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(Re)financing the Slave Trade with the Royal African Company in the Boom Markets of 1720[1]

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ABSTRACT

In 1720, subscription finance and its attendant financial policies were highly successful for the Royal African Company. The values of subscription shares are easily understandable using standard elements of derivative security pricing theory. Sophisticated provision for protection of shareholder wealth made subscription finance successful; its parallels with modern innovated securities are demonstrated. A majority of Company shareholders participated in the re-financing, but could provide only a small portion of the new equity required. The re-financing attracted to the subscription an investment class that was strongly composed of parliamentary and aristocratic elements, but appeared to be only weakly attractive to persons who had already invested in the East India Company and was not attractive at all to Bank of England investors or to those persons who were investing in newly created marine insurance companies. Subsequent trade in subscription shares was more intense than was other share trading during the South Sea Bubble, but the trade was only lightly served by financial intermediaries. Professional financial intermediaries did not form densely connected networks of trade that were the hallmarks of Bank of England and East India Company share trading. The re-financing launched an only briefly successful revival of the Company's slave trade.

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Keywords: South Sea Company; South Sea Bubble; goldsmith bankers; subscription shares; call options; derivatives; installment receipts; innovated securities; networks.

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In this paper we re-visit the activities of the Royal African Company (hereafter, the RAC) and its owners in the booming equity markets of 1720 London. This topic has been the sole attention of authors only once before (Carlos, Moyen and Hill 2002) and we want to expand upon that history. There are several reasons why it is now opportune to do so.

First, there exist only three datasets of the requisite quality and completeness that will allow study of trading behaviour of individual investors during the South Sea Bubble. One of these datasets, the trade in Bank of England (BoE) shares, has been previously studied (Carlos and Neal 2006; Carlos, Neal and Wandschneider 2007). To that dataset have been joined data on trade in East India Company (EIC) shares (Mays and Shea 2011 and Shea 2011). The only other data of comparable quality to the EIC and BoE data are data on trade in the RAC's engrafted (subscription) shares that were issued in 1720.[2] One of the objects of this paper therefore is to integrate RAC subscription share trade data into the combined EIC and BoE trade networks that were the particular subjects of study by Mays and Shea (2011) and Shea (2011). The RAC engraftment was a subscription for new equity that took place within a fortnight near the end of April 1720. It was not the only subscription that sprung up at that time. We have the lists of persons for two major insurance ventures as well as the first two of four issues of shares by subscription by the South Sea Company. Who were the people that participated in these subscriptions? What did they have in common with, and how did they differ from, investors who were already established as owners of shares in the EIC, the BoE or

[2] Regrettably, no data for trade in South Sea Company shares exist. Trading data has to be nearly 100 percent complete if it is to describe a network of trade with information on investors' stock inventories and the speed by which they conduct their transactions. For this reason we have to exclude from our studies the data on trade in original, fully-paid RAC shares that have been analysed by Carlos, Maguire and Neal (2006). It is clear that such very large amounts of data for this trade are missing for the late summer and

even in the RAC itself? What relations would they have had with people who were newly subscribing monies to marine insurance ventures or to the South Sea Company?

A second reason to look again at the RAC's attempts to re-finance its trade in slaves is that we can now come to a slightly more refined conclusion with regard to its impact in the transatlantic market for slaves. The database on the trans-Atlantic slave trade that is the product of David Eltis and his numerous collaborators is an element in making such a re-assessment possible (Eltis and Richardson 2008). The RAC, in co-operation with the South Sea Company, took advantage of the financial conditions of early 1720 and a window of opportunity for British participation in the slave trade to attempt to regain some status as a supplier of slaves. Although those conditions would not persist for more than three years after 1720, the RAC was in that period able to maintain the size of equity investment in its activities at the highest levels that had ever been achieved in the Company's history. We support this assertion by presenting a reconstruction of the long-term history of equity values and returns to RAC investors (Appendix A). It is a mistake therefore to place the RAC re-financing of 1720 alongside the more ephemeral speculative endeavours that were supposed to be the by-product of the South Sea boom. Numerous authors have recounted these ventures as largely spurious promotions, although we have to count at least two of them as being completely successful because the London Assurance and the Royal Exchange Assurance exist to this day. Before they were themselves absorbed into even larger insurance company amalgamations after 1970, they were amongst the largest and most successful insurance firms in the world. And both were first financed in the booming markets of 1720 (Drew 1950 and Supple 1973). The RAC that emerged from a financial re-structuring in 1720 thus falls somewhere

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autumn of 1720 that construction of data for net trade between individuals is impossible (Mays and Shea, 2011, Appendix A).

between the more ephemeral promotions of 1720 and these two completely successful insurance company promotions.

A third reason to look again at the RAC re-financing is that it is simply a heretofore unappreciated example of precocious financial engineering. A reader of only the introductory and the survey literature of the South Sea Bubble would expect that no such examples would exist, for in that literature financial managers are depicted largely as duplicitous and naïve and investors, of course, are for the most part hysterical (Hoppit 2002). The evidence we present is circumstantial, but weighty, because it is consistent with a number of design features of the RAC's subscription share issues and the market's responses to them. The evidence will be easily understood by any student of elementary corporate finance theory who has mastered the mechanics of designing a rights-issue of equity shares in credit-constrained markets for finance. DuBois (1938) recognised that subscription financing was ubiquitous in early modern British corporate finance and, from a legal perspective, he recognised that it was also distinct from other forms of equity financing. Investors in subscription shares would possess an option to deny to a corporation already-promised finance in circumstances described by law and contract. Ignoring this aspect of subscription finance has already had a deleterious effect on the literature of the South Sea Bubble (Shea 2007a and 2007b). We shall show that the RAC subscription shares have the same features of the eighteenth-century subscription shares surveyed by DuBois – indeed, we will show that this is the only sensible way that the prices of the RAC subscription shares can be understood. To establish this thesis in the South Sea Bubble literature could also be of benefit in future research on the Bubble. An empirical student of modern bubbles and crashes knows the value of having at hand data on the value of derivative securities. Analysing the values of derivative securities is a way towards measuring

such things as the size of risk (expected volatility) and the market price of risk. We proceed with this task immediately in the following section.

I

The RAC subscription share issue of 1720 arose from an equity capital enlargement scheme that was called an "engraftment". A complete description of the engraftment design is found in an indenture agreement between the Company and a group of trustees who administered the engraftment.[3] The subsequent performance of the engraftment is described in a 1724 report by the trustees to the Company.[4] Our account in this section draws heavily upon these two documents.

The engraftment was devised by one Joseph Taylor and several officers of the RAC who are named in the indenture. Joseph Taylor was not part of the Company's management, nor was he a RAC shareholder, although we have observed elsewhere that he was an active investor and trader in EIC and BoE stock. He is not otherwise identified in RAC sources, but from his signature, which also appears in many other BoE documents, we know that he was the same Joseph Taylor who was the clerk of Bridewell Royal Hospital, prominent Tory lawyer (Inner Temple), close associate of Bishop Atterbury and later MP (Sedgwick 1970, vol.2, pp. 463-4). Taylor's expertise might well have been applied to only the legal structure of the document and the financial design of the engraftment was authored by Company officers. We do not know enough about the origins of the engraftment to identify who was the author of its financial provisions, although there is so much on the matter in the correspondence of James Brydges, first Duke of Chandos, to suggest that the Duke was one of the major promoters of the scheme and may have had a hand in its

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[3] T70/101 *Minutes of the General Court, 1678-1720* [page 196 verso].
[4] T70/115/199, *Report of the Trustees of the Proprietors of the Old Stock, Submitted to the Committee of Accounts of the Royal African Company, April 30, 1724*.

design.[5] In early 1720 Chandos repeatedly referred to Taylor and 'cousin' Walcot as being intimately concerned with the new RAC financing. Humphrey Walcot, who was a relation by marriage to Chandos, was a Director of the RAC. In many letters Chandos was clearly managing the allocation of new shares on the subscription list to friends, mostly aristocratic. In two letters he was also concerned in the post-engraftment powers the Company would have to call upon shareholders to contribute more capital. We cannot find letters, however, in which he appeared to have been involved in the design of the engraftment itself.[6] At the time Chandos was writing these letters he was not yet a RAC shareholder.

The engraftment indenture agreement opens with a preamble which states that a new cash infusion was needed to remove a burden of debt and to reinvigorate the Company's trade. The RAC had an old, but vulnerable, position in the legally sanctioned transatlantic slave trade, but after the Glorious Revolution it endured years of losses and deteriorating trading conditions caused by competitors and war (Carlos and Kruse 1996). To revive its trade it would need new investment and the indenture specified that new capital was to be in the form of equity to be sought from the public. The Company was seeking to more than quadruple the number of shares issued and outstanding, implying that new subscribers would end up owning more than 3 shares for every original share outstanding. In this very important respect the RAC subscription share issue was different from the South Sea Company subscription share issues that were occurring at the same time; subscribers to the

[5] Correspondence of James Brydges, Stowe Collection, Huntington Library. My grateful thanks to Larry Neal for providing to me extensive transcripts of this correspondence.

[6] Chandos to Taylor and Chandos to Lockwood, both 18 March 1720, Stowe Collection. Corroborating evidence of Joseph Taylor's identity is in the former letter when Taylor is referred to as having acted as Lord Castlemaine's solicitor. The RAC, under its charter, was obliged to define the limit of the liability on shares, which could be in principle be larger than the monies originally contributed to the firm by shareholders. In these letters Chandos is responding to

RAC shares would end up owning more than 75 p.c. of the firm's equity, whereas South Sea subscribers could never expect to own more than 15 p.c. of South Sea equity.[7] Since original shareholders were being asked to effectively relinquish control of the Company to new investors, it is not surprising that the indenture agreement established strong safeguards for original shareholder rights and wealth.

Original shares numbered 4,304 and the indenture specified that there would be added to them 15,696 new shares to result in 20,000 shares in all. The original and newly engrafted capital would be assigned a new book value of £500,000. That is, each of the 20,000 shares would be rated at a nominal value of £25 per share (p.s.) and that would also be the price that subscribers would have to eventually pay for their 15,696 shares. Thus it was planned that £392,400 would be the total monies raised by the new issue.[8] It is that this point that the indenture clearly turns its attention to the protection of original shareholders. The indenture states that the best estimated value for all original assets ("stock") was £240,000, but original shareholders would own only £107,600 (=£500,000×4,304/20,000) of the £500,000 new book value, so they must be compensated £132,400 (= £240,000 - £107,600) out of the £392,400 paid by newly subscribing shareholders.

To the modern student of corporate finance the language of the document at this point is decidedly strange. How did the authors know that current assets were worth £240,000? More strangely, why would they specify a new book value of only £500,000 when they clearly intended to add another £392,400 to the Company's coffers? The £240,000 figure appears to be what we would now style a minimum net

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critics that the proposed limit of 132 p.c. might be too small to allow further expansion in the RAC's trade.

[7] Shea (2007b), Supplementary Appendix B, presents an analysis of the size of the South Sea Company's subscription share issues.

[8] By 1726 £387,967 had indeed been collected from subscribers (see T70/1186, *Rough Drafts and Copy Book A* [contra 142], *"London April 1726, An account of the several sums of money paid in originally and since the Company's establishment by subscriptions, calls or otherwise"*).

asset value and was probably derived by simply looking at the market values of existing shares in early to mid-April 1720. What we show below is that the choice of a book value for shares merely reflects the fact that the authors wanted to raise £260,000 in new funds to be invested in a revival of the Company's physical trade in slaves. Given that target for new funds to be raised, the size of the subscription issue in numbers of new shares would have to have been driven by a choice of an issue price for new shares. Indeed, the choice of the issue price for new shares was to some extent arbitrary, so to really understand the details of the engraftment we need to ask the question as to why the issue price was chosen to be £25 p.s. After all, at the time the engraftment was being drafted RAC share prices were over £60 p.s.

To unravel the reasoning by which these choices were made we need to look a little further into the indenture. Recall the document specified that compensation to original shareholders would have to be financed up to the amount of £132,400, but what precise forms would that compensation take? First and foremost, original shareholders were to be freed of debt. The £132,400 was to be split into two basic funds - £80,000 and £52,400. The £80,000 was for the discharge of a list of enumerated debts amounting to as much as £75,696. This sum was to be delivered by Joseph Taylor to a group of the Company's officers within 21 days after the indenture agreement came into effect. The Company's servants who would then settle and discharge the debts. The residual £4,304 from the £80,000 was to be Joseph Taylor's reward for his role in the scheme. The firm's debt-to-equity ratio was approximately 1:3 (£80,000/£240,000), so we cannot write that the firm was particularly heavily encumbered with debt. The debt, however, was largely long-standing and was owed to many of the firm's suppliers.[9] The debts appear to have been originally short-term

[9] T70/11/5199, cf. fn. 4.

bills owed to these suppliers and to honour these debts was probably a pre-condition for raising new financing.

The other fund of £52,400 was to be delivered by Joseph Taylor to the Company by 1 December 1720 and was to be put to two uses. If more debts were to be discovered, they would be paid out of the £52,400-fund. Secondly, once all such debts were satisfied, the residual would be distributed to the original shareholders in the form of a cash dividend up to £10 p.s. Finally, if the £52,400 were sufficient to pay all debts and to pay the maximum cash dividend of £10 p.s., then the residual monies would be paid to other Company officers for their efforts in administering the engraftment.

We are fortunate to have discovered know how some of the terms of indenture agreement worked out. At least we know how they worked out till the end of April 1726. [10] Joseph Taylor got his £4,304 fee, but the eventual debts of the Company were higher than at first expected. The maximum £10 p.s. cash dividend was not realised and what original shareholders actually got was about £8.34 p.s. But the RAC engraftment worked just about as planned: nearly the whole sums of monies projected to be raised, were raised; the costs of administering the engraftment were contained within the amounts budgeted and all old creditors to the company had been paid in full. This was all accomplished in the difficult financial conditions that followed the collapse of the South Sea scheme.

A primary reason that the subscription was successful was the care taken in protecting the wealth of existing shareholders. There were two mechanisms used to do this that are immediately recognisable to the modern student of corporate finance: i) under-pricing of shares and ii) dividend budgeting. We shall illustrate how the engraftment could have been designed in modern terms and hopefully the reader will

[10] T70/1186, cf. fn. 8.

begin to see the precocious elements of its design. New shareholders had the chance to subscribe for new shares at a subscription price of £25 p.s. and these shares would eventually stand equal to fully-paid shares. At the time the indenture was finally drawn up in early April 1720, fully-paid shares were valued at about £63 p.s. That would have made original shareholder wealth (gross) 4,304×£63 ≅ £271,200 at that time. To this would be added £392,400 from new shareholders, making total value of Royal African equity equal to £271,200 + £392,400 = £663,600. Spread over 20,000 shares this would make the long-term expected value of equity about £33.2 p.s. = $\frac{4{,}304 \times £63}{20{,}000} + \frac{15{,}696 \times £25}{20{,}000}$. We thus conclude that if there were no mechanisms in the engraftment scheme for the protection of original shareholders' wealth, their wealth would have been expected to decline by about £30 (= £63 - £33) p.s.

This potential loss of £30 p.s. in shareholder wealth was precisely prevented by the terms of the indenture agreement. We can now surmise that two numbers, i) the adjusted book value of assets and ii) the assignment of £240,000 to the value of original shares, were numbers jointly chosen to avoid these wealth losses. The resulting protection against wealth losses was manifested in two ways. First, new shareholders directly relieved original shareholders of £75,696 in debts. This relief was worth about £18 p.s. (≅ £75,696 / 4,304 shares). Secondly, original shareholders were also given the budget of £52,400 (or about £12 p.s.), which could be used to either relieve them of any further debts or to pay a cash dividend of up to £10 p.s. So, altogether these two funds would deliver an approximate £30 p.s. compensation to original shareholders.

The indenture agreement, of course, also had to work well and completely or else the anticipated £392,400 would not be paid to the Company. This is where the underpricing of the subscription shares would have played a role. Joseph Taylor was

responsible for delivering funds to the Company's officers in full and in a timely fashion. If for any reason he failed in these tasks, the original shareholders would be the losers. The task facing Mr. Taylor was to define a group of people who could subscribe for shares which, we have already calculated, would have an expected market value of about £33 p.s. These persons would have rights to these shares by paying the special price defined in the indenture agreement. By setting that price (£25 p.s.) to a number well below the expected value of shares, the writers of the indenture would have made sure that Mr. Taylor's solicitation of subscriptions was easy. A second set of features of the subscription shares that would have made them popular is that they were issued in small denominations and in large numbers. As long as investors could have rationally expected that RAC shares would never fall to a value less than £33 p.s., it would make sense to buy the subscription shares and to continue to make payments on their instalments.

The indenture stipulated that a £8 per new share deposit would very quickly be made to the Company. Further instalments collected by Mr. Taylor would be due on or before 1 June (£5 per new share), 1 September (£5 per new share) and 1 December (£7 per new share). Relatively small instalments due from Mr. Taylor put relatively little pressure on the numerous subscribers in paying their instalments. The original deposit on the shares would be sufficient to extinguish the Company's debts and was nearly enough as well to fill the budget for the promised maximum £10 p.s. dividend to original shareholders. The subsequent payments on the subscription shares would then become the new equity investment in the revival of the RAC's trade.

The re-financing of the RAC was a near complete financial success. In the stringent credit conditions of 1720 and 1721 there were defaulters, to be sure, but most of them eventually made good their obligations to the Company (with interest)

by 1724. But how was the refinancing viewed by the markets after the subscriptions were made? The boom and crash in equity values in 1720 were market-wide. Like South Sea Company, EIC and BoE shares, RAC share values rose and fell spectacularly. The values of the subscriptions shares followed this same pattern, but there is nothing remarkable about this fact. After all, subscriptions shares were ultimately claims upon original shares at a later date and thus they were literally derivative securities; their markets values would have to have been derivative of the market values for RAC original shares. But we know that in our own times the relative pricing of derivative securities can be analytically challenging. How hard would this task have been in the markets of 1720? The task actually would have been trivially easy.

Any owner of a subscription share could have chosen not pay instalments on the shares as long as he or she was willing to bear the costs of doing so. These costs could have been penalties imposed by the Company or by law. It matters not how easy or by what means such penalties could be imposed because as long as there was no incentive to default on instalments, subscribers would not likely do so.[11] As was discussed above, this was what underpricing of the RAC subscriptions shares achieved. Such underpricing was not a feature of the South Sea Company's own subscription issues and that is what makes their pricing more difficult to model (Shea 2007b). The underpricing of RAC subscription shares would have forced their market price to conform to a simple pricing identity, which we now illustrate.

We first pose a counterfactual situation in which the subscription shares were simply fractional claims upon original shares. To take an example, compare the price of subscription shares and original shares ($P_{original}$) on 1 June, 1720. On that date a £5

[11] In November 1720, in what amounted to a further lowering of the subscription price of its shares, the RAC further delayed the last instalment in order to forestall defaults T70/90, *Minute Book of the Court of Assistants*, 18 Nov 1720, pp. 131-2.

instalment was due on the subscription shares, but there were still to be paid another £5 (due 1 September) and a final £7 (due 1 December). We suppose therefore that on 2 June a subscription share would represent a fractional (£13/£25) claim on an original share that was shorn of the dividend that was budgeted in the engraftment indenture; the value of that would be $(£13/£25)\times(P_{original} - PV[£10])$. From this quantity we can construct an arbitrage lower bound on subscription share values and will argue that this bound would have to be obeyed, thus

$$(£13/£25)\times(P_{original} - PV[£10]) + PV(\text{instalments}) \geq P_{subscription}\,. \qquad (1)$$

If the bound was not obeyed, anyone who could buy a subscription share and borrow the present value of the remaining instalments would be able to obtain the equivalent of an original share at a cost smaller than that demanded in the market for such shares. If the bound appeared to be exactly binding, then we would have to conclude there was no possible value in the subscription shares attributable to a default option on instalments. Equivalently, if we were to assume there were no barriers to investors from borrowing the PV of the remaining instalment, Inequality 1 would reduce to an identity

$$(£13/£25)\times(P_{original} - PV[£10]) + PV(\text{instalments}) \equiv P_{subscription}. \qquad (2)$$

Did Equation 2 hold practically as an identity? Within the limitations of the data we have to judge such matters, the identity appears to hold very well. To finely test Equation 2 the demands on the data are very high. Equation 2 would hold only for original share prices and subscription share values that were perfectly contemporaneous. We have no assurances in our data sources that such prices, even

when listed for the same day, were contemporaneous. We do not know if prices were collected at different times of the day, indeed, we do not know if prices from previous days were not sometimes carried over to subsequent days in print. We do not even know if the numbers reported are quotations from potential buyers and sellers or whether they represent actual transaction values. Secondly, we do not have good information as to how investors would have formed expectations as to the special dividend that was to be paid to original shareholders. As late as 1724 we know something of the old debt liabilities that had been newly discovered after April 1720, but we do not know how information about these discoveries were absorbed by the markets nor how far from the maximum of £10 p.s. dividend investors' expectations would have strayed. Finally, credit conditions were notoriously tight throughout late 1720 and into 1721. Arbitrageurs would have had to always have reliable access to credit to make sure the arbitrage bounds were never violated. But we suspect that the costs of such arbitrage were sufficiently small and would have had to operate on only a small number of transactions to keep the arbitrage bound solid. Credit financing for such operations should have still been forthcoming because subscription shares were still strongly underpriced; even in late 1720 original share prices had not slipped below £30 p.s.

Despite the caveats stated above, Figure 1 illustrates a close adherence to Equation 2 and suggests that deviations from it were not economically meaningful. It depicts the value quotations for African ex-dividend original shares (assuming that the expected special dividend never wavered from £8 p.s.) and subscription shares plus the present value of the remaining instalments.[12] The pricing errors (denote them

[12] The present value of the instalments takes a slight step on 18 November (not perceptible in the graph) when the Company announced that only £4 would be due 1 December and not £7. The present value of the remaining £3 was calculated upon the assumption that it would not be due until 21 March 1721, which was the assumption made by Carlos, Moyen and Hill (2002, page 79).

e) also appear to have been statistically insignificant. In Table 1 we present the mean pricing errors and their associated probability values from a t-distribution. In calculating pricing errors we assumed that the expected dividend was constant throughout 1720-1 and we present in the table calculations for a range of such constant expected dividends. We do not wish to suggest that the investors actually had unchanging expectations for the special dividend, but simply wish to illustrate that, even under such an unrealistic assumption, it is possible to find a plausible constant expected dividend argue that makes pricing errors statistically small. Figure 1 illustrates that most pricing errors were very small, but that there was also a minority of observations for which pricing errors could be large. To reduce the influence of such outliers we can look also at the percentage pricing errors' median absolute deviations. Absolute deviations (AD) refer to the deviations of percentage pricing errors from their sample median in absolute value. The median absolute deviation (MAD) is a robust alternative for calculating dispersion in pricing errors in the presence of outliers.[13] In Table 1 MADs are only about one-half of the standard deviations of their respective ADs. The minimum average pricing errors and the minimum MAD occurred for an assumed constant expected dividend of £7.5 p.s., close to the actual special dividend paid (£8.34 p.s.).

If we could model the dynamic process by which old debts were newly revealed and ate into the engraftment's dividend budget, we could perhaps model the market's expectations of the eventual dividend payout more precisely. This is where our analysis departs substantially in disagreement with what has been written before. Carlos, Moyen and Hill (2002) in their analysis of RAC share prices do not attempt to price subscription shares relative to original shares, but attempt instead to isolate two separate pricing residuals, one for original shares and one for subscription

[13] Iglewicz 1983, pages 407-8.

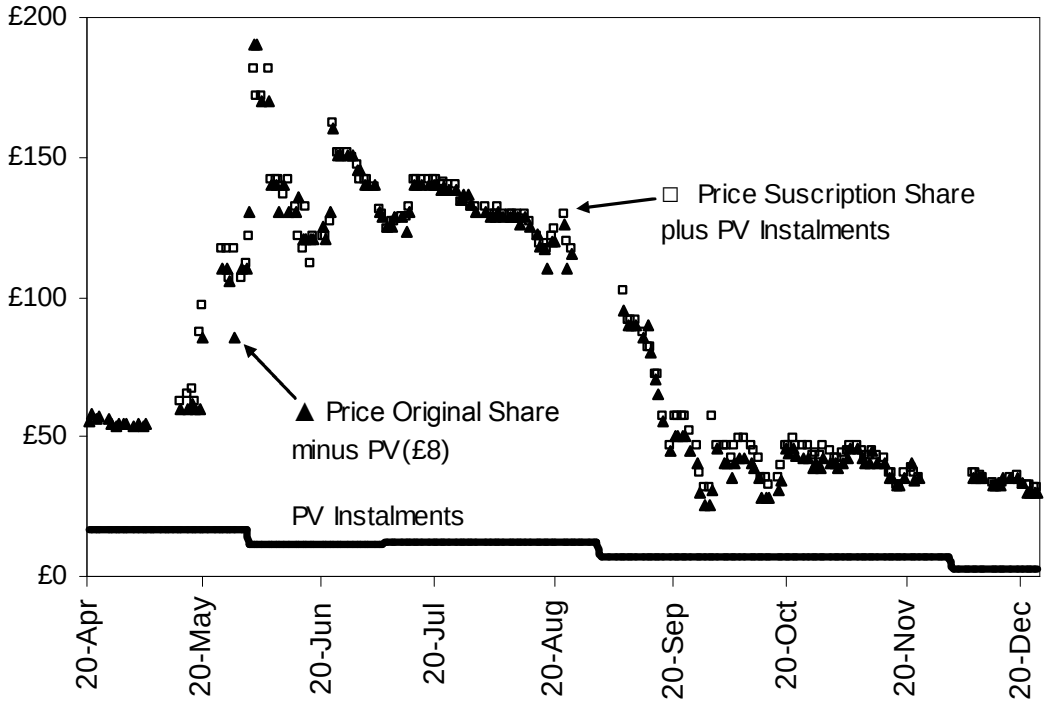

Figure 1. Royal African Company Original & Subscription Share Values 1720 (Freke 1722)

Table 1. Analysis of RAC Subscription Share Pricing Errors

E(Div)	Mean e	p-value	MAD	std(AD)
£10 p.s.	-£2.66	0	4.7%	5.0%
£9 p.s.	-£1.66	0	3.1%	5.1%
£8 p.s.	-£0.67	0.02	3.1%	5.4%
£7.5 p.s.	-£0.19	0.48	2.1%	5.2%
£7 p.s.	£0.29	0.29	2.7%	5.1%
£6 p.s.	£1.27	0	2.6%	5.0%
£5 p.s.	£2.25	0	2.7%	5.0%

N.B. N=246, 2 May 1720 – 21 July 1721. Data come from Freke (1722).

shares, which could be used in tests for rational bubbles. Arguing from the long RAC history of unpredictable earnings and reminding the reader that original shares would receive the special dividend that the subscription shares would not share in, they justify the modelling of a unique fundamental for the subscription shares. We argue that this approach was not justified because they did not identify the subscription shares as being derivatives of original shares. All future payouts to both original and

subscription shares were to be exactly the same except for the special promised dividend of £10 p.s. Because this dividend was budgeted and the funds for it collected at the beginning of the subscription, it would not have been subject to the earnings uncertainties that would affect all other dividends. The only uncertainty about the special dividend would have concerned whether any old debt liabilities would appear and reduce the budget for the promised £10 p.s. payout.[14] That certainly did happen to a small degree, but otherwise the funds for the special dividend remained in the hands of trustees, to be paid out to original shareholders when subscriptions shares became fully paid. In the end the special dividend paid out was £8.34 per original share – remarkably quite close to the constant £7.5 p.s. that minimises mean pricing errors in Table 1.

II

We have argued that the engraftment's design was precocious in its provisions for protecting shareholder wealth and the markets were precocious in pricing the new subscription shares relative to original shares. We have written much about how the engraftment worked, but not much about the more fundamental decisions that determined its design. For example, why did the firm not just borrow more money to invest in its renewed slave trade and to replace the old debts? From the long list of debts enumerated in 1726 that were retired by the re-financing of 1720, many of them significantly pre-dated 1720 itself and from this alone we can infer the firm's chequered history in reliably servicing debt. In the stringent credit conditions of 1720 as well, it is not surprising that further large-scale debt issues might have been out of the question. So, there remained equity financing and in the buoyant markets of late

[14] From the commencement of the engraftment one year was to be allowed for any further debts to appear. At the end of April 1721 the Court of Directors made one last plea for old creditors to

1719 and early 1720 that would have appeared attractive. Relative to the values of RAC equity in early 1720, the financing needs drawn up by the Company's management and the controlling projector of the new scheme, who appeared to be the Duke of Chandos, were quite large. If the current ownership of the firm was itself financially constrained, the engraftment of equity would have to be financed by outsiders. Otherwise, we would need to ask why RAC original shareholders themselves did not simply supply more equity investment to the firm. If the market supply of equity was that buoyant, we would have to conclude that original RAC shareholders themselves must have been especially constrained financially. This indeed appeared to be the case. More than 82 p.c. of subscribers to the engraftment did not own RAC shares at the end of 1719 or in May 1720.[15] Original share owners who did subscribe were mostly large shareholders. In terms of ownership of original shares, owners of just more than half (51 p.c.) of the Company chose to subscribe, but they were only about 12 p.c. of the subscribers by number and subscribed only about 15 p.c. of the engraftment. These patterns in subscription participation possibly illustrate the extent to which financial constraints were operating on the engraftment. Small RAC shareholders were certainly not forthcoming with further capital for the Company and although a bare majority of the ownership of the RAC was willing to participate in the engraftment, they would not be large in number and would pledge to purchase only a small portion of the engraftment.

An issue of shares by rights to original shareholders, no matter how severely it was underpriced with respect to original shares, would not likely then have raised

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present their claims before the special dividend was calculated. T70/90/217.

[15] We are working here from a compilation of RAC share ownership on 31 Dec 1719 as provided in T70/197. For early 1720 the share trading data contained in T70/198 appears complete enough that we can compute net sales and purchases of shares down to about late May 1720, but after that date it becomes clear that sufficient data are missing from this source that further net sales/purchases calculations are unreliable. cf. fn. 2.

the amounts of cash desired by the Company. A public issue of new shares would therefore have appeared to be the only alternative the Company had at this time. But what would be the terms of a public issue? Design of the issue at this point would matter to original shareholders because new shares might eventually stand equal to original shares and if new owners did not contribute cash to the firm equal to what their shares were worth, original shareholder wealth would decline. We have analysed this issue in Section I, but it would not have arisen as an issue at all if the Company had simply chosen to sell new shares to the public at the current market value of original shares. But would that have raised enough cash to refinance the firm's slave trade? The RAC planners apparently decided they wanted to appeal to a different buying public than the one that currently owned RAC shares or who would want to own shares in their current form. It was perhaps because equity markets were buoyant and were attracting a numerous class of new small investors that the Company planned to issue a large number of small-sized shares into the market. It was a matter simply to choose what number to sell and at what price per share so that nearly £260,000 was raised for investment in a revived slave trade. This would have to have been a judgment about both the breadth and depth of the new markets for equity in 1720.

If the markets were buoyant enough to supply large numbers of investors willing to supply equity in small doses, why not just issue a large number of fractional shares then? This would run a danger of so increasing the number of individual owners of the firm that it might significantly increase book-keeping costs. These costs would not have been trivial. One only has to look at the paperwork that survives in archives today to appreciate the costs required to accurately record the ownership and transfers of shares. Our impression is that the extra paper and time required would have been not linear in share numbers and shareowner numbers, but

was more likely to be exponential. If new investors did indeed desire to supplying equity in only small doses, one way to tap their supply would be with a subscription issue. At least with a subscription issue, new investors could be limited in number, but never be expected to contribute more than one small dose to new equity at one time. Since the depth and the breadth of the markets for new equity were uncertain, the Company would have to balance numbers of new shares, numbers of instalments per share and the issue price per share (size of instalments) to reach its targets for new financing raised. Original shareholders would not knowingly have agreed to the engraftment without some protection of their wealth, so the calculus of the RAC's financial planners would have to take care that the new financing also raised enough money to compensate original shareholders for wealth losses. We cannot recreate their calculations from historical sources, but the mathematics would have been straightforward enough depending upon how many financial targets they wished to fulfil. To illustrate and to also demonstrate that underpricing of the new shares at issue was key to the exploitation of the equity markets' breadth, we construct a hypothetical refinancing of the firm at an issue price for shares different from the £25 p.s. that was actually used.

The issue price could have been lower and perhaps substantially lower than even the £25 p.s. specified in the engraftment indenture. Suppose to meet an investment target of £260,000 the Company issued new shares at £20 p.s. instead of £25 p.s. 15,696 new shares at £20 p.s. would raise £319,380 cash, which after £260,000 was deducted for new corporate investments, would leave only £59,380 to the relief of original shareholders. This would not even cover original shareholders' debt liabilities of £75,696. If on the other hand, the first objective was to fully compensate original shareholders, the £319,380 cash raised would be sufficient to do that, but how much would be left over for investment in the slave trade? From the

point of view of the engraftment's designers in midApril 1720 they judged that the minimum net value for shares was about £240,000, as we have discussed in Section I. Expected prices of shares after the engraftment would be expected to become approximately £28 p.s. $\cong \frac{£240{,}000 + 15{,}696 \times £20}{20{,}000}$. This would result in an expected wealth loss to original shareholders of about £240,000 – 4,304×£28 = £119,488. The £319,380 would certainly cover that loss and would leave nearly £200,000 for the Company to invest in its trade. Would that have been enough to satisfy the Company's planners? We do not know, although Chandos did express in several letters his feeling that the Company was actually trying to raise more cash than could be efficiently employed in the African trade.[16]

To conclude this section, the provisions of the RAC engraftment certainly operated to raise new capital and to protect original shareholder wealth. They were not, however, the only ways these objectives could have been met if circumstances in 1720 had been different from what they were. In different credit conditions original shareholders might have been able to provide the new financing themselves and/or the debt markets might have been able to provide financing. Whatever conditions were for new equity investors who appeared in 1720, they apparently precluded a supply of equity investment in large doses from a small number of new investors. The Company sought instead to attract a large number of investors to commit to a succession of small doses of equity investment. One advantage of a subscription issue of new shares would be to restrict the number of new small-dose investors. In the next section we shall try to draw some inferences about who these new investors were.

[16] Chandos to Fielding, 8 June 1720 and various other letters dated 23 June 1720, Stowe Collection.

III

Who were the investors that helped refloat the RAC and were they typical of those investors who helped create the South Sea Bubble? From the aristocracy down to the middling and all the way down to the very small first-time investor, the South Sea Bubble was supposed to have involved society in financial speculation to an extent to which it had not been involved before. Or so contemporaries wrote – usually in complaint (Hoppit 2002, pp. 145-7). But how can we investigate such matters? There is really only one valid approach to doing this. If we possessed a sufficiently large, demographically representative sample of the population in 1720, we could randomly sample from it and compare that sample to groups of investors such as they are described in investment data. Then we might be able to conclude what particular portions of the population typically were newly drawn into the markets of 1720. Unfortunately we have no such good demographic data. We have assembled a database of nearly 13,000 people but, as large as that number is, it is highly selected group of people because they are for the most part identified from only investment sources. More than 70 per cent of them at some time between early 1719 and by March 1723 appeared as owners of RAC, EIC or BoE shares. We might declare that they are representative of some class within society that was prone to investment activities, but we have yet no data with which we can measure how typical they were of society as a whole. It is perhaps even going too far to claim that they are typical investors because there are no existing data for South Sea Company share ownership or trade nor, at this time, have we yet exploited the considerable data that pertain to a much larger number of people who were invested in British government annuities.[17] We shall also add that as deficient as the data are with regard to the demographics of

[17] Dickson (1967, p. 272) states that the number is easily in excess of 25,000 individuals.

profession, class, etc., variables indicative of economic status, such as income and wealth, are simply not available at this time.

Thus at this jointure we have what we can describe only, somewhat tongue in cheek, as the observable universe of investors in early Georgian London. From the available sources we have been able to re-construct many of the social and professional characteristics of these investors. Table 2 is an overview of the data. All the data sources discussed in the key to the table are sources generated from investment activity excepting the Parliamentary biographies (Sedgwick, 1970). Table 2 quickly affirms the special character of our data collection. If one thing is clear, women certainly are demographically under-represented in our data. Although without comparative wealth statistics for men and women in our data or for the population as a whole, we cannot even judge if their 15.7 per cent representation is a remarkably small or a large number. The enumeration of members of the MP-class is complete and that class will be of course demographically over-represented in our sample. We suspect that even the merchant class is under-indentified in our sample. It has to be remembered therefore that the inferences we are about to draw are conditioned upon data that is drawn from a population that has already been specially selected for its investment activities.

We conduct an ordinal regression to analyse some of these matters. The ordinal classification dependent variable will be an indicator of the RAC engraftment investment class an individual fits into: 1 denotes an individual who made no subscription; 2 denotes a subscriber to at least five, but no more than 40, shares; 3 denotes a subscriber of at least 45 and no more than 70 shares and 4 denotes a subscriber of 75 or more shares. In the location portion of the ordinal regression model, as independent variables, we employ some more ordinal variables. The ordinal independent variables indicate investor categories. An example will illustrate.

We define an ordinal classification of ownership in RAC original shares as of 31 December 1719: if an individual owned no RAC shares on that date, he or she was classified as 1; if the investor owned shares to the amount that puts him or her into the lower half of the distribution of ownership by numbers of shares, the investor is denoted as 2; above the median of the same distribution and up to the eighth decile, the investor is denoted with a 3 and an investor whose shares owned puts him or her into the upper 20 percent of the same distribution is denoted with a 4. Using the same percentile distinctions we have defined ordinal variables for the ownership in original BoE and EIC shares on 31 December 1719, as well. We have also classified

Table 2. The Observable Universe of Investors and Other Social Classes in Early Georgian London

		N	Marginal Percentage
Royal African Engraftment Subscribers, May 1720	5 to 40 shares	197	1.5%
	45 to 70 shares	330	2.6%
	75 shares or more	39	0.3%
MP (Commons) class		1197	9.3%
GSBs		250	1.9%
Jewish		337	2.6%
Foreign domiciled		705	5.5%
Baronet/Knight		236	1.8%
Marquis or higher		298	2.3%
Merchant		1055	8.2%
Identified in Stock Ledger		9075	70.5%
Male		10845	84.3%
Female		2025	15.7%
RAC Original Shareholders 31 Dec. 1719		572	4.4%
BoE Original Shareholders 31 Dec. 1719		3294	25.6%
EIC Original Shareholders 31 Dec. 1719		1692	13.1%
Mercer's Hall Assurance (REA) Subscribers, Jan 1718		284	2.2%
Chetwynd's and Colebrook's Assurances (LA) Subscribers, early 1720		384	3.0%
South Sea Company, first Cash Subscription, April 1720		1439	11.2%
South Sea Company, second Cash Subscription, April 1720		1719	13.4%
Total		12870	100.0%

Key: a) RAC Engraftment Subscribers are persons who took transfers from Joseph Taylor 28 May or shortly afterwards in sources T70/199, 200, 201 and 202.
b) MP (Commons) class are persons who stood for either the 1715 or 1722 Parliament. They include unsuccessful candidates and those elected by special elections or appointed upon the deaths or removals of seated members, according to biographies in Sedgwick (1970).
c) GSBs are goldsmith bankers, bankers or brokers identified mostly in investment ledgers, but other sources as well, especially in Price, A handbook of London bankers, etc. or in Outing, BankNotes4U.
d) Jewish identifications are based upon surname lists derived from various genealogical webpages for the Sephardim and Ashkenazi of early eighteenth century London. Some prominent members of the Sephardim are also found in Hyamson, The Sephardim of England.
e) Foreign-domiciled persons are identified as such purely in investment ledgers. A few prominent Dutch merchants would variously appear as both London and Amsterdam domiciled in different sources. In such cases we have given precedence to the Amsterdam residence.
f) Baronet/Knights are identified as such in either investment ledgers, subscription lists or Sedgwick.
g) Marquis or higher aristocracy. Same sources as f).
h) Merchants are identified as such mostly in investment ledgers.
i) Stock ledgers are the sources for trading data. They are (RAC) T70/197 through 202, (EIC) L/AG/14/5/4, and (BoE) AC27/430-437, AC27/6439-6450 and AC27/1539-1558. The dates that these sources cover depend upon the company. The range of dates for the RAC is the narrowest, covering from EoY 1719 to July 1720. The BoE sources we have analysed so far provide names of investors who owned BoE stock between March 1719 and EoY 1721. The list of EIC investor names include investors who appeared in L/AG/14/5/4 between March 1719 and March 1723.
j) Gender is determined on likelihoods based upon forenames or titles.
k) RAC original shareholders as of 31/12/1719 were identified directly from T70/197.
l) BoE original shareholders as of 31/12/1719 were identified in various BoE Archive sources cited in note i) above.
m) EIC original shareholders as of 31/12/1719 were identified in L/AG/14/5/4.
n) Mercers-Hall, A list of the names of the subscribers for raising the summe of one million sterling… This list records subscribers and their voting rights, which are proportional to the number of shares subscribed. The names are largely found again in various petitions that led up to the Bubble Act in which the Royal Exchange Assurance was established. See The Special Report.
o) Separate subscriptions were taken for assurance schemes that under the Bubble Act became the London Assurance. Lord Chetwynd's subscription (actually gathered by Stephen Ram, Lord Chetwynd being the titular lead-subscriber) began in November 1719. There was a competing scheme (Colebrook's) that was merged with the Chetwynd subscription. We have taken our list of subscribers to the joint scheme from an Aug 1720 list, Copy of the subscription book of Ram and Colebrook's receipts into the capital stock of the ship charter, Aug 12 1720, London Assurance Archives, Ms. 8725/3.
p) South Sea Company, first and second cash subscription lists are respectively HL/PO/JO/10/5/57 and HL/PO/JO/10/5/58, Papers of the Committee of Secrecy.

subscribers to the contemporaneous the London Assurance and the first two cash subscriptions for new South Sea Company shares in the same way. In the case of the Royal Exchange Assurance subscription, we do not have information on the numbers of shares subscribed, but do have information on the number of votes subscribers will have in corporate decision-making, which are proportional to the numbers of shares subscribed. A subscriber with 1 or 2 votes is classified as a 2. A subscriber with 3 votes is a 3 and a subscriber with 4 or more votes is a 4. The other independent variables are binary [0,1]-factors that indicate the membership or exclusion from a class. Table 2 lists all the independent variables we have used in ordinal regressions and their marginal percentage representation amongst the nearly 13,000 individuals we have in our database.

Ordinal regressions, like probit regressions, try to predict the probability that an event or a response will occur. The difference is that in the ordinal regression model the basic building block is the cumulative probability that an event will be classifiable into a category contained within an ordered set of categories. A well-behaved function on the [0,1]-interval is then used to relate the cumulative probability of an occurrence to a linear function of predictors of that occurrence. The relational functions are generally called link functions and the probit function is just one of a number of possibly useful link functions. If Prb_j is the probability that an event will fall into the j-th category, the basic model is

$$link(Prb_j)=\theta_j-[\beta_1 x_1+\beta_2 x_2+...+\beta_p x_p] \qquad (3)$$

where x_i is the i-th variable (out of p) that helps predict classification and θ and β_i are regression coefficients.

In Table 3 are presented the results of estimation of such a model. Estimation proceeds via maximum-likelihood and goodness-of-fit is summarised by the significance of the marginal increase in the log likelihood function from a constant-

only model to one that includes a set of explanatory variables (the model's so-called location component) and a selection of pseudo-R-square measures. We do not report estimates of parameters that are redundant in estimation (such as θ_4, which is restricted to 1) and those that individually are not significant.[18] Recalling that the point of this exercise is to see how likely we can predict the extent to which people in our population of 13,000 will appear as subscribers to the RAC engraftment, we see that the model has only a limited capability of doing that. In units of percents of variation explained, we can conservatively conclude that the model can reproduce only anywhere from 10 percent to, at most, 15 percent of that variation.[19] We employed a complementary log-log link function, which usually has the effect of concentrating a model's predictive power on predictions of inclusion in the higher ordinal groups. What predictive success the model achieves, it achieves in such higher ordinal predictions. That is, the model's greatest success is in correctly predicting those small numbers of individuals who subscribed to 75 or more RAC shares, such as Chandos. Its ability to predict those who subscribe to any other positive number of shares (ordinal categories 2 and 3) is greatly less, the vast majority of these people being predicted to subscribe for no shares at all (ordinal category 1). It is likely that a more complete description of the socio-economic circumstances of our 13,000 individuals would greatly improve the predictive performance of such models as this one, but we can still make some interesting inferences concerning the significance of some of the variables that do and do not appear in the current location portion of the model. Amongst the ordinal variables we have defined, being an owner of RAC

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[18] The threshold parameters, the θs, represent constant contributions to the link function when all other predictor variables are zero. θi represents this constant for each of the four ordinal dependent variables.

[19] The pseudo-R-squared proposed by Cox and Snell (1989, p. 208) is 1 minus the (2/sample size)-root of the likelihood ratio. Its maximum is not 1, but is naturally bound below 1. Nagelkerke (1991, p. 692) proposes that this statistic be divided by its theoretical maximum,

original shares on 31 December 1719 or being a subscriber to the first of the South Sea Company's cash subscription shares is significantly correlated with being a RAC

Table 3. An Estimated Ordinal Regression Model for the Prediction of Investment in the RAC Engraftment Subscription, May 1720

Parameter Estimates

					95% Confidence Interval	
Threshold Parameters	Estimate	Std. Error	Wald	Sig.	Lower Bound	Upper Bound
θ_1	1.03	.19	30.83	.00	.67	1.40
θ_2	1.19	.19	40.83	.00	.84	1.55
θ_3	1.8	.19	92.67	.00	1.44	2.18
Location Parameters						
RAC Original 31/12/1719	.31	.03	99.65	.00	.25	.37
EIC Original 31/12/1719	.05	.03	3.47	.06	.00	.10
South Sea Subscription 1	.26	.02	123.53	.00	.21	.30
South Sea Subscription 2	.04	.01	7.56	.01	.01	.06
Not identified as a member of the MP (Commons) class	-.16	.04	13.89	.00	-.25	-.08
Not identified as a GSB	-.33	.08	15.24	.00	-.49	-.16
British domiciled	.26	.10	6.75	.01	.06	.45
Not identified as a baronet or knight	-.23	.09	6.84	.01	-.40	-.06
Not identified as an aristocrat - marquis or higher	-.53	.07	55.20	.00	-.66	-.39
Not identified as a merchant	-.09	.06	2.56	.11	-.19	.02
Never identified in a stock ledger	.33	.03	96.91	.00	.26	.39

Goodness of Fit					**Pseudo R-Square**	
	-2 Log Likelihood	Chi-Square	Df	Sig.	Cox and Snell	.050
Intercept Only	2134.465				Nagelkerke	.142
Final	1471.972	662.493	11	.000		

after which it will be as well-behaved on the [0,1]-interval as is its conventional linear regression relatives.

subscriber. The correlations are smaller and not as strongly significant for being an EIC original shareholder or a subscriber to the second South Sea subscription. The other contemporaneous subscriptions to the insurance ventures and being an original BoE shareholder did not correlate with RAC subscriptions at all.

It is salient here to note the importance of the [0,1]-factor variable that indicates if an individual is among the 70 percent of people who appear in a RAC, EIC or BoE stock ledgers at some time between 1719 and 1723. After taking into account that being an RAC or an EIC shareowner on 31 December 1719 is important, this variable's estimated coefficient (0.33) shows that it is otherwise important that the individual does not appear in any of the ledgers of these companies. This interestingly suggests that there was strong contribution to the RAC subscription from people who were outside of the observable investment community at the time of the engraftment. The strength of that contribution is re-enforced when we also consider that many of them would have newly appeared in the investment community as subscribers to new shares in the South Sea Company or in the new insurance companies. In other words, even after having taken into account that new RAC subscribers might have been amongst a general wave of new investors who were attracted to all sorts of new share offers, RAC subscribers tended to be outside the investor groups who were attracted towards BoE and EIC investments. We cannot aver that this occurred because BoE investors were disinclined towards investment in RAC shares. If that was the case, the coefficient on the BoE ordinal variable would have revealed itself to be significantly negative in Table 3. We know little so far of other characteristics for these people except that they tended to be highly placed politically. They tended to be members of the MP (Commons) class or were members of the aristocracy. For sound financial reasons too we see that they were strongly associated with the GSB class. When we consider that GSBs would have been

especially adept at placing new issues amongst ultimate investors, this is not surprising. Just marginally the new RAC subscriber tended to be of the merchant class. We retain this factor in the model despite its marginal significance and small size because we feel that merchants may still be under-identified in our sources. Finally, the new subscription was surely more attractive to the British-domiciled investor than it was to the foreign investor. The factors that were clearly not significant were the gender of the investor and whether he or she was Jewish. In Table 3 it was marginally more important that an investor was a merchant than whether he was Jewish. Since so many professions and politics were closed to the Jewish community, it is not surprising that they tended to appear as merchants in our sources. If being Jewish within the merchant community was important with regard to investment behaviours, it is not showing up in our regression.[20]

The RAC subscription appeared to attract a special investor. The investors who were creating two new companies for marine insurance were not strongly associated with the RAC re-financing. The same can be said of persons who invested in BoE shares. Overseas trading merchants might have had a special interest in the re-financing, but this would require further investigation to establish why they were not similarly involved in the financing of the new marine insurance firms. At this point all we know is that being identified as a merchant or as an investor in the EIC or RAC increased the likelihood that one would be a new RAC investor. Also strongly associated with this would have been an investment interest in the South Sea Company's new shares that were being sold for cash in April 1720. This is the strongest evidence we have that the RAC re-financing was perhaps riding on a wave of new investor enthusiasm. The Chandos correspondence that we have previously

[20] The activities of Jews in finance in this period were the special focus of Carlos, Maguire and Neal (2008). Mays and Shea (2011) also

discussed would suggest that, at least as far as his organisational efforts were concerned, the RAC re-financing was also a project that was especially dear to the high-and-mighty of the political and aristocratic classes. This is an effect seen in Table 3's results - even after having accounted for the influences of other investment activities. In further researches on these matters we suspect that the most productive route would be to look directly into the African trading and slaving community of London which existed outside of any previous involvement with the RAC. It may be that the nonRAC trading/slaving community of merchants, the independent traders, were being drawn into the re-financing and that is a missing factor variable that, if discovered, could improve the regression model specification.

IV

Not all subscribers to the RAC re-financing would have participated for the sake of long-term investment. Some would have subscribed to obtain stock for trade or were directed to do so by associates who themselves were bent on investing in the RAC. The distribution of new shares from Joseph Taylor to subscribers was merely the first step in the ultimate placement of shares. Subscribers very quickly began to effect large net sales of their shares; by the beginning of June they had disposed of 10 per cent of their shares and another 10 percent had been sold by the middle of June. Thereafter net sales continued at a slower pace and original subscriber ownership stabilised at around 60 percent of the original subscription in November 1720. The pace of transfers between subscribers and nonsubscribers is summarised in Figure 2.[21] The market for RAC subscription shares was what we would style a market for placements. The marginal adjustments to subscribers' inventories would necessarily

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report the special activities of Jewish merchants as intermediaries in BoE and EIC stock during the collapse of the South Sea Bubble.

[21] Figure 2 depicts sales and purchases over the previous 90 days on a daily basis.

have to been large at the commencement of trade. It is obvious in Figure 2 that in the first three months of trade the entire issue of 15,696 shares was turned over more than once. By the time the subscription shares were turned into fully-paid shares in July 1721 each share had changed hands on average 2.4 times.

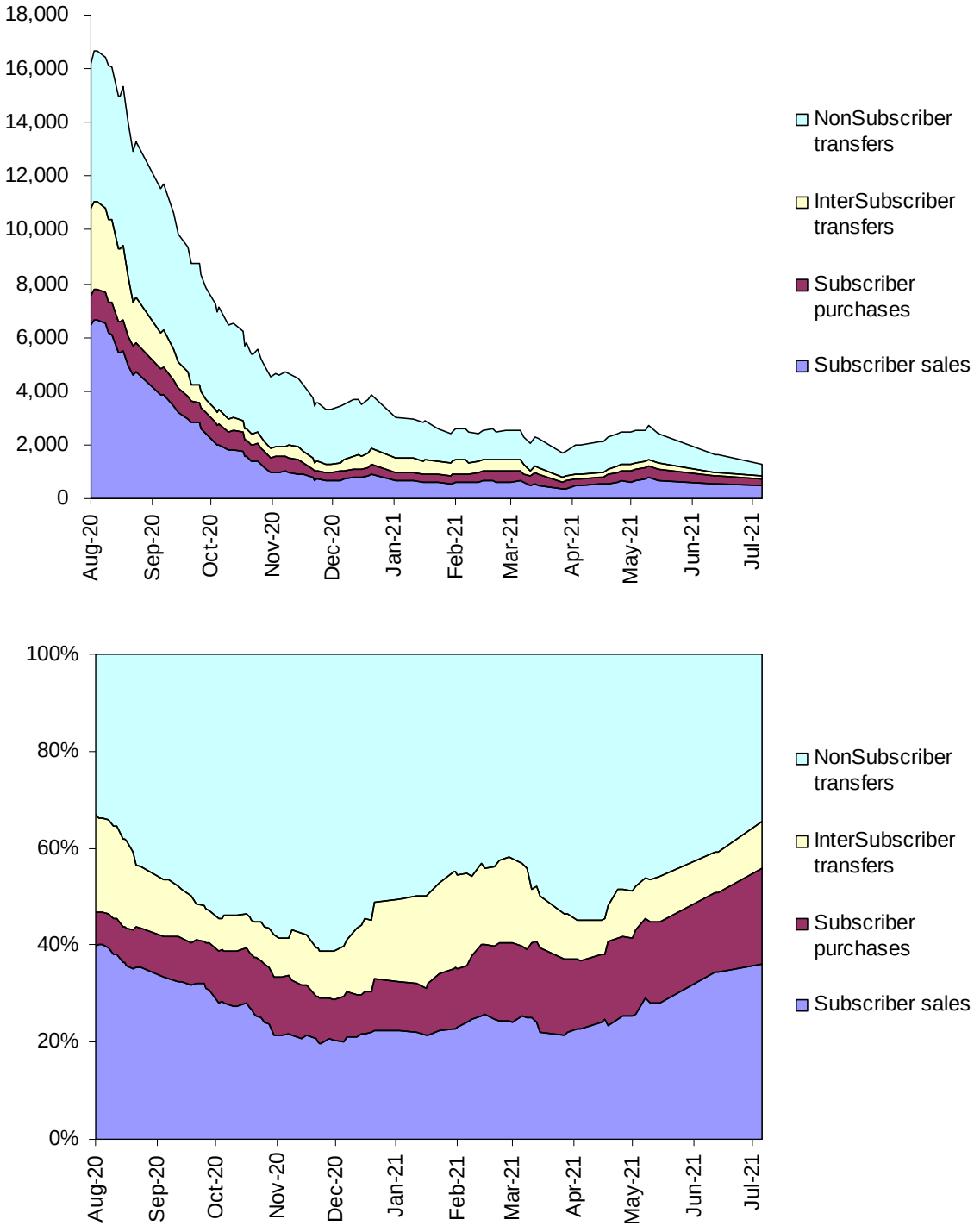


Figure 2. RAC Engraftment Sales and Purchases by Numbers of Shares (top panel) and by Percentage Decomposition (bottom panel).

In the previous section we anticipated that goldsmith bankers and brokers (GSBs) would have probably participated in the subscription to facilitate the placement of shares. Here we investigate how the placement of RAC shares proceeded throughout the height of the South Sea Bubble with the aid of the GSBs. The GSBs were the premiere intermediaries of trade in EIC stock and to a slightly lesser extent in BoE share trade as well (Mays and Shea 2011). But at the time the RAC engraftment was getting underway the GSBs were rapidly reducing their inventories of EIC stock and increasing their inventories of BoE stock. There is also evidence that they were withdrawing their intermediation services from markets well before midsummer share values collapsed. In comparison to the EIC and BoE markets, how was the market for RAC subscription shares intermediated and did the GSBs play a special role in intermediation? In another paper (Shea, 2011) we demonstrate how intermediation can be studied on a network of share transfers which are treated as flows. When share transfer data are arranged to describe the structure of a network of flows, we can derive measures that are helpful in addressing questions with respect to financial intermediation. Two concepts are key:

Pass-Through (PT): The total sum of flows that pass through the hands of trader (per unit of time) is a way of measuring flows. The words ‘pass through’ connote flows that simply pass through a trader’s hands and do not contribute to or detract from traders’ inventories. PT relative to the accumulation of inventories is a way of measuring the extent to which flows tend to stop and start in a network. The ratio of PT to total sales in the network is also one measure, but not a complete measure, of market intermediation.

Core Pass-Through (CPT): CPT connects all traders who facilitate PT with other traders who also facilitate PT. The ratio of CPT to PT is another measure of intermediation, what we might call the density of intermediation. For example, in one

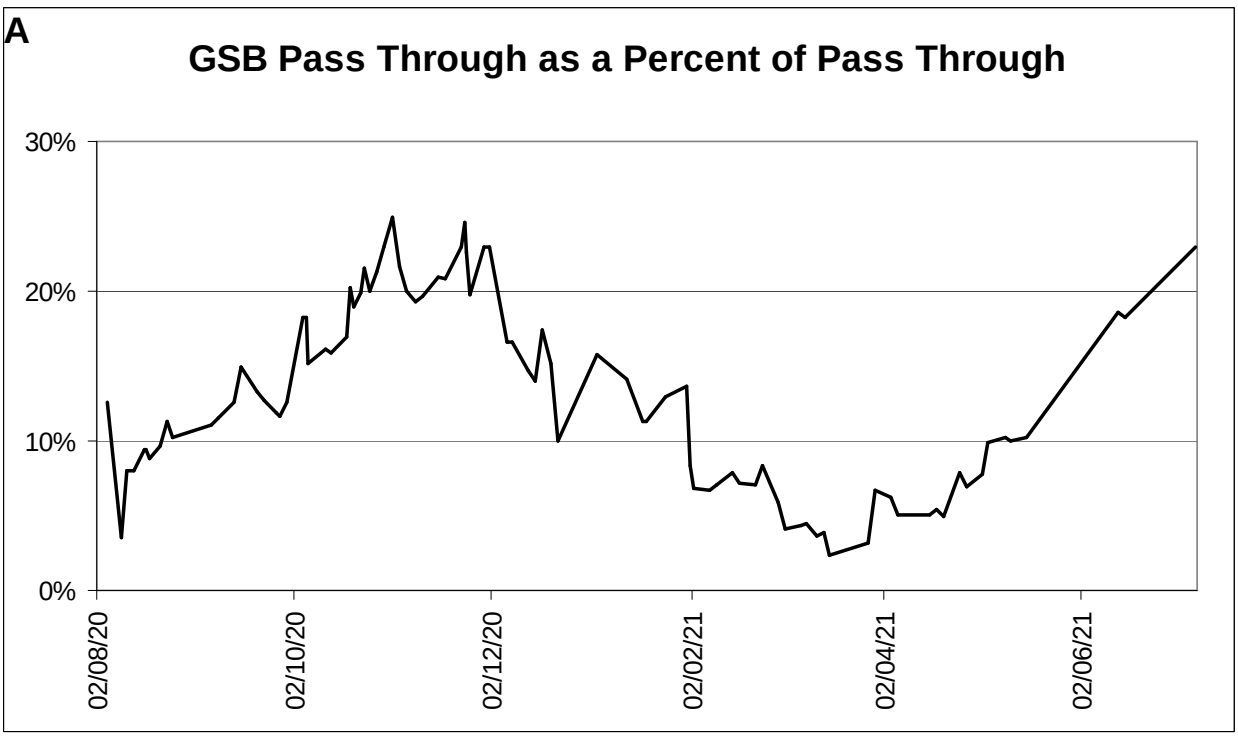
interpretation, the more fully trade within a network passes through intermediaries who themselves tend to trade with other intermediaries, the more fully markets are interconnected by informed or influential traders. In such densely informed intermediation we would expect that a high proportion of PT would be CPT.

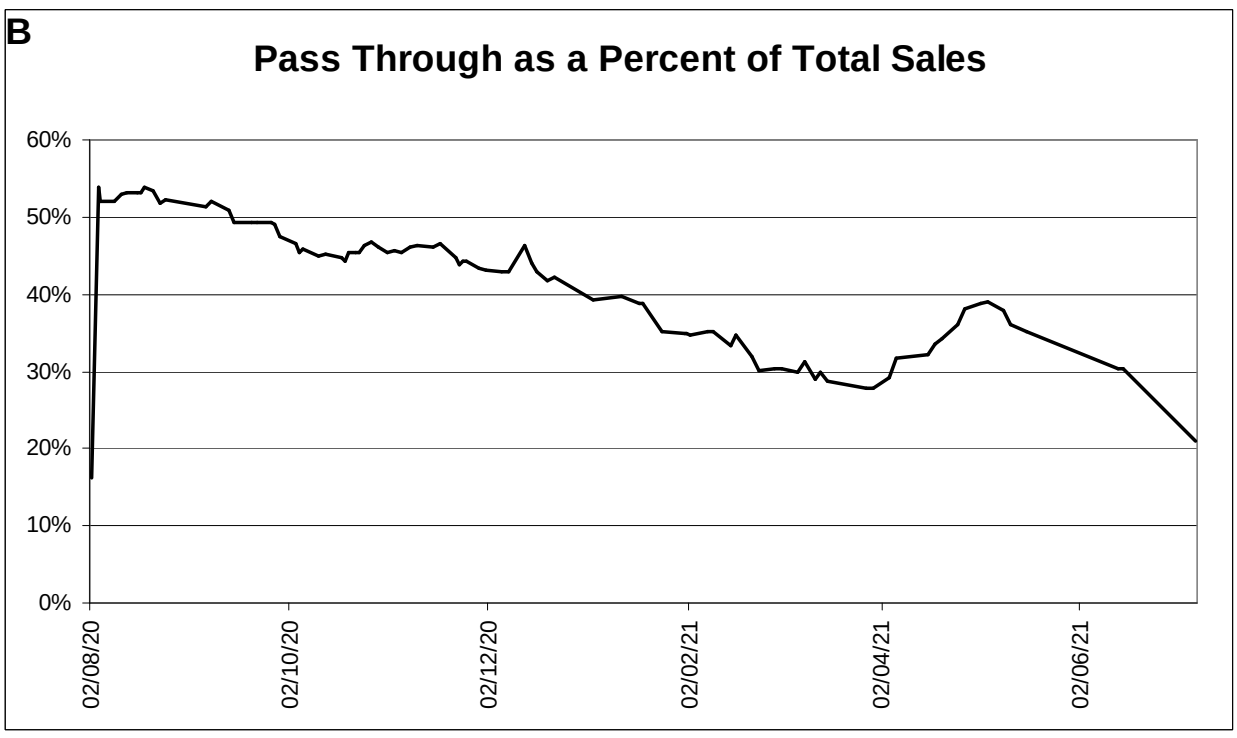
In Figure 3 is the summary history of RAC subscription share intermediation and the role of GSBs within it. Pass-through as a percent of total sales is the first intermediation measure we discuss and if Panel B is compared to the same measures when applied to EIC and BoE trade (Mays and Shea 2011, Figure 16, top panel), it is clear that that RAC trade was intermediated perhaps not quite as intensely as was EIC trade and was only slightly more intensely intermediated than was BoE trade. All three share markets experienced gradual disintermediation in the wake of the South Sea Bubble.

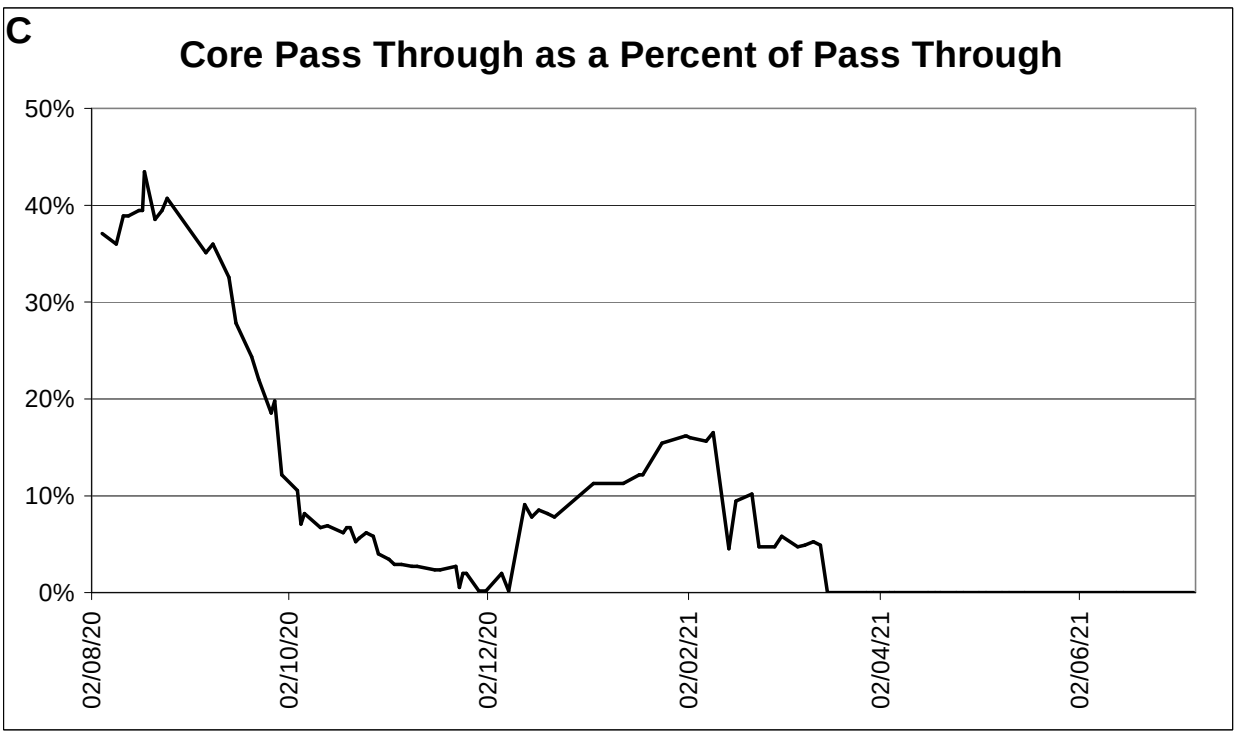
Where RAC share trade really differed from EIC and BoE share trade was the extent to which intermediaries dealt with each other. In EIC trade in particular intermediaries almost never acted alone in obtaining shares from isolated buyers and passing them on to the ultimate buyer; they almost always obtained and sold shares in several steps, themselves dealing largely with other intermediaries (Mays and Shea 2011, Figure 16, second top panel). These core intermediaries were noticeably less important in BoE trade, but in RAC share trade core pass-through was never any greater than 50 percent of all pass-through. Such core intermediary trade went to zero by the end of 1720 and only revived slightly in early 1721 before it collapsed to zero again in the spring (Panel C). GSBs moreover were not as prominent in intermediation and core intermediation to the extent they had been in EIC and BoE trade. They never dominated intermediation as a whole (Panel A) and were not prominent in core intermediation until itself was nearly extinguished (Panel D). The brief revival of some core intermediation in early 1721 was intermediation by a cadre

of foreign merchants, who played a similar role in EIC trade at the same time (Figure 3, Panel C and Mays and Shea 2011, Figure 16, third bottom panel).

The trading market for RAC subscription shares was indeed a placement market and it is not surprising that on a per unit basis the trade was measurably more intense than was trade in the more established EIC and BoE share markets. Intermediation in trade there was, to be sure, but it was not as nearly marked by trade within a core of intermediaries and it certainly was not specially marked out as trade in which the GSBs were prominent as they were in the EIC and BoE share markets. There were perhaps fewer incentives for professional intermediaries to deal in RAC subscription shares, especially if they had to do so as dealers rather than as brokers. One of the special costs of maintaining an inventory in RAC subscription shares is that the dealer would have to have the wherewithal to meet instalment obligations on the shares if he happened to be holding them when instalments became due.







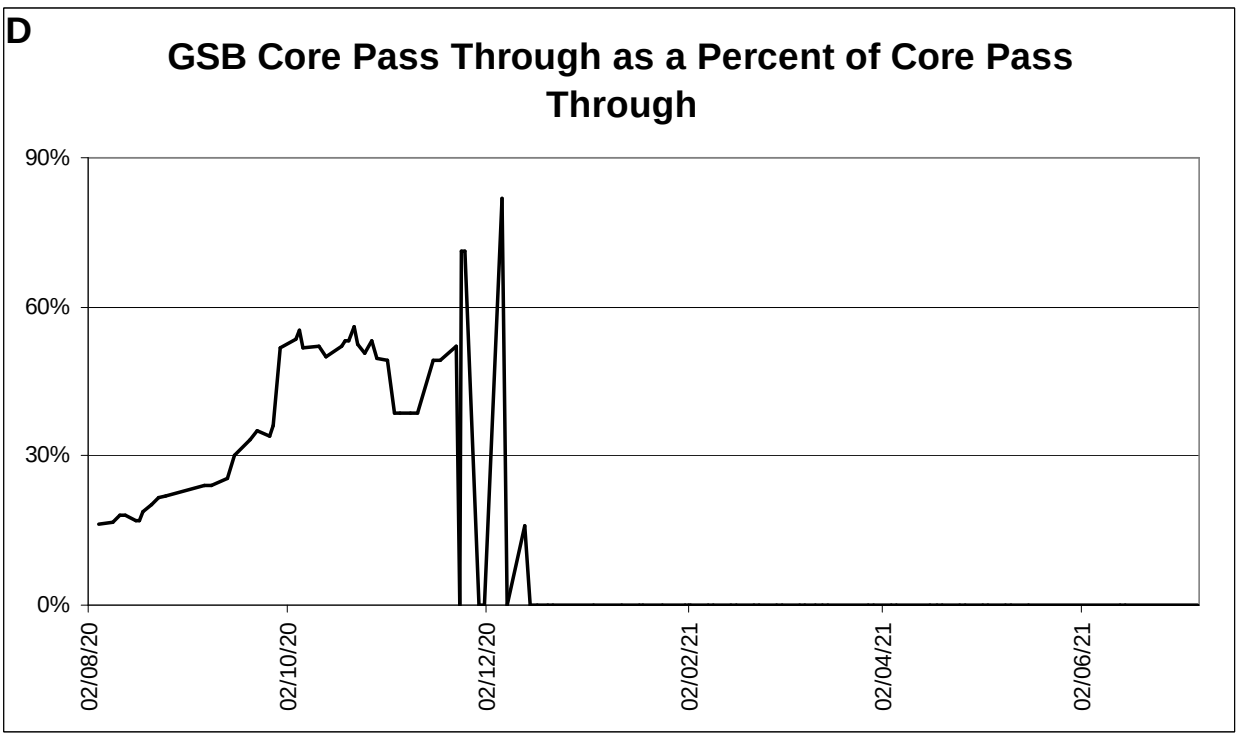


Figure 3. RAC Engraftment Subscription Share Pass-Through and Core Pass-Through

V

The capital restructuring of the Royal African Company during the South Sea Bubble and afterwards was a success in a period whose history is told largely as a chronicle of financial failure. The few years after 1720 when the Company attempted to re-construct its trade, however, were but an Indian-summer in the longer history of the Company's equity values and returns. Under Charles II and James II, the Company's equity yielded average 6 p.c. p.a. returns and about 60 p.c. of those returns were in the form of cash payouts. After the Glorious Revolution and in the subsequent 24 years until 1713, payouts practically ceased and equity declined in value roughly 10 p.c. p.a. From 1713 to 1719, the Company's trade was moribund, there were no payouts and returns were on average neither positive nor negative. The pre-Bubble low-point in the Company's equity values occurred in 1718.[22]

In the buoyant stock markets of late 1719, however, the Royal African Company's share values rose by as much or more than did other firm's share values; they had more than doubled over the levels seen at the end of 1718. Historians have noted before that the year 1720 was actually a year of high returns for shareholders who owned shares prior to the late spring or early summer of 1720. Even South Sea Company share values ended 1720 about 50 p.c. higher than they were at the end of 1719, but Royal African share values were four times higher than they were at the end of 1719 and were more than six times higher than what they were in 1718. Even through most of 1721 they were more than four times their 1718 values.

For much of the decade after 1720 the Company was capable of attracting enough equity investment towards the firm to keep total equity values at about the same level (£200,000) they had been during the years of its greatest prosperity, as

[22] This analysis is based upon the equity capital history and data developed in Appendix A.

depicted in Figure 4. The Company was able to achieve this even when values of shares started to slide after 1722. On the back of these equity values, the Company was able to revive its credit and thereby financed an ambitious programme of fitting out new ships, rebuilding its Gold Coast establishments and entering upon contracts for the delivery of slaves. After the South Sea Bubble and despite the financial challenges posed by the resulting restrictions on credit supplies, the Company meant business and it was apparent that the financial markets also believed that the Company remained fixed upon a business plan to which the markets apparently assigned a real chance of success.

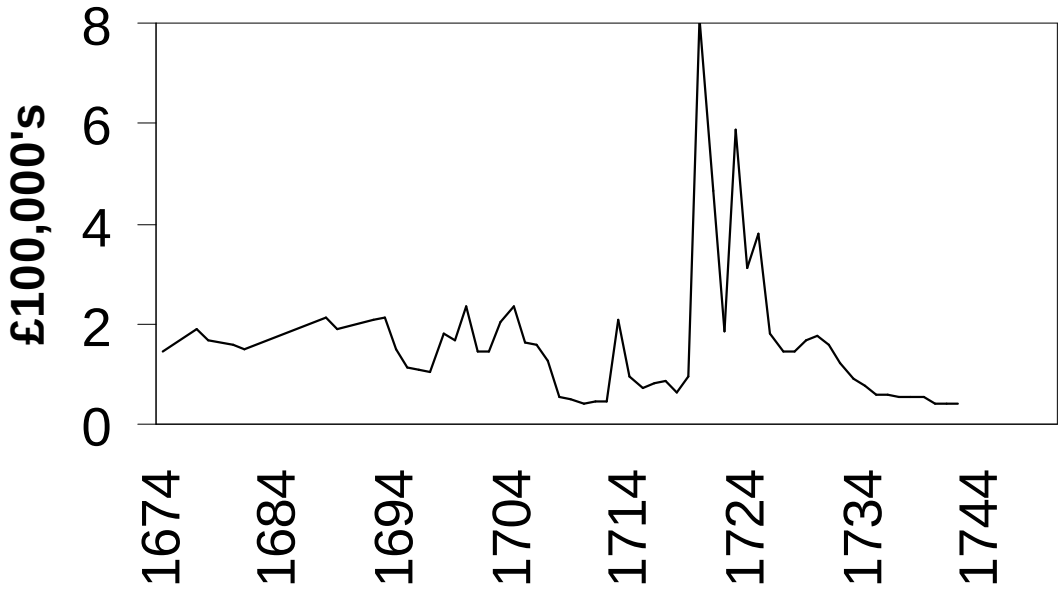


FIG. 4 Royal African Company Total Equity Value

To what extent was success achieved in the real business of the Company – the export of trade goods for the purchase of slaves on the west coast of Africa and slave importations into the British-controlled western hemisphere? We can only take account here of such success in the revival of the slave trade numbers. Further studies will have to be undertaken to determine how long any resulting financial success was achieved in such trade. We are at least in a position to assess the extent to which the

RAC and South Sea Company together could wrest control of the trans-Atlantic slave trade from the independent British slave trader. The Slave Voyages Database allows us to count the slaves who were landed in British-controlled ports from British-registered ships and from those ships of the RAC and the South Sea Company in particular. According to contracts drawn up between the two companies, the anticipated arrangement would be that any slaves contracted for delivery by the RAC to the South Sea Company, would be handed over to the latter in Africa. As early as September 1720 the Company was planning and outfitting voyages to establish bases in Angola and at Cabinda in particular.[23] Thereafter mention is made of contracts with the South Sea Company to supply that firm with slaves at Cabinda.[24] The Database shows that in the years 1721-30, the South Sea Company was able to take more than 3500 slaves from Cabinda to South America and the Caribbean. We can see in Figure 5 the apparent effects of such arrangements with South Sea Company (SSC) landings of slaves following the pattern of RAC landings with a lag of a year or two.[25] The lower panel of the figure is meant to illustrate the RAC and South Sea Company's shares in all British slave imports into the Western Hemisphere. It can accurately reflect long-term trends in such shares perhaps only after 1712. Before 1689 the Company's charter would have purposely given the Company a monopoly on such imports, but because of cheating by the Company's own servants and, to a much larger degree, because of slave imports by independent traders ("the interlopers"), many unrecorded voyages and landings of slaves may well have escaped inclusion in the Slave Voyages Database. After 1689 and up to 1712, when the Company

[23] Davies (1957, pp. 231-4) writes of Angola from which the Company's attentions were distracted after 1689, but apparently a new base was planned to be established there in 1720. T70/90/84, 96. Shortly afterwards Portuguese representatives in Britain were making their complaints known about the Company's activities in Angola. T70/91/11.
[24] T70/91/133, 163.
[25] The figure is constructed from the "slamimp" variable of the Slave Voyages Database. The identifications of imports by nationality and

attempted to collect a fee from British independent traders for the privilege of trading in slaves within the boundaries of the Company's former charter rights, the incentives to engage in secret trade independent of the Company were lessened.[26] It is in this period we can see a clear separation between RAC imports and all observed British imports into British America. The increasing gap (in natural logarithmic terms) shows that the RAC market share was declining and the co-operation between the RAC and the South Sea Company after 1720 did little to reverse that decline. The RAC and the South Sea Company were never able to achieve together any more than 20 percent of the all landings of negroes in British America in the years 1720-3.

We do not know if the new investors in the RAC thought they could arrest the long-term relative decline in the volume of the Company's trade in slaves and we can only presume that they thought they could sufficiently improve the firm's financial performance to re-create acceptable returns on their investments. How they failed to do the latter has to await future investigation. The RAC and its new investors may be forgiven for thinking that the firm's trade could be rebuilt. Figure 5 shows that the South Sea Company was itself steadily building up its annual deliveries of slaves prior to 1720 and although those efforts were ultimately financially unsuccessful, that lack of success could have been rationally attributed to Spanish caprice and not to anything inherently unsound about the corporate slave trade (Donnan 1930). But the RAC's historian has written of the long-term decline as inevitable and indeed has even pointed to insufficient profitability in the company's halcyon days as a harbinger of its decline (Davies 1957, p. 347). How large those profits would have to have been

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company depend upon the various ship-registration variables contained in the database.

[26] Because independent traders' activities largely escaped detection and precise measurement, the extent to which the RAC's pre1689 monopoly was breached has to proceed on the basis of the best slave demographic analyses to be had. It is highly likely that even at the height of its strength under its charter, the RAC never achieved a majority share in total British slave imports (Carlos and Kruse 1996).

to create success we are not told. We have documented already that the RAC was able to earn 6 p.c.p.a. on average in the first eighteen years of its existence and to deliver most of those return to shareholders in the form of payouts. It was in the re-creation of success to at least that degree that we can surmise the Company wanted to re-establish its facilities in West Africa and to push on into establishing new ones in Angola. Clearly it experienced some squeeze upon financial margins that put a stop to its efforts after 1724. What those margins were precisely need to be identified and until that is done, the history of the Company's management prowess cannot be completed. If the story has to be concluded with a final judgement that managerial incompetence was material to the Company's downfall, then that will temper the story we have told so far of the management's competence in re-financing its transatlantic slaving business.

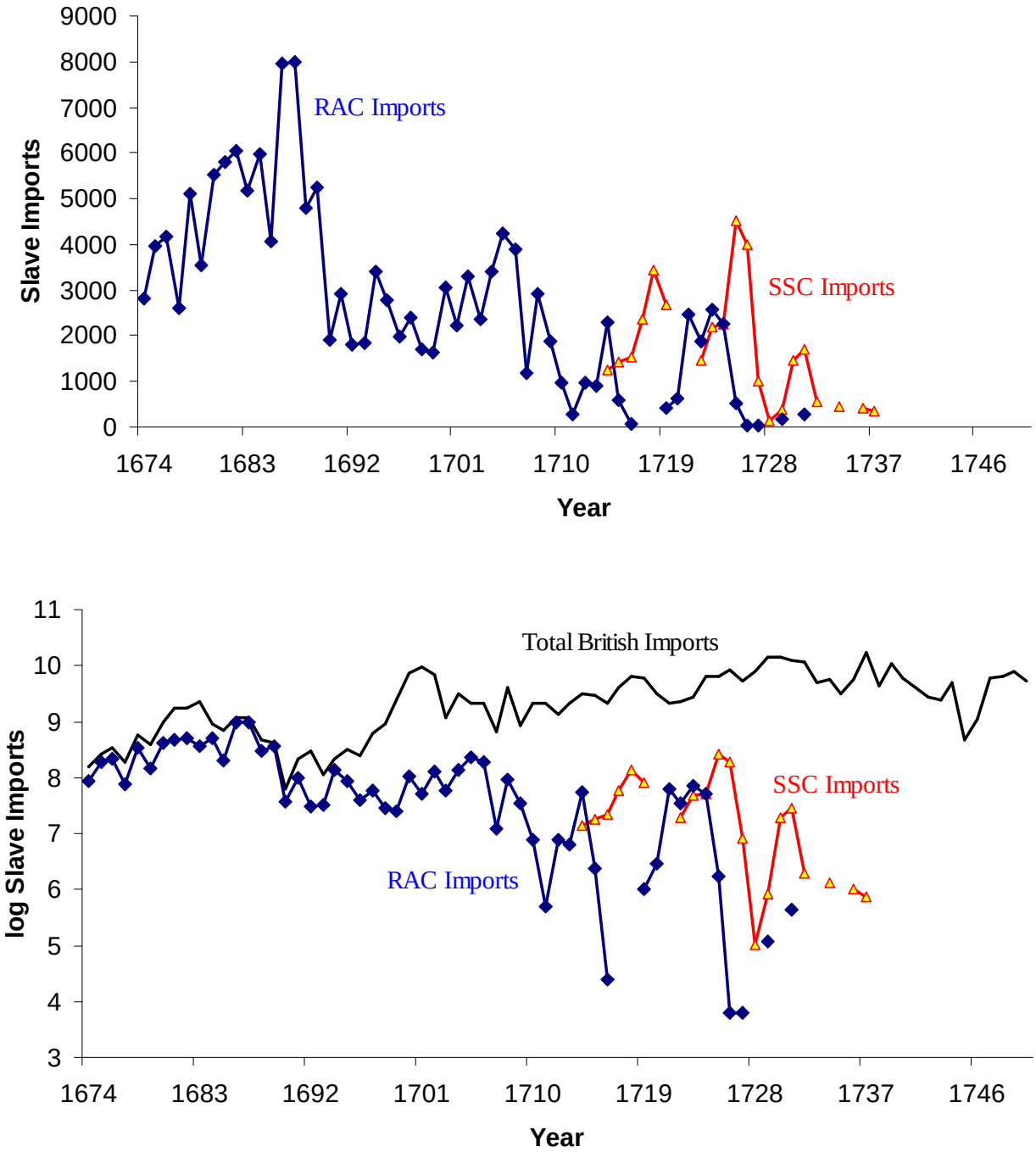

Figure 5. British Slave Imports into the Western Hemisphere

Source: Slave Voyages Database

VI

The Royal African Company re-financing in 1720 is a semi-success story that emerges from the South Sea Bubble. Corporate slave trading was perhaps an impractical means for carrying on that nefarious trade and perhaps it had been so ever since the 1680s. The smaller unit of trade represented by the independent slaver or the small consortium of trading captains who would put together the occasional slaving voyage was the better means and perhaps people knowledgeable of the slaving business in 1720 should have known better. Apparently they did not. The subscribers of new finance to the Company were, after all, somewhat likely to be members of the higher political and aristocratic classes. Maybe they were but examples of the type of investor who precisely did not know better. For a few years after 1720 new equity capital continued to be supplied to the RAC and the RAC valiantly outfitted ships and invested in its West African facilities. Unlike the new marine insurance firms that were floated and financed during and after the South Sea Bubble, the real side of the RAC's business eventually did collapse. But like these insurance companies, the RAC was also a company whose finances were not only transformed in 1720, but also survived the collapse of the South Sea scheme. This is the success side to its story and does speak well of the firm's financial management.

Textbook exercises in corporate finance show the student the many ways in which new equity can be raised in efficient markets without any adverse effects upon shareholders' wealth. A good example is the issue of shares by rights to original shareholders. It makes no difference what the rights price is, whether it is above market value or book value of shares, the effects of a rights issue are always wealth-neutral because the firm's equity remains 100 percent-owned by the original shareholders. The problem of the refinancing of the Royal African Company in 1720 was that its original owners were not numerous enough nor wealthy enough to

provide the four-fold expansion in equity that was required by the firm's management. The RAC solution to this problem was the issue of what now would be called an innovated security. It was priced and managed in ways that allowed it to be sold to such large numbers of new capitalists so that it could raise a fund to compensate original shareholders for the foreseeable declines in the value of their shares. The new equity raised was transparently applied to extinguish debts and to make a cash payout to original shareholders so that their wealth was unaffected and, most importantly, could be foreseen to be unaffected. The result was that an easy-to-understand arbitrage pricing relationship between original shares and the innovated subscription shares was established. The evidence shows that any profitable arbitrage opportunities were efficiently extinguished in the stock markets of 1720. A close modern parallel to the Royal African case is the efficient arbitrage between fully-paid shares and instalment receipts found in many Commonwealth countries today (Pinder 1998 and Charupat and Prisman 2004). In the South Sea Company's case the innovated securities, the subscription shares, had a different design and were certainly applied to very different uses than were the Royal African subscription shares. Yet the evidence shows that these securities were also the objects of no less efficient arbitrage than were the Royal African subscription shares (Shea, 2007b). Our study of the markets for RAC subscription shares complements this research on the South Sea Company's subscription share markets. There was a degree of pricing efficiency and even sophistication in the design of innovated securities that do not fit easily within the histories of the South Sea Bubble as they have usually been written. Our story of the Royal African Company's re-financing in 1720 is therefore somewhat revisionary of South Sea Bubble literature.

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Appendix A: A Brief History of the Equity Capital of the Royal African Company, 1674-1750

The Royal African Company had a corporate existence for three quarters of a century. Its equity capital structure underwent several changes in that long period which has made it difficult to write a coherent history of returns to investment over the entire history of the Company. In this appendix we describe the events that have to be taken into account to define a standard share unit for equity investment in the company for its entire existence.

The Royal African Company was a limited prototype of the great moneyed company of the early 18th Century. As it was formed in 1671 the Company was a reorganised monopoly on the English African trade. This meant that the firm had monopoly rights to trade from certain West African trading posts (factories) with England. The trade was practically carried on as a triangular trade between West Africa, the Caribbean and South America and England. The firm had occasional dealings with various holders of the *Asiento*, the Spanish grant of monopoly rights to bring slaves into Spain's South American and Caribbean possessions.

The Company lacked one significant feature of the later moneyed companies, such as the East India Company; it never held loans to the government or Crown as a large portion of its assets. The Restoration Crown's finances were certainly embarrassed when the Royal African Company was reorganised, but the Crown never looked to the Company as a means of restoring its credit except through limited participation by courtiers in the share equity and the revenues that would be generated via taxation on the African trade. In other significant respects, however, the Company bears comparison with its most notorious moneyed successor, the South Sea Company. The Company was reformed after a potentially lucrative trade with Africa had been destroyed in the Second Dutch War. It was in anticipation of the restoration

of peaceful trade, with newly-secured trade rights associated with a share in the *Asiento* contract, that the Company was reformed. It was founded upon hopes and anticipations very similar to those on which the South Sea Company's trade was to be founded in 1713. Davies (1957) used the extensive collection of Royal African Company records (class T70) at the National Archives (NA), Kew, to research his book, *The Royal African Company*. It is that book and those NA records that are the sources for the following capital history.

The original share equity in the Company came from the reorganised share equity in the earlier Company of Royal Adventurers Trading to Africa. Further share equity was issued to former creditors of that Company and shareholders from the once-competitive Gambia Adventurers. We can start tracing the value and size of this capital from 1674. At that time there were 1100 shares on which £100 had been paid. These shares we take as our standard shares.

We need to define standard shares so that we can understand share values and payouts over long periods in which there were changes in the definition of nominal shares in the Company's stock. We keep track of these changes with the use of an adjustment factor. One way to think of what the adjustment factor achieves is that it corrects for changes in the definition of nominal shares when such changes have, at least in part, no effect on the wealth of a shareholder. There are a large number of possible changes in shares that require new adjustment factors. Share splits, share bonuses and share amalgamations are the obvious cases. But rights issues or share repurchases at rights prices or repurchase prices different from the current market values of shares also require changes in the adjustment factor. Share prices and dividends on what we call standard shares are simply values and payouts for nominal shares multiplied by the adjustment factor. The number of standard shares issued and outstanding is the number of nominal shares divided by the adjustment factor.

After first setting our adjustment factor to 1 in 1674, we have to account in 1691 for the effects of a 300% stock bonus. This is just the same as a four-for-one stock split. It of course takes the nominal shares from 1100 in number to 4400 and cuts the price of nominal shares by three quarters, but exercises no influence on shareholder wealth. This event requires us to make the adjustment factor 4 in order to correct fully for the wealth-neutral effects of this event.

In March 1693 there was a 1-for-2 rights issue at £40 per nominal share when market prices were slightly higher than that.[27] Only about 2/3's of the issue was taken up. Then there was a 1-for-1 rights issue in 1697 at £12 per share that could be paid for in instalments that stretched to early October 1698. Using a series of share prices from Houghton's *A Collection of Letters for Improvement of Husbandry and Trade*, and from some of the earliest issues of *The Course* we can observe that the rights prices implied by these instalments were just a bit below nominal share prices. Therefore the measured adjustment factor drifted above 4 by the end of the seventeenth century.

In December 1702 the Company started to make calls upon shareholders.[28] The first, of £6 per share, was due in March 1703. In June 1704 there was another call of £7 per share that could be paid in three instalments, the last of which was not due for payment until March 1705. In April 1707 there was a further call of £4 per share. When matched with prices of shares closest to the dates on which all these calls were due, the resulting alteration in the adjustment factor brings it back down to a value just below 2.

In September 1712 the Company was poised for what was hoped was to be a revival of its fortunes in anticipation of the peace to follow the War of the Spanish

[27] Scott (1912), Vol. 2, p. 26.

Succession. The parlous state of its finances, however, made a wholesale reorganisation of its capital necessary. In December 1712 there was a £3-per share call. With the substantial concessions granted for early payment of the call it appears that the actual call amounted to about £2.3 per nominal share. The price of nominal shares at the time was about £3.5. At the same time (January 1713), nominal shares were amalgamated on a 1-for-10 basis. This reduced the number of nominal shares back to something like the number of original shares (1009) in 1674. To make matters no less complicated, the Company then declared a 50% stock bonus upon which £100 (per bonus share) was immediately called. All these machinations greatly deflated the adjustment factor, but in the end there was no substantial change in the number of original shares issued and outstanding. The only substantial change in that regard in 1713 came with a conversion of about 3000 Company bonds into shares.

The next major change in the Company's capital came during the South Sea Bubble. In April 1720, when there were 4304 nominal shares, it was proposed that 15,696 new shares were to be publicly issued at £25 per share. As it was, about 15,519 such new shares were issued. Prices for nominal shares were currently between £60 and £65 per share. The reason why original shareholders could agree to such a public issue was that a portion of the proceeds (£52,400) coming from it was to be used mostly to pay them a cash dividend that could amount to as much as £10 per nominal share. Another portion (£75,696) was to relieve proprietors of liabilities they had incurred in support of the firm. So, even though their original shares were to be eventually treated equal with new shares that were being publicly offered at £25 per share, they would have cash in pocket and their original shares that had a total value of a bit more than £60. This was just about the market value for original shares before the public offer was made. The offer was made during the course of the South Sea

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[28] It was quite common in company charters that shareholders' liabilities were not strictly limited. Companies could demand, from

Bubble and Royal African share prices were as buoyant as prices of many other shares. The effect on the adjustment factor of the public share offer at below-market prices was quite substantial. The adjustment factor was slightly less than 0.06 in the years 1713-19, but had more than doubled to 0.142 by EoY 1720 and stood at 0.146 by EoY 1721.

In November 1722 there was a 5 percent call upon shares. It was to be paid in two instalments; one 2 percent instalment to be paid by 20 December 1722 and the other 3 percent instalment to be paid by 1 March 1723.[29] Just prior to these dates we have nominal share prices around £7.5 and £7.6 respectively, which we use to deflate our adjustment factor. By the end of 1723 there was a 1-for-2 amalgamation of shares[30] that cuts the adjustment factor in half. At the same time there was a rights issue that resulted in about 1920 new nominal shares. Since the rights terms were very close to market terms, there was no effect on the adjustment factor.

In March 1727 there was a further 1-for-8 amalgamation of shares and then a further 5 percent call on shares in April. Even after the March amalgamation of shares the April price of shares was only about £8.75 so that by this time the adjustment factor that creates standard shares of 1674 has become practically microscopic. The final equity-capital event for the firm before its dissolution in 1750 is a 10 percent stock bonus in 1733.

The graphs below depict end-of-year (EoY) values for our calculated adjustment factor and the resulting numbers of standard shares. EoY share value data are taken variously from Houghton, Freke or Castaing. EoY payouts are constructed from several sources; the early payout history for the Company (1672-1702) is found in the General Court Minutes (T70/100 and 101). Records of subsequent payouts are

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time to time, payments from shareholders. These were termed “calls”.

[29] T70/180, front cover.

[30] T70/1180.

to be found in T70/1186, *Rough Drafts and Copy Book A*.[31] The graphic depictions below for values of payouts and shares pertain to standard shares of 1674.

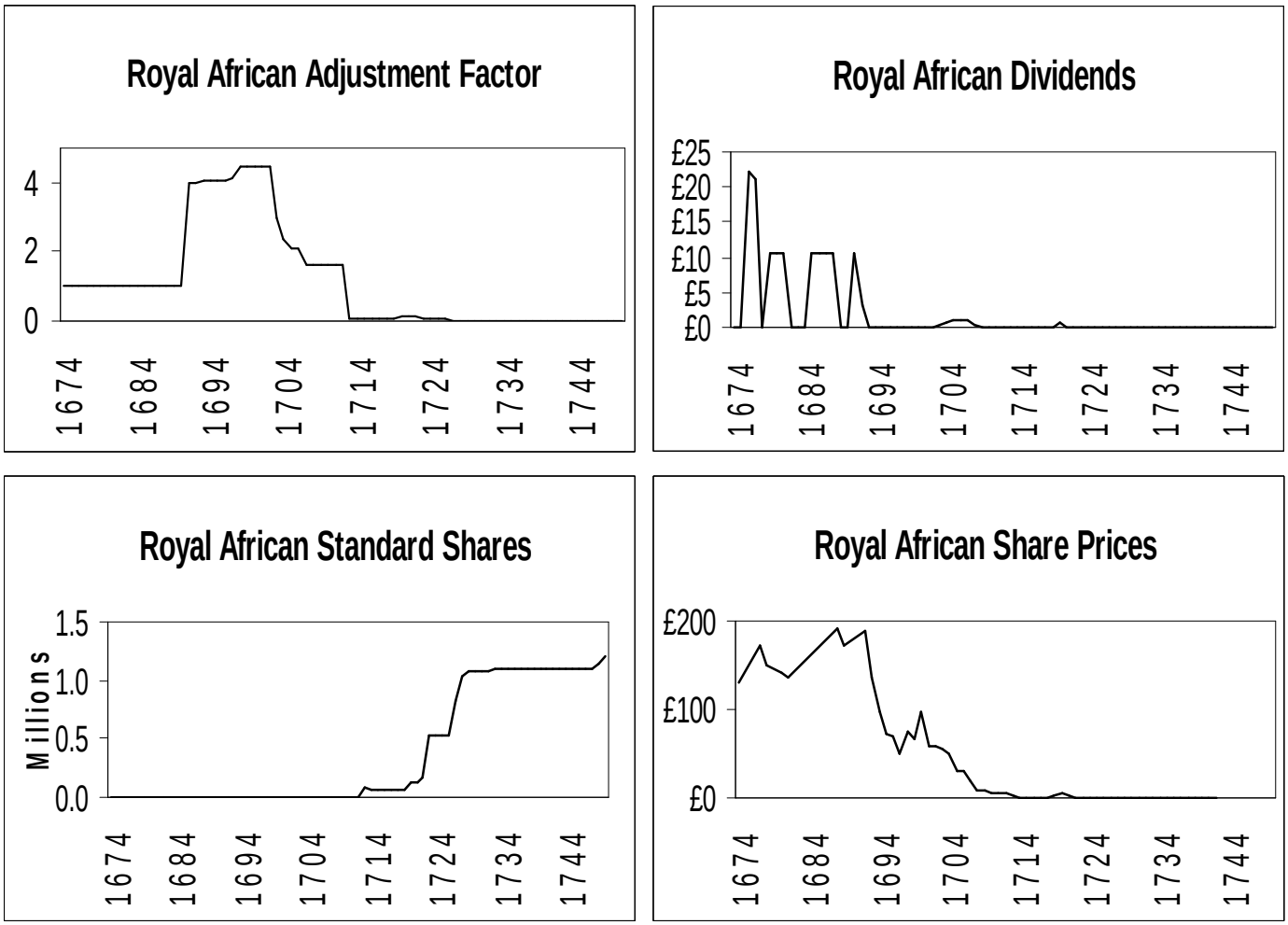

FIG. A.1 Adjustment Factors, Total Numbers, Dividends and Values of Royal African Company Standard Shares

[31] 'Dividends made', p.132.

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