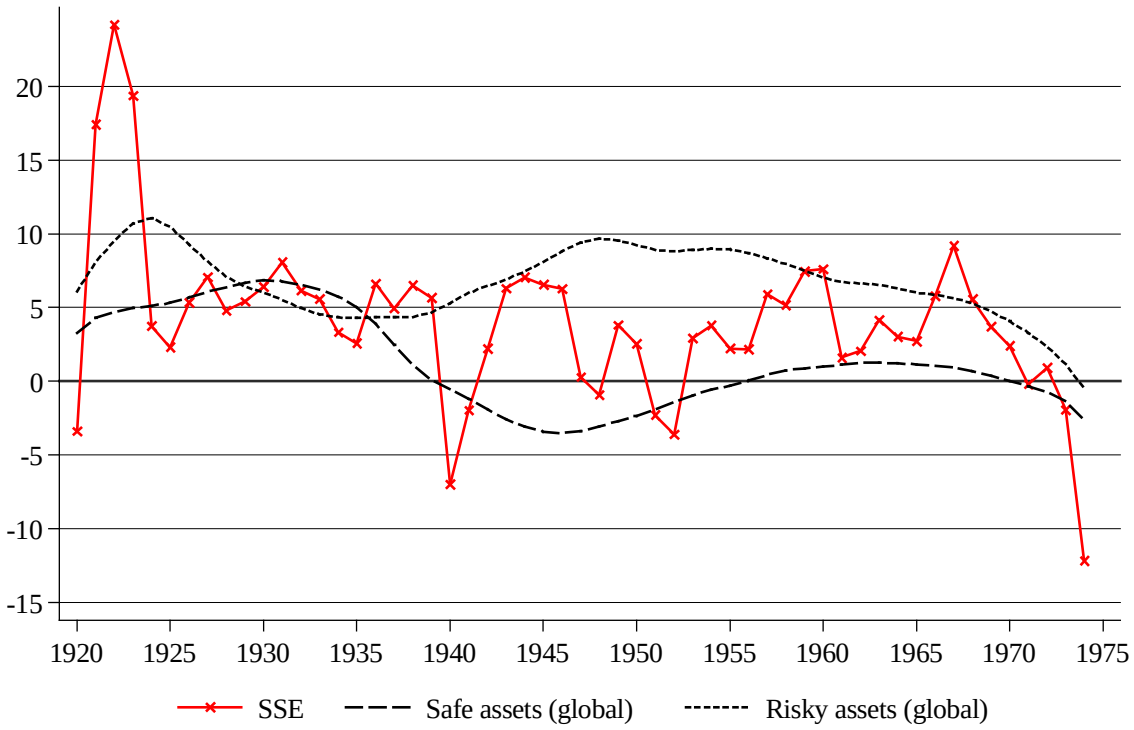
(a) Comparison against UK assets




[40] Although SSE was listed on the LSE, historical data on quoted share prices for small(er) companies are largely unavailable after 1930. The sources used by Rönnbäck and Broberg (2019) provide data for SSE only for 1924–30 and 1964–69 (Klas Rönnbäck, personal communication).

[41] Risky assets are defined as the average of investments in equities and housing; while safe assets are bonds and Treasury bills. The dataset comprises primarily (now) high-income countries and their Western offshoots.

(b) Comparison against global assets




Note: returns in per cent to SSE investors are the annual sum of dividends and interest on preference/debenture shares divided by the book value of equity capital; returns are inflation-adjusted; risky assets are equities and housing; safe assets are government debt instruments.

Source: authors' compilation, using data from Jordà et al. (2019).

Another point of comparison is other companies with operations (predominantly) in Africa. Rönnbäck and Broberg (2019: 107) document an average real return of 8 per cent, covering 702 companies listed on the LSE over the period 1869–1969. However, as they show, these returns were generally highest in the late 19th century. During the period 1920–1969, real returns to investors averaged nearer 5 per cent (per annum), across all companies. Moreover, disaggregation by region and sector appears to show that the average was driven by a relatively strong performance of enterprises in South Africa, particularly those engaged in mining. Real returns for investors in South African colonial equities generally averaged 6.2 per cent for 1869–1969 and 6.7 per cent for 1920–69. But for the 32 companies in their database classified as producers of 'consumer products', the annual real return was just 1.9 per cent (1869–1969). Over the same period, the average return to companies with operations in Central and Southern Africa (not South Africa) was just 2.2 per cent (87 companies). In this perspective, SSE was certainly a solid performer.[42]

The second comparative method focuses on *internal* returns, namely the capacity of the enterprise to generate profits, stated as a proportion of its core liabilities. We employ here the return on capital employed (ROCE) measure, conventionally defined as earnings before interest and taxation

[42] The volatility of returns to SSE stock (excluding equity price movements) was also comparatively low—e.g. the full-period standard deviation was just 5.56 per cent, equal to less than half the standard deviation associated with the entire class of UK risky assets (12.7 per cent) and only around a quarter of the 21.3 per cent standard deviation in returns for 1919–69 for all African colonial equities in Rönnbäck and Broberg's sample (2019: 127–29).

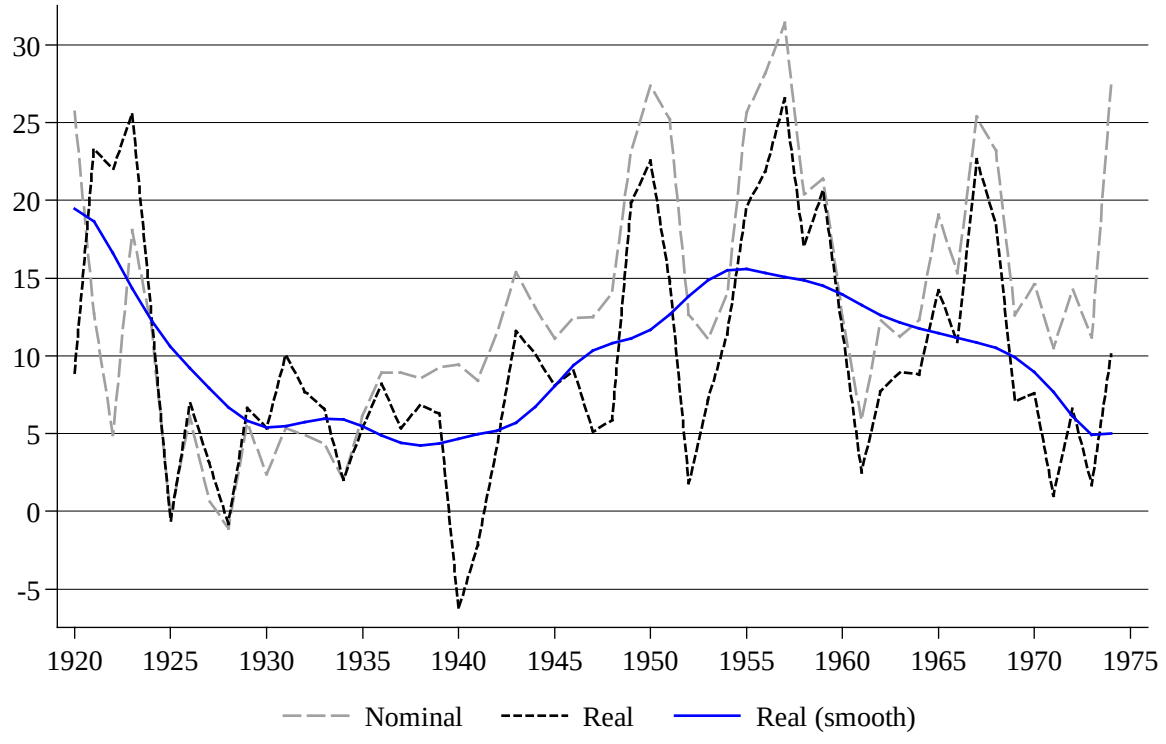
(EBIT) divided by the sum of equity capital plus long-term liabilities or total assets minus current liabilities (equivalent to net assets):

$$\text{ROCE}_t = \frac{\text{EBIT}_t}{\text{Net assets}_t} \tag{2}$$

This metric has been used in various contexts within the business history literature, e.g., to assess the performance of British railways (Mitchell et al. 2011), Lancashire mills (Toms 1997), merchant trading groups (Jones 2002; Jones and Wale 1998), and UK companies generally (Higgins and Toms 2011). ROCE is generally understood to capture the overall efficiency with which capital is deployed to generate revenue and, correspondingly, the quality of management of the enterprise. Moreover, as the numerator refers to total operating profits, rather than the component of post-tax profits distributed to equity holders (as in equation 1), it represents a broad measure of firm performance. Put differently, the external measure (return on investment) can be viewed as a special case of the ROCE where there is no long-run debt and zero taxes, and all profits are distributed to equity holders.

Figure 3 plots the nominal and real ROCE registered by SSE over the full period, based on the reconstructed series of accounts. The average annual nominal return was 13.1 per cent or 9.8 per cent in real terms. However, as with the external measure of returns, there is substantial variation over the sub-periods. In particular, SSE achieved comparatively high returns in the early 1920s (over 18 per cent), but this was followed by around 20 years during which returns oscillated around 5 per cent in real terms. The next 20 years saw steady gains, with real average returns increasing to around 13 per cent per annum (1945–64); and returns in the final ten years remained strong at about 10 per cent. Also, as noted with respect to external returns, there were a just a few instances in which SSE failed to turn a positive operating profit—in 1925 and 1928.

Figure 3: Trends in SSE's ROCE, 1920–74




Source: authors' construction.

As systematic comparisons across UK companies based on ROCE are possible only from 1948, for the first half of the 20th century we must rely on records from individual firms or types of enterprise considered by business historians. Using these diverse sources, Table 3 summarizes ROCE calculations for various UK-headquartered companies over different periods, in each case providing the relevant comparison with SSE. As for the assessment based on external returns, the main insight is that SSE achieved a consistent and solid level of profits. Regardless of the sub-period (or sector) chosen, the average return on SSE's capital was consistently located toward the centre of the distribution of returns. This position is maintained even if we compare SSE's performance against that of other UK food companies, or against well-known and more diversified UK operators in the sugarcane industry at the time (Figure 4).

Table 3: Summary of returns on capital employed, SSE and other UK firms

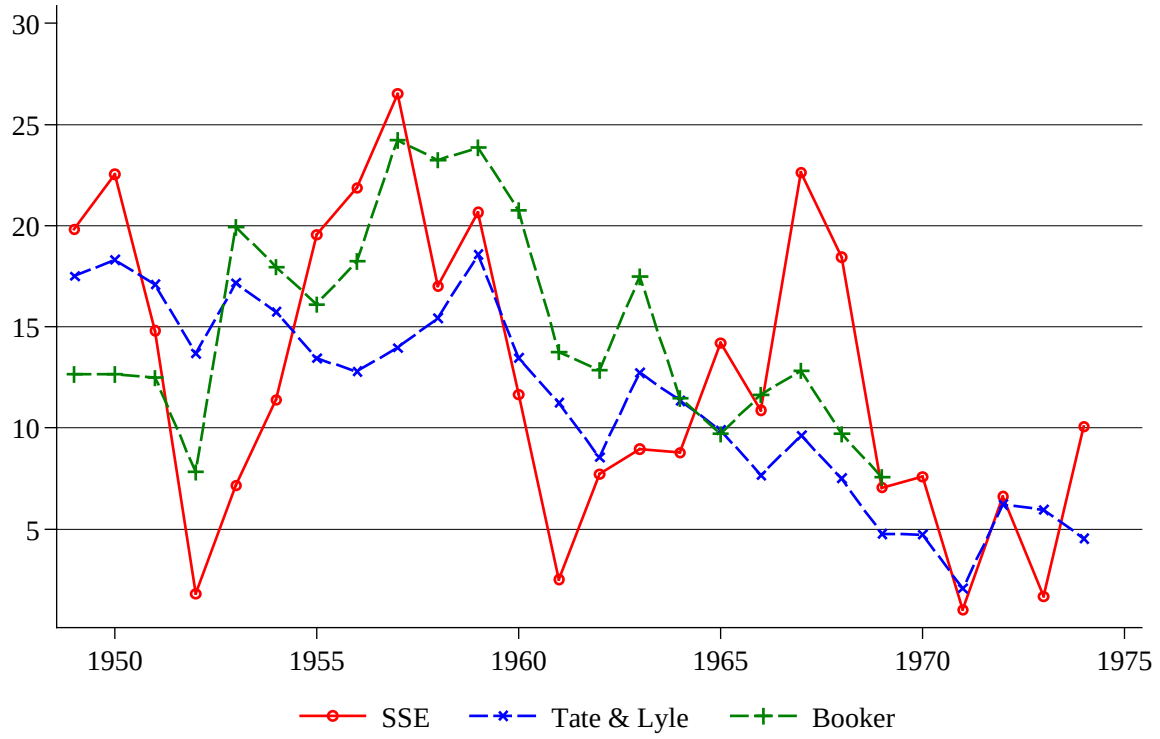
| Source | Firm(s) | Period | Nominal | Real |
|---|---|---|---|---|
| (a) | Harrisons & Crosfield | 1921–1941 | 9.8 | 9.8 |
| | Finlay & Co. | 1924–1941 | 7.3 | 7.3 |
| | Borneo Company | 1921–1941 | 2.7 | 2.7 |
| | *SSE* | *1920–1941* | *7.4* | *7.4* |
| (b) | Selected UK companies | 1939–1950 | 12.9 | 7.2 |
| | *SSE* | *1939–1950* | *14.0* | *7.8* |
| (c) | Lancashire cotton mills | *1920–1938* | 3.2 | 3.8 |
| | Lancashire cotton mills | *1946–1960* | 15.3 | 11.2 |
| | *SSE* | *1920–1960* | *12.3* | *10.0* |
| (d) | UK companies (all) | 1949–1974 | 17.3 | 11.7 |
| | UK food companies | 1949–1974 | 17.2 | 11.7 |
| | Tate & Lyle | 1949–1974 | 16.9 | 11.3 |
| | Booker | 1949–1969 | 19.6 | 15.1 |
| | *SSE* | *1949–1974* | *18.0* | *12.4* |

Note: table reports selected estimates of ROCE for different companies (groups) and periods, giving nominal and real returns.

Source: (a) Jones and Wale (1998); (b) Arnold (2016); (c) Higgins and Toms (2011); (d) own estimates from ESRC/University of Essex Databank of UK Company Accounts 1948–90; all SSE estimates are based on authors' own computations.

In sum, our analysis of external and internal returns to SSE operations reveals that it achieved sustained positive profits over a long period. These did not exceed but rather were comparable in (average) magnitude with those of other large companies headquartered in the UK, including companies with substantial overseas operations (in Africa), as well as those with interests in sugarcane. What this implies is that SSE was neither a stellar success, despite what might seem to be high risks of its operating environment, nor an outright failure. This is in line with the long-standing view that, even conditional on survival, few imperial business ventures delivered spectacular profits. As Hopkins (1988) notes, superprofits were difficult to sustain, especially in the era of formal colonial rule; and, as suggested, extremely high profits were most often associated with monopolies granted to specific trading ventures, such as CFAO and SCOA in French West Africa, or mining operators such as Selection Trust (CAST), Ashanti Goldfields, and Union Minière. Furthermore, the stability of SSE's results (see above) should not be ignored.

Figure 4: Trends in SSE's ROCE vs other UK sugarcane companies, 1949–74




Source: authors' compilation, also using data from ESRC/University of Essex database.

### 5.2 Counterfactual performance

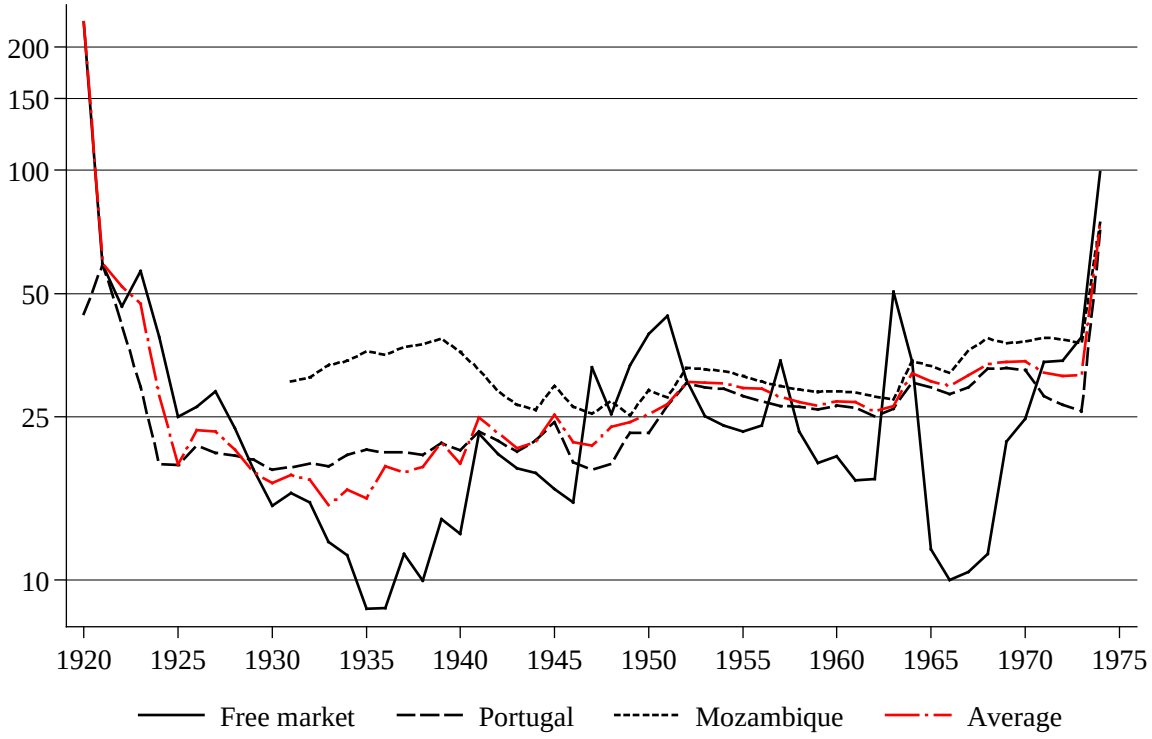
We now move to the core aspect of our research question: did SSE's success depend on rents from specific colonial features of its environment including forced labour and preferential market access? To answer this question we adopt a counterfactual approach as in Mitchel et al. (2011) (also Toms and Beck 2007), in which we re-estimate the firm's ROCE on the basis of alternative and (as we argue) plausible assumptions regarding the cost of labour and effective prices at which SSE could sell its output. Essentially, this amounts to altering the numerator of the ROCE equation by the difference in costs or revenues associated with a particular scenario. For example, under different labour costs we have:

$$\text{Counterfactual ROCE}_t = \frac{(\text{EBIT}_t - \Delta\text{Labour costs}_t)}{\text{Net assets}_t} \qquad (3)$$

We recognize that this approach is simplistic and mechanical. In varying a specific component of costs or revenues we hold all other components entering the ROCE fixed, including the value of the firm's assets—thus abstracting from the complex and interconnected nature of decisions within individual firms (see Toms 2007). But this functions merely as a structured thought experiment; we seek to understand the degree to which SSE's profitability was sensitive to alternative paths for local labour costs and export prices. In so doing, we shed light on whether SSE could have remained a viable enterprise, operating on a similar scale to that observed historically, had it faced different institutional conditions. Furthermore, the two key prices faced by SSE—for local labour and sugar exports—were variables over which the firm exerted limited direct control and were thus at least partially exogenous. As indicated in Figure 5, price agreements (preferential market access) in Portugal and Mozambique meant that SSE was directly not much exposed to variations in the world price in any given year. Even so, SSE was not the only sugar

producer with preferential access to Portugal; and the correlation in price changes between the free market price and the weighted average price at which SSE sold its sugar was over 0.90—i.e. the two markets were hardly autonomous. Also, the cost of labour depended substantially on the level at which the government set the indigenous tax rate or the minimum wage, as well as the extent to which the state was both willing and able to enforce coercive measures. As discussed widely in the context of colonial Mozambique (e.g. Allina 2012; das Neves 1998), outside options through clandestine migration were often available, particularly in porous border regions, meaning that SSE continuously adjusted its wage offer depending on the regions from which it was attempting to recruit as well as (after 1940) in response to competition from other employers.

Figure 5: Trends in SSE sales prices, 1920–74




Notes: log scale; prices are in GB£ per long ton and are inflation-adjusted, based on 1950 constant prices; average is weighted by volume of sales across all markets.

Source: authors' construction.

*Labour cost counterfactuals*

The essential postulated effect of coercive labour institutions is to reduce the price of labour by lowering the value of outside options (Acemoglu and Wolitzky 2011; Dippel et al. 2020). We consider four counterfactual wage scenarios. First, we postulate that all labour was recruited on a so-called voluntary basis and paid correspondingly. Although a significant portion of workers were classified as *voluntários*, a larger number were taken under compulsion from the labour reserves of Zambézia, where substantially lower wage rates applied. So, we simply assume that all local workers were recruited at the higher going rate for *voluntários*, which is the same as assuming that SSE did not have access to a sub-group of extremely low-cost workers.

In this scenario we assume that wage and compound costs were 70 per cent higher than actuals prior to 1930, 50 per cent higher in 1930–60, and 30 per cent higher from 1961 onwards. These assumptions derive from our reconstruction of the internal composition of the SSE plantation

workforce by wage rate and type of contract (*voluntário* vs. *contrato*) at different points over the 1920–74 period, and by estimating the cost of paying all SSE plantation workers the wage rate applying to voluntary workers or, where voluntary worker wages were themselves differentiated, the cost of paying all forced labour the wage rate applying to the lowest rate for voluntary work. In addition, we subtract observed recruitment costs (payments to recruitment agents) and replace them with a 15 per cent bonus, as was commonly applied to *voluntários*.[43] Appendix Table A1 summarizes the assumptions used in the simulations.

The results from this exercise are given in panel (a) of Table 4. The first column reports the original estimated real ROCE (average per decade); and counterfactual column (I) presents results from the counterfactual scenario where all labour is 'voluntary'. While it is to be expected that this counterfactual negatively affects profitability, the relevant question is 'how much did profits fall?'. We estimate that, if SSE did not have access to very low wage labour, real returns on capital would have averaged around 5 percentage points lower in any given year. Although this would still have allowed SSE to remain profitable in each period on average, it nonetheless corresponds to a rate of return considerably below those of other UK-based companies at the time.

Table 4: Estimates of counterfactual ROCE in African operations vs observed series, decadal averages

| **Period** | | | **Counterfactual** | | |
|---|---|---|---|---|---|
| | **Original** | **(I)** | **(II)** | **(III)** | **(IV)** |
| *(a) Labour cost scenarios* | | | | | |
| 1920 | 10.8 | 7.4 | 0.0 | -3.5 | -2.6 |
| 1930 | 6.4 | 3.6 | -1.9 | 1.8 | 6.4 |
| 1940 | 6.5 | 4.2 | -5.6 | 2.9 | 1.0 |
| 1950 | 16.3 | 11.6 | 11.5 | 8.8 | 5.7 |
| 1960 | 11.3 | 6.2 | 10.9 | 5.0 | -0.9 |
| 1970 | 5.4 | 1.9 | 5.3 | 2.4 | 0.5 |
| All | 9.8 | 6.2 | 3.2 | 2.9 | 1.8 |
| *(b) Export price scenarios* | | | | | |
| 1920 | 10.8 | 13.7 | 11.0 | 14.6 | 11.0 |
| 1930 | 6.4 | 2.0 | 3.8 | 5.6 | 6.4 |
| 1940 | 6.5 | 8.0 | 5.3 | 8.6 | 5.5 |
| 1950 | 16.3 | 17.2 | 17.2 | 30.3 | 25.1 |
| 1960 | 11.3 | 0.9 | 0.8 | 22.2 | 15.6 |
| 1970 | 5.4 | 12.2 | 6.8 | 20.6 | 10.2 |
| All | 9.8 | 8.7 | 7.6 | 16.7 | 12.5 |

Note: cells report estimates of the ROCE for SSE (by decade) comparing original historical estimates vs. simulated counterfactuals; panel (a) considers labour cost scenarios where counterfactual: (I) assumes all labour was recruited on a voluntary basis, (II) assumes local labour costs were always no less than 40% of total production costs, (III) assumes local wages were the same as those of unskilled rural workers elsewhere in the region, and (IV) fixes the real wage at the value observed in 1965–69; panel (b) considers sugar price (trade access) scenarios where counterfactual: (I) assumes all sales to Portugal were at the annual average free market price (London CIF), (II) assumes all sales outside Portugal were at the free market price, (III) assumes all sales to Portugal attracted the annual USA in-quota preferential price premium, and (IV) assumes all sales outside Portugal attracted the annual USA in-quota preferential price premium.

Sources: authors' own estimates.

The second scenario is similar in spirit to the first. Cost estimates from a range of (labour-intensive) tropical sugar plantations in other locations during the same period all suggest that local labour

[43] Per capita compound costs are estimated to rise by the same amount as wages in each of these scenarios in order to simulate parallel increases in the social wage incurred by increased levels of labour stabilization.

costs—which cover not only direct wages but also food, accommodation, and other indirect expenses—generally represented at least 40–50 per cent of total production costs. For instance, for all years for which data are available, annual labour costs never fell below 46.8 per cent of total costs in British Guiana (1945–52); nor below 39 per cent in Jamaica (1938–40 and 1955–65); nor below 49.8 per cent in Trinidad (1954–59).[44] For SSE, we estimate the share of local labour costs in total production costs as somewhat lower than this benchmark, at 36 per cent on average for the full period. However, this share was significantly lower in the 1940s and 1950s, at nearer 30 per cent. Thus, we simulate returns to capital by applying the assumption that local labour costs were never less than 40 per cent of total production costs. These results are reported in column (II) of Table 4. With the exception of the 1920s, when labour costs were relatively high due to a large proportion of SSE's workers being paid at Manica/Sofala rather than Zambézia rates,[45] the mean counterfactual ROCE for the remaining period falls to just 2.1 per cent (versus 9.6 per cent in the observed series). Thus, again, the expected performance of SSE appears substantially worse when we assume that local worker costs were more comparable (in relative terms) to those of tropical sugar plantations elsewhere.

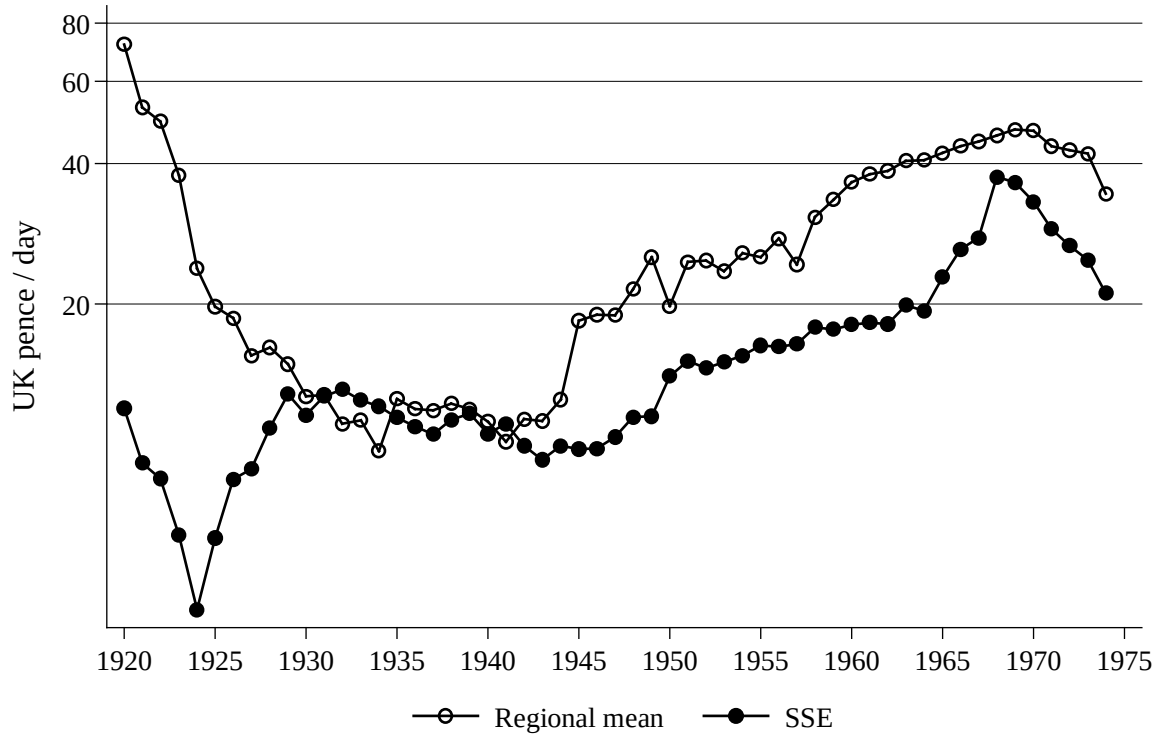
Continuing this comparative mode of analysis, the third scenario assumes that local workers at SSE faced similar conditions to local workers in other countries of the region, to which Mozambicans often migrated. Here we use historical daily wage data collected by Frankema and van Waijenburg (2012) for rural unskilled African workers from Nyasaland, Tanganyika, Kenya, Uganda, and Mauritius (all in GB£, as per SSE accounts). From this we construct the regional average wage and then multiply local labour costs at SSE by the ratio of this average to the average wage in SSE—e.g. if the regional average was 10 pence per day versus 5 at SSE, then our counterfactual scenario would assume that labour costs at SSE should double. Figure 6 plots the two wage series (regional mean and SSE) over time and confirms that average wages at SSE were generally lower than those in the region, especially in the 1920s and after World War II. And it is precisely in the post-war period that Mozambique persisted in applying statutory forms of labour coercion, unlike elsewhere in East Africa, where such requirements had been outlawed (Cooper 1996).

The results from this counterfactual, reported in column (III) of Table 4, suggest that, had SSE raised labour expenses in line with the average level of remuneration in the region for similar workers, its real returns would have fallen to around zero over the long run. In nominal terms, we estimate that the counterfactual operating profits under this scenario would have been in negative territory for 16 years versus 2 years in the observed series. In this environment, it is difficult to imagine that SSE would have been able to raise capital and operate as a going concern in line with its original form.

[44] For Guiana data see IBRD (1953: 135, table 26); for Jamaica see Chalmin (1990: 319, 333); for Trinidad see Boards of Inquiry 1955 and 1961 (data adjusted to exclude outgrower sugar).

[45] Marromeu and Caia plantations were in Sofala and prior to 1930 still had workforces predominantly from these provinces.

Figure 6: Real daily wage rates at SSE and for the average unskilled rural African in the region, 1920–74




Note: regional mean refers to wage rates for unskilled rural labour in Nyasaland, Tanganyika, Kenya, Uganda, and Mauritius taken from Frankema and van Waijenburg (2012); log. scale applied.

Source: authors' construction.

Last, we adopt a more extreme counterfactual position on real earnings. As Figure 6 shows, real wages at SSE climbed steadily in the post-WWII period, particularly abruptly in the second half of the 1960s, when statutory instruments requiring Africans to find paid work were finally repealed. This also coincided with moves within SSE to establish a more stable (permanent) local workforce (see above). Under the assumption that the conditions facing the local workforce in this later period were such that most would freely choose to work at SSE, we calculate the nominal daily wage corresponding to a real wage fixed at the value observed in 1965–69. On this basis, we adjust African labour costs in the ROCE calculation by the ratio of the counterfactual nominal wage to the observed actual average wage. Column (IV) of Table 4 indicates that this scenario corresponds to considerably lower operating profits, especially in the first 30 years under analysis. Indeed, in this period (1920–49), we estimate that SSE would have sustained an operating loss in 26 of the 30 years. And, overall, the average ROCE for SSE under this counterfactual falls to -7.2 per cent, a full 17 percentage points lower than the observed rate. Put differently, it is difficult to imagine that SSE could have sustained its business model with a free permanent African workforce. We discuss the implications of these findings further below.

*Sugar price counterfactuals*

SSE's preferential access to the Portuguese market, based on a TRQ and a company quota system, implied that it often received prices for its sugar above those of the free market. However, Portugal absorbed only between around 40 and 60 per cent of its raw sales, meaning that the company navigated a complex and volatile sales environment. As shown in Figure 5, export prices received by SSE sometimes varied by a factor of two in any given year between different destinations. Nonetheless, the weighted average price at which SSE was able to sell raw sugar was typically (but

not always) higher than the free market price, with an average premium of around 25 per cent for the full period.

The simplest sales price counterfactual is to assume that the firm uniquely sold on the free market. Thus, panel (b) column (I) of Table 4 simulates the ROCE of the firm's African operations, assuming that all sales to Portugal were at the relevant annual average London CIF price. Notably, this yields only a moderate (1.2 per cent) reduction in the full-period average return (see also Appendix Table A1). However, this is driven by much larger negative differences in both the 1930s and 1960s, when the free market price hit historical lows (see Figure 5). Indeed, in both these decades we estimate that the return on capital would have been approximately zero had SSE not benefited from colonial protection.

Of course, another source of rent was protected access (sales) into the local market (increasingly in the later period), as well as sales within the broader region under conditions of geographical protection or to other Portuguese colonies under preferential arrangements. Thus, our second counterfactual simulates returns under the assumption that all sales *outside Portugal* were at the free market price—i.e. that the only source of protection came in Portugal itself. These results, shown in column (II) of Table 4(b), are almost identical to those of the first, showing a moderate fall in the overall ROCE but much larger drops in the 1930s and 1960s. This reflects the fact that the prices at which SSE was able to sell its sugar under other circumstances were very similar to those of its exports to Portugal.

A possible concern with the previous scenarios is that very few (if any) large sugar producers have relied on open sales to the global market. As the history of the industry bears out, complex market access arrangements have been and continue to be the norm, justified as essential to reduce risks for producers (investors) and stabilize prices for consumers. Indeed, it bears note that on average SSE sold less than 10 per cent of all sugar exports at the free market price. Thus, an alternative counterfactual is to look at plausible alternative preferential arrangements. Here we select the USA, which historically has used market access quota commitments for sugar imports, allowing certain 'colonial' exporters (e.g., Hawaii, Philippines, Puerto Rica) and Cuba to benefit from a substantial quota price premium (see Ballinger 1978; Sicotte and Dye 2006). Thus, we construct an alternative price series that adds the effective premium on Cuban in-quota exports to the USA to the going free market price. We then re-run the first two counterfactuals, substituting this USA in-quota price for the free market price—i.e. in the first case we assume that all sales to Portugal were sold at the USA in-quota price.

The results from this exercise, summarized in columns (III) and (IV) of Table 4(b), reveal that the preferential market access arrangements enjoyed by SSE on sales to both Portugal and the region were not extreme in comparative terms. The simulations suggest that had SSE benefitted from arrangements similar to those faced by countries covered by US 'colonial' sugar import quotas, its ROCE would have been substantially higher—almost double, at 16.3 per cent on average (column (III)). Moreover, in the post-WWII period, estimated returns to holders of SSE capital would have been well over 20 per cent, placing it toward the upper end of the distribution of returns achieved by UK-based companies in the same period.

### 5.3 Offsetting factors

As a final exercise, we address our third research question. Broadly, there are two main candidate explanations for why high internal and external returns may not be realized despite the presence of substantial colonial rents. The first is that such rents were offset by comparatively high costs, risks, or inefficiencies elsewhere in the business. While this issue is difficult to unpack without comparable data from other firms, the small *relative* share of African labour in total operational

costs is nonetheless striking—see Table 2 panel (c). On average, these costs represented just 18 per cent of total operational costs, reaching a maximum of about 35 per cent in the early 1950s. In contrast, despite numbering in the few hundreds compared with the tens of thousands of Africans, total costs associated with European employees were of the same rough order of magnitude for the majority of the period. Put differently, the cost of hiring one European was at least 20 times that of the average African, representing a significant financial burden on the firm. The scale of European employment at SSE mainly reflected the company's extreme racial division of labour, with no Africans employed above the level of field foreman or tractor driver until the late 1960s (Lapperre 2020: 211).[46]

The second explanation for lower-than-expected profits is the potential negative effects of rent-extracting institutions on overall productivity. This may arise through multiple channels. At SSE, however, two dominated: degradation of human capital and prolonged postponement of productive investment as a result of the forced labour system. The conveyor belt-like supply of cheap labour through this system made all but a few African labourers literally expendable. Wastage of entire *ensaca* of men delivered to the estates persisted into the 1940s—Head (1980: 295) notes, for example, that of a consignment of 792 Angoni *contratados* in 1941, fewer than 50 completed their contracts,[47] and those that survived did so on a malnourished and disease-prone basis. Workers' average weight was very low, with only 21 per cent of a 1942 sample of 1,474 men weighing 60 kg or more, while the incidence of parasitic infections was 79 per cent in 1939 and 100 per cent in 1954 (Head 1980: 221, 289–90).

Additionally, as predicted in Edlin and Stiglitz's (1995) model, for long stretches of SSE's history expenditure on maintaining a system of labour repression had a higher priority than capital expenditure. From 1936 to 1951, SSE spent a nominal annual average of just under GB£50,000 (equivalent to 5 per cent of average equity) on 'recruitment'—mostly lubricating the machinery of public administration—while the nominal book value of its capital equipment did not increase at all. Only after the dawn of the new sugar regime in 1952 did annual expenditure on new capital equipment overtake that on recruitment (uncatalogued ledger, HP; R&As 1936–53).

To investigate this issue more formally, we adopt a real production function approach. Concretely, we model the quantity of raw sugar produced in any given year as a function of real labour (*H*), capital (*K*) and land inputs (*L*). And, to capture variation in total factor productivity (TFP, denoted *A*) associated with rent-creating institutions, we model this term as a linear function containing proxies for these rents as well as a time trend (to capture unobservable factors). Our working hypothesis is that higher labour-related and market-access rents were associated with lower overall input productivity. Thus, we analyse versions of the following general specification:

$$Y_t = A_0 e^{\{\delta t + \pi w + \phi m\}} \cdot H_t^{\alpha} \cdot K_t^{\beta} \cdot L_t^{\gamma} \cdot \varepsilon_t$$

where *t* denotes time in years; *w* is a proxy for labour-related rents; *m* is a proxy for market-access rents; and the final term is the residual, assumed white noise. Taking natural logarithms yields a simple linear functional form, which we estimate by OLS for the full period (N=55).

The results are reported in Table 5. Column (I) imposes the crude assumption of constant TFP, which is relaxed in column (II) such that productivity can evolve linearly with time. This improves

[46] Until then the only white-collar African workers were 'office boys'; skilled mill workers were 'coloureds' from Mauritius, Goa, or Guyana.

[47] 696 had to be repatriated early, 16 died, and 31 were hospitalized (Head 1980: 295).

the fit of the model and yields coefficients on the three input factors that are all positive, are significantly different from zero, and sum to one (in line with a Cobb–Douglas technology; see note to table). The coefficient on the time trend indicates that productivity was slowly increasing over the period, at around 1 per cent per year. Column (III) adds to this specification our first proxy for labour-related rents, namely the ratio of the synthetic price index to nominal African wages—i.e. an increase in this ratio implies a lower relative cost of labour. To assist interpretation, we express this ratio relative to its value in 1962, corresponding to the year after the repeal of the Native Labour Regulations and its replacement by the Rural Labour Code, which also marks the start of a period of significant real wage increases. The results indicate a moderate negative elasticity between factor productivity and the magnitude of these rents.

Table 5: Results of econometric productivity analysis, SSE, 1920–74

| | (I) | (II) | (III) | (IV) | (V) | (VI) | (VII) |
|---|---|---|---|---|---|---|---|
| Labour | 0.07 | 0.27** | 0.28** | 0.50*** | 0.27** | 0.28** | 0.59*** |
| | (0.12) | (0.12) | (0.12) | (0.14) | (0.12) | (0.12) | (0.11) |
| Land area | 1.25*** | 0.64*** | 0.54** | 0.73*** | 0.65*** | 0.61** | 0.55*** |
| | (0.17) | (0.22) | (0.22) | (0.19) | (0.22) | (0.23) | (0.16) |
| Physical capital | 0.33*** | 0.24*** | 0.24*** | 0.35*** | 0.24*** | 0.24*** | 0.39*** |
| | (0.04) | (0.04) | (0.04) | (0.06) | (0.05) | (0.04) | (0.05) |
| Time | | 0.01*** | 0.01*** | -0.00 | 0.01*** | 0.01*** | -0.01** |
| | | (0.00) | (0.00) | (0.01) | (0.00) | (0.00) | (0.01) |
| Real wage index (log.) | | | -0.10* | | | | -0.22*** |
| | | | (0.05) | | | | (0.04) |
| European cost share | | | | -0.40*** | | | -0.55*** |
| | | | | (0.14) | | | (0.12) |
| Relative protection | | | | | -0.01 | | -0.05 |
| | | | | | (0.04) | | (0.04) |
| Global price index | | | | | | -0.01 | -0.01 |
| | | | | | | (0.03) | (0.02) |
| Constant | -3.90*** | 0.24 | 1.20 | -2.93* | 0.23 | 0.46 | -1.98 |
| | (1.12) | (1.49) | (1.56) | (1.71) | (1.51) | (1.55) | (1.46) |
| Obs. | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| R sq. | 0.87 | 0.91 | 0.91 | 0.93 | 0.91 | 0.91 | 0.95 |
| Returns to scale - 1 | 0.65 | 0.16 | 0.07 | 0.58 | 0.16 | 0.14 | 0.54 |
| (prob.) | 0.00 | 0.34 | 0.70 | 0.01 | 0.35 | 0.43 | 0.00 |

Note: table reports log linear production function analysis, using alternative specifications; dependent variable is raw sugar production volume; columns (III) onward add proxies for variables that may affect TFP, including: the real wage index (the log. ratio of our synthetic consumer price index to nominal African wages, 1962 = 1), relative protection (the ratio between the average sales price obtained by SSE to the free market price), and a global price index (the ratio of the free market sugar price to the synthetic consumer price index). Significance: * 10% ** 5% *** 1%

Source: authors' own estimates.

Column (IV) employs an alternative proxy for labour-related rents, now the relative share of European labour costs in total operational costs. In effect, this can be seen as capturing the excess burden arising from expenditures on costly expatriate workers or the unequal and racialized treatment of workers, where higher values for this ratio (also expressed relative to 1962) imply a greater burden. This term is also negative and significant, suggesting that if the relative weight of expatriate labour costs in total costs were to double, TFP would decline by around 40 per cent.

Columns (V) and (IV) consider the relationship between rents from market access (proxied by sales prices) and productivity. The former includes an index of relative protection, defined as the ratio of the average sales price obtained by SSE to the free market price; and the latter (as a control)

simply includes the ratio of the free market price to the synthetic price index. Considered separately, neither of these proxies displays a statistically significant conditional association with output. Even when we include all the proxies simultaneously in the model, as per the results in the final column, this non-association still holds. In contrast, this model shows substantial and highly significant associations with *both* of the labour-related proxies. Not only is the result consistent with the previous finding that labour-related costs were generally a more important source of profitability; an additional insight now is that access to these rents, and perhaps the corresponding burden associated with high European labour costs, may well have impeded longer-run productivity growth, plausibly through lower investment in modern technologies (see above).

## 6 Conclusion

This paper set out to connect two hitherto largely separate literatures: studies on the return to private investments in the colonies and analyses of the nature and legacies of (extractive) colonial institutions. We argued that both these literatures had largely taken an aggregate view, and the focus of previous studies on returns to external investors meant that it was generally not possible to dig into the internal drivers of firm profitability. Our contribution has been to take a firm-level perspective. Through reconstruction of SSE's annual financial records from 1920 to 1974, we were able to trace the evolution of net earnings and their corresponding components, particularly labour input and sugar output quantities, as well as corresponding factor prices. This was in a context of sustained access by the firm to forced labour (legally abolished only in the early 1960s) and preferential trading arrangements with the metropole in Portugal.

In keeping with existing studies of returns to colonial investments, we found that SSE achieved moderate yet stable returns over the 55 years analysed. Compared with investments in 'risky' UK assets, which yielded an average real annual return of 7 per cent over the period 1920–74, we estimate that investors in SSE obtained an average real return of 4 per cent, ranging from 8.6 per cent in the 1920s to a negative real return (-2.2 per cent) in the 1970s as economic challenges mounted. The comparable return on capital employed, a more precise measure of profitability, was 9.8 per cent for the same period; this was also of a similar order of magnitude for a range of UK companies (for which we have data).

Turning to the contribution of 'colonial institutions' to this performance, we focussed on: access to cheap labour, achieved via various coercive legal instruments including the legal obligation to undertake work and head taxes; and preferential access to the Portuguese market, primarily through tariff rate quotas and guaranteed prices. Sets of counterfactual simulations, in which we varied input (local labour) and output (sugar) prices based on plausible less extractive regimes, revealed two basic insights. First, access to cheap labour was an essential component of the SSE business model, at least for lengthy periods; various plausible scenarios suggest that cost increases associated with lower access to compelled labour would have lowered real profitability by at least one half, possibly putting into question the firms' operational viability. Second, preferential market access was not such a fundamental driver of success; returns to SSE capital would have remained at the same order of magnitude (when viewed over the long run) if a much larger portion of its product had been sold on the free market. We also showed that the degree of preferential treatment afforded to SSE was not nearly as large as that shown to in-quota suppliers to the USA.

Finally, we investigated the extent to which access to these colonial rents may have affected overall firm productivity. An econometric production function analysis revealed that higher rates of local labour exploitation and higher relative expenditures on European workers were associated with lower total factor productivity. This is consistent with the record of slow or late investment in

technological innovation, such as higher-yielding varieties, as well as very high rates of mortality and morbidity on the plantations at least until the 1950s.

We conclude from this case study that the consequences of extractive institutions for colonial firms were dual-faced. On the one hand, their direct effect was to support higher profits than would otherwise have been obtainable (e.g. if labour were provided in a free and non-racial labour market). On the other hand, they likely had a perverse effect on productivity and, perhaps, by sustaining a highly racialized social and economic structure, may have sowed the seeds of their own destruction.

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# Appendix

Table A1: Assumptions used for counterfactual simulations

| | | Counterfactual | | | |
|---|---|---|---|---|---|
| **Period** | **Original** | **(I)** | **(II)** | **(III)** | **(IV)** |
| *(a) Total local labour costs (pence per worker/day)* | | | | | |
| 1920 | 11.3 | 16.6 | 31.3 | 43.2 | 55.6 |
| 1925 | 11.0 | 16.4 | 26.1 | 24.2 | 18.8 |
| 1930 | 12.8 | 17.6 | 26.1 | 21.4 | 12.0 |
| 1935 | 10.5 | 13.9 | 22.0 | 15.5 | 11.2 |
| 1940 | 9.5 | 12.0 | 21.0 | 12.9 | 10.3 |
| 1945 | 11.6 | 13.4 | 22.2 | 14.8 | 19.0 |
| 1950 | 19.0 | 21.6 | 24.1 | 25.2 | 27.0 |
| 1955 | 19.5 | 25.3 | 22.5 | 26.2 | 29.9 |
| 1960 | 22.6 | 28.1 | 23.6 | 31.2 | 41.3 |
| 1965 | 31.1 | 39.7 | 25.7 | 39.6 | 43.1 |
| 1970 | 26.9 | 34.9 | 24.9 | 33.8 | 38.2 |
| *(b) Average sugar export price (£/ton)* | | | | | |
| 1920 | 111.1 | 115.7 | 111.2 | 116.8 | 111.2 |
| 1925 | 27.9 | 32.4 | 28.3 | 34.0 | 28.5 |
| 1930 | 22.6 | 19.4 | 21.2 | 21.2 | 21.9 |
| 1935 | 25.0 | 18.4 | 20.6 | 24.6 | 25.6 |
| 1940 | 29.3 | 27.7 | 26.4 | 28.9 | 26.7 |
| 1945 | 31.0 | 33.2 | 31.0 | 33.2 | 31.0 |
| 1950 | 38.2 | 40.5 | 41.2 | 47.0 | 44.1 |
| 1955 | 37.1 | 35.2 | 34.8 | 43.5 | 40.6 |
| 1960 | 37.0 | 38.3 | 36.1 | 44.5 | 40.1 |
| 1965 | 42.6 | 28.9 | 31.2 | 47.6 | 44.3 |
| 1970 | 54.7 | 59.5 | 57.0 | 64.1 | 58.5 |

Note: table reports 5-year averages for total local labour costs (panel a) and average price of all sugar African sales (panel b), used as inputs into the counterfactual scenarios reported in Table 4; all values deflated by the synthetic price index (1962 = 1); ‘original’ indicates observed historical values.

Source: authors’ estimates.