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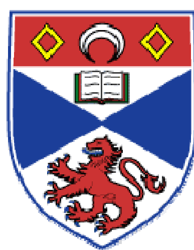

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# Financial Market Analysis Can Go Mad (in the search for irrational behaviour during the South Sea Bubble)

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### ABSTRACT

An investigation into the legal and political history of South Sea Company subscription finance shows that the subscription contracts had default options built into them, as was typically the case in eighteenth-century subscription financing. Company records and contemporary pamphlet literature show that people understood the subscription finance mechanics that were stated in law. A fair presentation of South Sea share value data also supports this view. We thus conclude that the analyses published in this *Review* by Dale, Johnson and Tang were irretrievably flawed and present a substantially incorrect history of the markets for South Sea shares.

**JEL Classification:** G13, N23.
**Keywords:** South Sea Company, Royal African Company, Financial Revolution, Bubble Act, subscription shares, options markets.

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In the May 2005 issue of this *Review* was published 'Financial markets can go mad: evidence for irrational behaviour during the South Sea Bubble' by Dale, Johnson and Tang (hereafter DJT). The authors purported to have presented, for the first time, quantitative evidence of irrational pricing behaviour in financial markets during the South Sea Bubble. From their analyses flowed a larger set of conclusions about irrationality in financial markets and even the need for market regulation. Their conclusions also informed some of the discussion found in Dale's monograph on the South Sea Bubble.[1]

But the analyses presented by DJT are irretrievably flawed. The logical structure of the paper is like that of an inverted pyramid. A broad range of conclusions about irrationality, financial market inefficiencies, gambling manias and so forth during the South Sea Bubble rests upon one proposition that a pricing relationship between South Sea original shares and subscription shares was violated. DJT argued that this pricing relationship was the only one plausible and that irrationality could be the only possible reason for which it would be violated. As reasonable as their argument at first seems, DJT do not appear to have consulted the law on the subscription shares, which is the primary oversight from which all their subsequent errors flow. In this paper it will thus be shown that a) by not examining the legal and political history of the subscription shares, DJT present a history that is fundamentally counterfactual and b) how their data were selected, adjusted and presented just happened to make their arguments appear in the most favourable light possible. The main body of this paper contains four sections. Section I presents the theory of the pricing relationships that DJT discuss. In section II we demonstrate that the purpose of subscription finance and

[1] Dale, The first crash. Where anything has been adequately stated by DJT, we do not restate it; the paper is written under the assumption the reader is thoroughly familiar with DJT. Dates are reported in old style (O.S.) for days and months, but not for years – the new year starting conventionally on 1 January. Thanks are due to Stefan Altorfer, Antonia Clark, Larry Neal, Charles Nolan, Alex Trew and

its legal implementation was not very different for the South Sea Company in 1720 than it was for other companies in 1720 and later in the eighteenth century. One of the great legal and political debates of late 1720 surrounded the validity of the South Sea subscription contracts; an analysis of this debate is found in appendix II. In section III it is shown how, by ignoring this debate, DJT could latterly justify an excision of very important data from their analyses. A large portion of the data that DJT retained for analysis were then adjusted so that it appeared that subscription values were smaller than original share values – an appearance that was highly favourable to their thesis. Section IV contains our conclusions.

I.

Subscription shares were sometimes referred to as subscription contracts and, as such, could have been possibly viewed as ironclad agreements between the issuer and the subscriber. That is, the subscriber was under strict obligation to pay the instalments on time and in full, otherwise the issuer had full legal right to recover the due instalments at the subscriber's cost, which included interest. This is the DJT hypothesis.

If this was the proper way to view the subscription contracts, how would their value be determined? A subscription share would be worth one original share minus the discounted present value of all the remaining calls (the contemporary term for a requested instalment payment). On 20 June 1720, for example, an original share was worth about £760 ($P_{\text{original share}}$) and a subscription share (from the first series) was worth about £590 ($P_{\text{subscription share}}$). The difference between the two values was £170. The present value (PV) of the remaining 7 instalments (calls) of £30 each would have to have been smaller than £210, but a realistic value (at about a 4 or 5 per cent per annum discount rate) would also have been greater than £200. Thus we see that this particular subscription share was a bit too valuable to be in accord with the

two anonymous reviewers for criticisms of an earlier draft of this paper

interpretation of the subscription contract given above unless one is willing to argue, as do DJT, that either the original share or the subscription share was priced irrationally. Thus the DJT hypothesis is basically:

$$P_{\text{subscription share}} + PV_{\text{calls}} = P_{\text{original share}}, \qquad (1)$$

the left-hand side of equation 1 being what they define as an original share 'equivalent' value. If this equation does not hold, then the difference between the two sides of the equation must arise from irrational pricing errors. DJT's purpose was not to demonstrate an irrational cause for the South Sea Bubble itself. Instead, their purpose was to demonstrate an even more fundamental 'irrationality', an inability of persons in 1720 to agree on the values of what DJT consider to be two perfectly equivalent classes of shares. Equation 1 is also a statement of a hypothetical linear relationship between subscription and original share values, a hypothesis which must be maintained if DJT's econometric results are to be of any interest.

An alternative hypothesis would be that the subscription shares were not equivalent to original shares, but had extra rights (such as the right to default upon instalment payments) attached to them and hence they were more valuable than original shares. DJT acknowledged the alternative hypothesis, but dismissed it.[2] If they had not done so, they would then have had to acknowledge that subscription shares contained special option values and the following inequality (and not equation 1) would be expected to be found in the data:

$$P_{\text{subscription share}} + PV_{\text{calls}} \geq P_{\text{original share}}. \qquad (2)$$

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(http://ideas.repec.org/p/san/cdmawp/0508.html). All errors that remain in this paper are my own alone.

[2] DJT, pp. 257-8. Although DJT cite no one who advocates this hypothesis, it is not new. It was stated by Cochrane, 'Review of Famous first bubbles', p. 1153. It was stated again most recently by Neal, 'Book review of The first crash'.

In fact, inequality 2 implies that $P_{original\ share} - PV_{calls}$ would have to serve as a lower bound on subscription share values.[3] Additionally, if the alternative hypothesis is accepted, then any equilibrium relationship between subscription and original share values will have to be nonlinear one. In that case none of the cointegration nor any of the causality analyses in the DJT paper will be appropriate and the empirical results will be of no interest.[4] Although much of the DJT paper is devoted to empirical analyses and although there is much in it that could be criticised, such as the reliability of testing for unit roots in daily data over very short time spans, we take the position that such criticisms are not of even secondary interest. As it was argued in the introductory text of this paper, the entirety of DJT's analyses starts from and depends absolutely upon equation 1 being the correct relationship between subscription share values and original share values. It is equation 1 itself that is historically quite wrong.

## II.

In this section we investigate the enforcement mechanisms pertinent to the money subscription contracts. It will be shown that neither the relevant secondary literature on eighteenth-century subscription contracts nor the relevant Parliamentary Act that described the mechanisms for enforcing subscriptions were discussed or even cited by DJT.

Since its publication in 1938, DuBois' The English business company has been the basic survey of all matters legal, organisational and financial for the eighteenth-century British business corporation. DuBois' opinions on the general enforceability of eighteenth-century subscription contracts are quite relevant to the specific cases of

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[3] DJT (pp. 248-9) claim that the inequality is at times even reversed in their data – we examine this claim in Section III.

[4] In option pricing theory option values are highly nonlinear functions of, at least, i) the value of the asset on which the option contract is written and ii) the volatility of returns on that asset (Cox and Rubenstein, Options markets, pp. 165-78, 186-7). For this reason econometric studies of the

the South Sea and other companies in 1720. In a few passages he makes his basic points and concludes,

> It is clear that no common law right of action was recognized and that, if a right to sue existed at all, it was believed to rest upon the privilege granted by the act of Parliament. Moreover, it was thought essential for the success of the action that the procedure for making of calls, prescribed in the act, be carefully and painstakingly followed.[5]

Whether the historian agrees or disagrees with DuBois, his study is still the basic starting point for a study of eighteenth-century subscription contract enforceability and it must be cited and discussed.

In 1720 did no one write or say anything about how subscription contracts would be enforced? We start our search for enforcement mechanisms, as DuBois advised, with incorporating charters or parliamentary acts. In the South Sea Company's case the relevant Act is 6 Geo.1, c.4 (April 1720). This is, of course, the very important Act that was destined to govern most all of the Company's operations in 1720. When it came to raising new financing, we find the relevant passages we seek near the end of the Act.[6] The Act states that additional capital could be raised by a number of means, including a money subscription for shares.[7] The South Sea Company used these powers to launch four series of money subscriptions to the general public by a very simple device. A select group of Directors and prominent shareholders were issued the additional stock and were bound in trust to deliver to the Company any monies they raised from the sale of such stock to the public. Rather than being novel, this was a commonly used device. A variant of it was being

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relationships between option values and values of the option contracts' underlying assets cannot straightforwardly use the tools of linear time series analysis.

[5] DuBois, The English business company, pp. 367-9.

[6] Reproduced in full in app. I.

[7] app. I, lines 12-9.

followed in 1720 by the Royal African Company in its own subscription for new capital.[8]

There was no mechanism described in the Act by which the Company could reach into the pockets of defaulting subscribers and extract a call, with interest, as the DJT hypothesis would require. As far as the Act was concerned, a defaulter's liability was limited to 'Shares and Stocks' that he had already of the Company. The important provisions found in the Act are as follows:

1) Without the payment of the call, the subscriber would be deprived of any 'Share, Dividend, Annuity, or Profits' that he might otherwise be entitled to;[9]
2) Without payment of the call, the Company could also 'stop the Transfers or Assignments' of the defaulter's interests in the firm;[10]
3) The defaulter's liability for a missed payment, plus 5 per cent per annum interest, would be met from the 'Shares and Stocks of such Defaulter'. If the subscriber persisted in default for a space of three months, the Company, or anyone whom the Company designated, could sell the defaulter's 'Stocks';[11]
4) Even when the default persisted beyond three months the defaulter could still obtain something of value if the sale of his forfeited stock garnered more than his liability to the Company. The defaulter would be delivered the 'Overplus'.[12]

The language used in 6 Geo. 1, c. 4 therefore **is** the language of options and sanctioned default. Subscribers were not told that they would be forced to comply with their subscriptions, nor were they told that their personal estates would be liable

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[8] DuBois, The English business company, p. 394, n.68. The Royal African Company's subscription issues most recently figured in the study by Carlos, Moyen, and Hill, 'Royal African Company share prices', although the option-like character of subscription shares was not discussed in that paper.
[9] app. I, lines 27-8.
[10] app. I, lines 33-4.

for the missed calls and costs of enforcement. They were handed an option to default and the Act tried to make clear only what would be the costs of exercising that option. Most importantly, the Act stated explicitly that a defaulter's liability to the Company was limited to his holding of stock in the Company. Not only were subscribers handed an option to default, they were also told that the consequences of default were not necessarily permanent. As long as they complied within three months, their position as members of the Company could be restored. This handed additionally to the subscribers what we might call an option 'to wait and see'.

Parliamentary bill writers were perfectly capable of writing enforcement mechanisms of the kind that DJT presumed existed and could have inserted them into 6 Geo. 1, c. 4, if they had been required to do so. They could have written language that made subscribers' personal estates liable in actions of debt or actions on the case. A good contemporary example of such mechanisms is found in the swingeing language of 6 Geo. 1, c. 10 by which the circulation of new Exchequer Bills was enforced.[13] The South Sea Company also had a view as to how it would enforce subscription contracts. As early as 2 June 1720, there was concern about potential default on the second payment of the first subscription (due 14 June). This prompted the Company further into its policy of lending money on stock and subscription receipts, but in case these measures did not prevent default, defaulters would face the simple forfeiture of their first subscription deposit.[14] We also have evidence that contemporaries understood readily what the enforcement provisions of 6 Geo. 1, c. 4 implied for the money subscription contracts. One example is the introductory text to one of Archibald Hutcheson's many tracts, to wit,

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[11] app. I, lines 35-44.
[12] app. I, line 45.
[13] app. I, lines 53-67.
[14] Minute book of the committee of the treasury, HLRO B64, p. 17.

It is very certain, that the Proprietors of the Four Money Subscriptions, will rather choose to submit to the Forfeitures (which they are liable to, and which the Company may exact) than comply with the remaining Payments. And in this Case the Proprietors of the Third and Fourth Money Subscriptions, will forfeit all the Money by them paid in; having only made their First Payment. The Proprietors of the First and Second Subscriptions will forfeit their First Payments, and be intitled to Stock for the further payments they have made;[15]

What then is the DJT view on these matters? DJT write in such a way to suggest to the reader that the meaning of much of their terminology should be self evident. Phrases like 'legally enforceable', 'legally binding' and 'legally valid' are used liberally, but without definition.[16] With regard to the subscription contracts DJT state, for example, 'If these were not legally enforceable, purchasers of subscriptions might simply walk away from their obligations, in effect treating their contracts as options.' The words 'simply walk away' clearly show that DJT want the reader to think that default could not be legally sanctioned, yet this was precisely what 6 Geo. 1, c. 4 allowed. DJT continue with, 'However, there can be no doubt about the legally binding status of subscriptions, since in early 1720 Parliament initiated legislation that was specifically designed to ensure that any subscription issue made by the South Sea Company would be legally valid, and transferable by simple legal assignment'. The reader might think that DJT are referring to the legislation relevant to enforcement, 6 Geo. 1, c. 4. But no, DJT are referring actually to 6 Geo.1, c.18 – the Bubble Act. The only words in that Act relevant to the subscription shares (which DJT quote) are 'all such subscriptions ( … ) shall be firm and valid'. There is no further explanation in the Bubble Act of what 'firm and valid' means. The only possible guidance would be 6 Geo. 1, c. 4 itself. Indeed the Bubble Act appears simply to affirm that the

[15] Hutcheson, Some computations and remarks relating to the subscribers, p. 3. Hutcheson clearly understood that the Company would impose forfeitures starting with any deposit payments subscribers had made. cf. fn. 14. Hutcheson made a similar statement (September 1720) in An estimate of the value of South-Sea Stock, p. 86 (Item 15) in A collection of calculations and remarks. Another contemporary statement about possible forfeitures on the subscription shares is found in the anonymous Objections against the new scheme for restoring publick credit, abstracted in Boyer, The political state of Great Britain, Vol. 21, February 1721, p. 127.

provisions of 6 Geo 1.c. 4 will remain 'firm and valid' and this was precisely how contemporaries understood the meaning of the Bubble Act.[17] In citing the Bubble Act in the context of enforcement mechanisms, however, DJT give the impression that the Bubble Act was describing what these enforcement mechanisms were. This was simply not the case; the mechanisms were described in the earlier Act – 6 Geo. 1, c. 4.

The mechanisms embodied in 6 Geo.1, c. 4 were not particularly different from the mechanisms used throughout the eighteenth century (and later) to encourage compliance with the terms of subscription agreements.[18] DuBois writes of the tender care that canal companies took in the 1790s to cajole and to work with, but rarely to threaten, their subscribing capitalists who were in default on calls.[19] Why was enforcement of subscription contracts designed typically to be 'gentle'? The question touches upon the issue of why subscription finance was resorted to in the first place in the eighteenth century. In a time when shares were large in nominal size and new finance was likely to be constrained in supply, subscription contracts appealed (gently) to a class of financiers who might not otherwise be able or willing to buy complete shares outright.[20] After all, if a company wished to raise large-scale financing from credit-constrained financiers, a simple alternative means would have been to make public offerings of smaller fractional shares, but in the eighteenth century companies

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[16] DJT, pp. 257-8.

[17] This is demonstrated fully in app. II. The Act additionally provided for the transferability via endorsement of subscription receipts, a provision thought by some especially necessary to attract potential subscribers. cf. fn. 20. In app. II it is shown that the passages in the Bubble Act concerning subscriptions were also the products of a general concern about the legality of the Company's subscriptions.

[18] Even the Bubble Act contains an example of such enforcement mechanisms relevant to how the London Assurance and the Royal Exchange Assurance could raise further capital from their shareholders. In 1720 the Royal African Company's subscription contracts were subject to similar enforcement provisions. See NA T70/101, Minutes of the general court, pp. 201-2. cf. fn. 8.

[19] DuBois, The English business company, p. 369.

[20] There is some 1720 testimony that the demand for subscriptions came from such people. 'For many Persons, who were to follow the King to Hanover, and others, were hard put to it, to make their second payment to the first Subscription, were both equally desirous to turn their Stock into Money'. (Boyer, The political state of Great Britain, Vol. 19, June 1720, p. 656.) The anonymous writer of An abstract of the case of the subscribers says that 'forasmuch few Subscribers were able to pay more than the first

rarely did this.[21] After hypothesising that original and subscription shares were precisely 'equivalent', it is indeed curious that DJT did not then raise the question as to why the subscription shares were issued at all.

Even if 6 Geo. 1, c. 4 had never permitted default, there were other reasons for which thinking individuals could have viewed the completion of the subscription contracts as being optional. These reasons were put forth, rebutted and defended in a lively debate that certainly commenced as early as September 1720 and continued into 1722. Some of the issues debated even predated the crisis in South Sea share values. In their terse assertion of supposedly inviolable enforcement provisions of the subscription contracts, DJT mentioned no such debate and indeed gave the impression that any controversy was settled unequivocally by a House of Commons resolution of the 19 December 1720.[22] But such was not the case. The debate probably served to lower the costs of default to subscription share owners and raised thereby the value of default options already embedded in the subscription contracts. DJT not only ignored this debate and its implications for how people viewed the subscription shares, but they also excluded from their analysis data coming from this most important period. This and other aspects of DJT's handling of data are examined in the next section.

III.

South Sea share value data are very scarce and Bubble historians should have some very good reasons for excluding any amount of the available data from their analysis. DJT have actually left out a large proportion of the available data from their analysis, which happened to be the data most unfavourable to their thesis. In the course of excluding this data, DJT were left with data that spanned an approximate four-month (15 May - 27 September) period. In two of those four months (23 June - 22 August)

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Payment, unless they had been enabled by Parliament to sell and assign the same (i.e. the subscription receipts)'.

[21] This is what the Hudson's Bay Company did in 1720, but it was exceptional (DuBois, p. 357).

the Company's share transaction ledgers were closed. In that period, when spot transaction values for shares were not available in the historical record, DJT choose to approximate those values.[23] The approximation method chosen was instrumental in creating an appearance that subscription share values were less than original share values. DJT considered this appearance as very favourable to their hypothesis, but it will be shown that the approximation method used was hardly an appropriate one to employ on 1720 financial data. It will be demonstrated that counterparty risk in forward financial contracting during the South Sea Bubble was very large. If such risk is not taken into account, it is very easy to overstate grossly the spot values of original shares, as DJT have done.

DJT wrote briefly on the question of reliability of data sources and their conclusions are for most all purposes correct – there are, for most purposes, no appreciable differences between data from Freke[24] or Castaing[25] that would make one source of data preferable to the other.[26] From the available Freke data, DJT chose to use only the values between 14 May and 27 September inclusive. For dates prior to 14 May, the Directors' trades (sales) of first and second subscription shares are adequate sources for extending the record of values.[27] Figures 1 and 2 show clearly the data ('DJT excluded') that are omitted from DJT's figure 1.

What is important is not so much the early 1720 figures that were excluded, but the later 1720 figures for the first and second subscriptions. Why did DJT exclude the latter data? The only statement we have for it is,

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[22] DJT, fn. 72.
[23] DJT do not seem to be aware that the ledgers were quickly closed again (26 August) and remained shut until 12 September, and thus they make no forward-to-spot adjustments to data in that period. See the analysis in supp. app. III, cf. fn. 59.
[24] Freke, <u>The prices of several stocks</u>, but hereafter referred to as <u>Prices of stocks</u>.
[25] Castaing, <u>The course</u>.
[26] supp. app. III, conclusion A.III.1.
[27] supp. app. III, conclusion A.III.2 and A.III.3. DJT do use some early reported values from <u>A true state of the contracts</u>.

> ( … ) their value for this study is questionable, since towards the end of September the South Sea Company began to consider proposals for remedial action involving retrospective adjustment of the last two subscription prices ( … ) A cut-off point of 27 September is used to allow for possible anticipation of such action, which may have led to some distortion in subscription prices.[28]

The full scope of this 'possible anticipation' is discussed in appendix II. Of course the markets for subscription shares were full of anticipations of what alterations might be made, not only in the terms of the subscription agreements, but in their continuing validity. Such 'distortions' are the stuff of history and should not result automatically in scarce data being discarded.

One consequence of excluding the post-September data is that it allowed DJT to write, with little risk of contradiction, '( … ) there is no evidence of a widening gap between stock valuations and those of subscription two as the share price fell to levels below the amount of calls outstanding late in September'.[29] Perhaps there is no such evidence as long as one is not looking for it into October 1720 or beyond. The DJT-excluded data are subscription share values from periods in which South Sea share values were relatively low – precisely the periods in which default options embedded in subscription contracts would have had their greatest value and the periods in which we would expect to find a 'widening gap' in values. As South Sea share prices fell precipitously in September, they approached and fell below the level of the issue prices of the first two subscriptions (£300 per share and £400 per share, respectively) and the default options embedded in the subscriptions would steadily have become more valuable. The debate surrounding the subscriptions would have been corrosive to the goodwill the Company needed from the public and the government to prevent

[28] DJT, p. 242. Neither Freke nor Castaing report any post-September values for subscriptions three or four in any case. There are however post-September values for the first two subscriptions in both sources.

[29] Ibid., p. 258. This particular DJT conclusion was also aided by their use of data from Freke. Castaing's data tell a different story. See supp. app. III, conclusion A.III.3.

defaults. Indeed, as share values fell, the Company became actually supine in its demands for cash instalment payments. This may have very well signalled to the

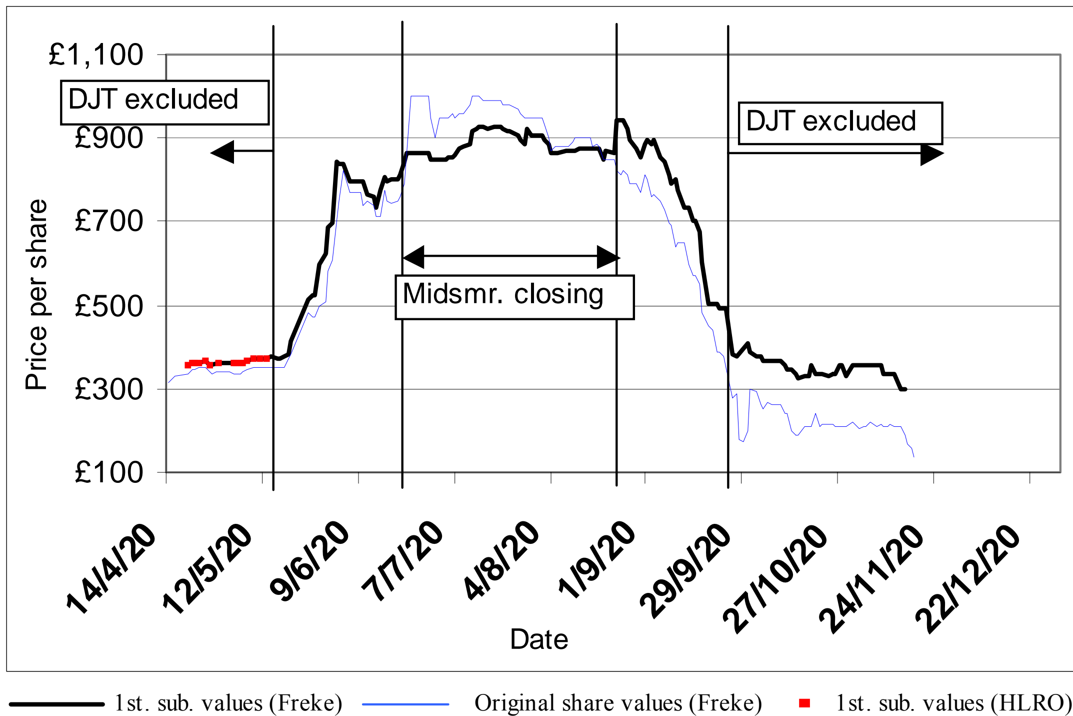


Figure 1. *South Sea original and 1st. subscription share values, 1720*

*Source:* Freke, *Prices of stocks* and HLRO Box 158 (see text supp. app. III)

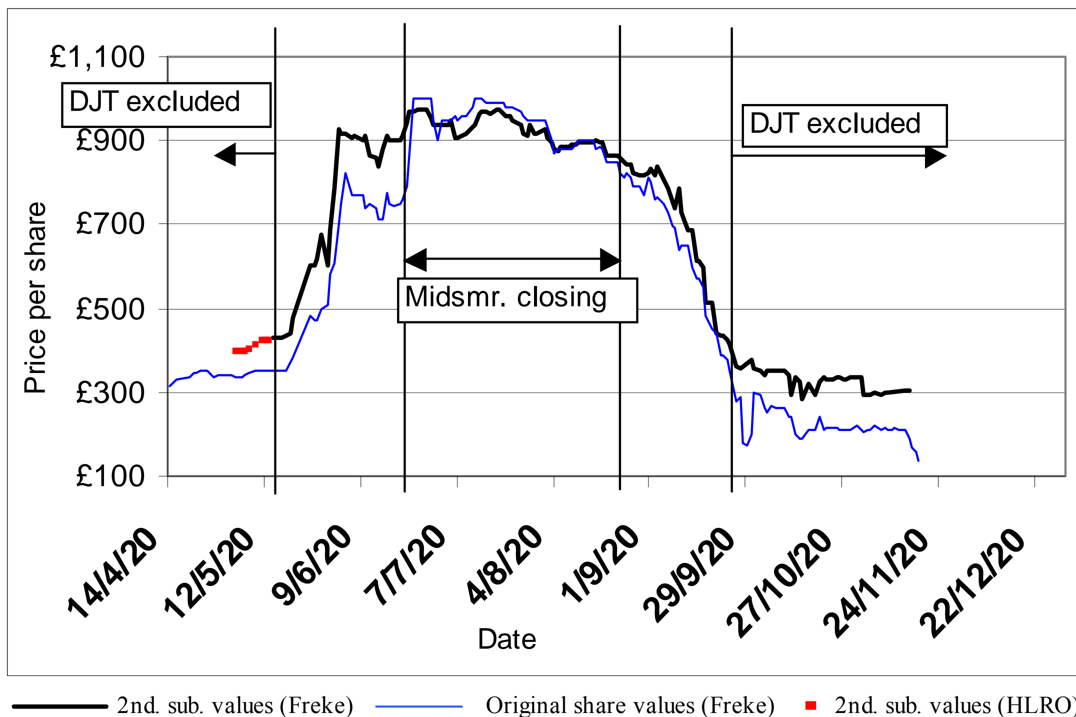


Figure 2. *South Sea original and 2nd. subscription share values, 1720*

*Source:* Freke, *Prices of stocks* and HLRO Box 158 (see text supp. app. III)

Support for these views is certainly much stronger when the DJT-excluded data are viewed alongside the data that appear in DJT's figure 1 and the potential for discovering a nonlinear pricing relationship of the type discussed in section I is enhanced.[30]

We now turn to another significant aspect of DJT's data handling. Nearly 60 percent of the data DJT analysed came from the periods in which the Company's share transaction ledgers were closed.[31] The only values for shares reported both by Freke and Castaing were values for forward delivery 'for the opening'.[32] The investigator must work backward from that data to some approximate values for 'spot' trade. How that is done will determine the level of imputed spot prices in the 23 June - 22 August period.

The method that DJT use to calculate these imputed values is very simple; they discount the reported forward values from Freke with a 5 per cent per annum discount rate. This does not mean that their imputed spot values are 5 per cent below the reported Freke values. The 5 per cent per annum rate is applied over only the time left to the opening of the transfer ledgers or, at most, two months. So, for example, on 23 June when Freke reports a forward value of £1000 per share, DJT would impute a spot value for shares on that date of about $£1000/(1 + .05/360)^{60} = £991.70$, less than 1 per cent below the reported £1000 forward value.[33] In other words, DJT's imputed

[30] cf. fn. 4.
[31] Between 15 May and 27 September there were only 113 (Freke) observations of South Sea original share values. 66 of these observations come from the closed-ledgers periods.
[32] This would have been generally understood to be the dates 22/23 August as far as the midsummer closing period was concerned. We do not know what Freke or Castaing were reporting in the second closing period. Presumably they were similar forward delivery values for the opening, which was announced to be 21 September, but was changed to 12 September in a snap decision made on 11 September. See the analysis in supp. app. III, cf. fn. 59.
[33] The 5% p.a. assumption employed here by DJT was also employed by Dale in The first crash. Exception to this assumption (for the purpose of calculating values for $PV_{calls}$) has been taken by Neal in his review of Dale's monograph (Neal, 'Book review of The first crash'). We review this controversy at the end of supp. app. IV.

spot values hardly differ from the forward values reported by Freke. This has a noticeable impact upon some of their conclusions, for example,

> ( … ) if subscriptions were treated as options by investors, they should certainly not sell at a discount relative to stock. Yet subscriptions one and two traded at a discount on the share price for 41.6 per cent and 37.2 per cent of the period covered by the analysis ( … ).[34]

What DJT neglected to inform the reader of in this passage is that these supposed discounts can be observed <u>only</u> in periods in which the Company's transfer ledgers were closed, as a glance back to figures 1 and 2 will readily confirm. By assuming that forward premia were very nearly zero, DJT obtained approximate spot values for shares that were as high as they could possibly have been and making consequently original share values appear as if they were in excess of subscription values. And, of course, in not calculating any forward premia for the second closing period (26 August – 12 September), DJT treat the Freke data as if they <u>were</u> spot value data, which they were probably not. To all intents and purposes, DJT have imputed spot values for South Sea shares as if the South Sea forwards were traded on a modern futures exchange, in which most all counterparty risk is eliminated. Such forward values today are understandably referred to as 'zero-premium forwards'. DJT were thus dismissive of the notion that the peak in South Sea share values was much lower and earlier than they depict, but they did not look for evidence to the contrary.[35]

The forward premium, the difference between a forward price and a contemporaneous spot value for the same asset, can have potentially several different components. Only a few of these components should be strongly influenced by levels

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[34] DJT, pp. 257-8.

[35] Neal , <u>The rise of financial capitalism</u>, pp. 101 and 111, conjectured that the peak in South Sea share values was much lower than was conventionally depicted. He based his argument on inspections of spot values for other shares besides those of the South Sea Company. Again in Neal, 'Book review of <u>The first crash'</u> he mentions the possibility that forward premia might have been as large as 50% at the end of June 1720. His original conjecture was probably correct and, as we discuss at the end of this section, an estimated 50% forward premia might have even been conservative.

of interest rates. Forward premia might be large because there are additional cost or risk components in forward contracts. An intriguing possibility is to consider whether South Sea shares themselves carried a convenience yield. There were many actions taken by the Company's Directors that were attempts to control the number of shares outstanding in the markets. Some of these actions have been interpreted as attempts to create a controllable scarcity in tradable shares.[36] Indeed, the schemes for converting much of the national debt into South Sea shares could have generated some uncertainty about future inventories of stock. In the face of such uncertainty, the convenience of having shares in hand could have had some value. Other components of forward prices would likely have to be attributed to counterparty risk. Counterparty risk can take a number of forms, but in the context of forward delivery agreements there are two basic types: a) When Party A contracts to deliver stock forward to Party B for a fixed price, Party A faces the risk that Party B will not accept delivery and will withhold payment and, b) on the other hand, Party B faces the risk that Party A will not deliver the stock or will not accept the promised fixed-price payment as adequate. When considered along with the possibility of a convenience yield, it becomes a very interesting question (and, ultimately, an empirical question) as to how large and with what sign a forward premium appears. How this question is answered should determine the method by which spot values can be imputed from forward values.

Such questions simply do not hold any interest for DJT. Why did DJT not consider a possible role for counterparty risk when they calculated imputed spot values for shares? This is a puzzle because it is clear that they believed in counterparty risk in this context.

[36] This was what some pamphleteers wrote about (app. II, table 1, col. 8) when they complained of being robbed of the 'chance of the market'. The failure to deliver subscription receipts was a particular sore point with such writers. Some writers also complained of what they perceived to be the arbitrary and overly lengthy closures of the share transfer ledgers.

> In addition, subscription receipts were subject to settlement risk because they were deferred contracts in which the counter-party might fail, whereas stock transactions (other than for the opening of the books) were based on delivery versus payment.[37]

So, it is not as if DJT did not believe in possible counterparty risk; they appeared to be simply incurious about its direction and size.[38]

To obtain direct measurements of forward premia, we would have to observe forward values and spot values for the same dates. Such is not to be had for the 23 June – 22 August period, of course, but some data can be had from outside of that period. The data have to come from actual forward delivery contracts or from records that refer to such contracts. One place to look for such contracts is amongst the private papers of individuals who were known to be active forward traders. No one was more notorious for such trade than was Henry, the first Duke of Portland. Amongst the fairly large number of forward agreements that the Duke made between April and December 1720, there were a number made from early May right up to 23 June in which he agreed to take delivery of South Sea shares upon the opening of transfer books in late August. The measured forward premia that were imbedded in Portland's forward contracts were very large. For some weeks before the closing of the transfer books his forward contracts for South Sea stock were clearly as expensive as were the contract values reported by Freke and Castaing in midsummer. The smallest forward premium recorded in this data is 77 per cent per annum and the largest is 216 per cent per annum.[39] The average forward premium in the two weeks prior to the closing of the books was about 115 per cent per annum. Now it might be objected that these are too large to reflect typical counterparty risk premia. The Duke was a notoriously

[37] DJT, p. 257.

[38] In supp. app. III it is also argued that DJT failed to discuss the size of forward premia embodied in the 'regular' and 'for money' third subscription values. See conclusions A.III.4 and A.III.5.

[39] These contracts are variously found in classes Pl and Pw in the Portland (London) manuscript collections, University of Nottingham.

bullish supporter of the Company and it might be argued that the high forward values for which he was willing to write contracts reflected only his unique assessment of the future value of South Sea shares. There are several problems with this argument. He was writing contracts with some of his friends and advisors who were known to be as bullish on the South Sea scheme as he was bullish.[40] After the collapse of the Bubble, he proved himself highly capable of reneging on his contracts. Being from the highest ranks of the aristocracy, Portland had at his disposal considerable legal and political resources, few of which could be matched by the other parties to his contracts. It might be argued that rational forward sellers might have demanded especially large forward premia from the Duke. An added complication is that his contracts were laden with extra provisions that were designed to encourage performance from both contracting parties. He was used to binding his counterparties to perform on the contracts by having them state that he (Portland) was the actual owner of the stock (which he sometimes was) and they were but trustees of the stock they were promising to deliver to him. Portland too would bind himself more strongly to performance by giving securities and stating that amounts promised to be paid were but loans from the forward seller. The contracts also specified typically severe penalties ('penal sums' as they were called) for non-performance by either party. A study of actual forward financial contracts, such as the Duke's, reveals that financial contract writers used a wide array of means for dealing with counterparty risk. Even when such risk-management devices were deployed, the apparent forward premia in speculative contracts could still be huge.

In figure 3 is illustrated some of the summary information we have concerning the size of forward delivery premia in 1720. Prices for the forward delivery of third

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[40] Sir John Meres – lawyer and advisor - was a counterparty to the Duke's contracts. He was the author of the Equity of parliaments, a defence against Swift's attacks on the South Sea scheme. Another counterparty was Sir George Caswall, partner in the Swordblade Bank, the South Sea Company's bank.

subscription receipts (what DJT call 'regular' prices) are depicted and they also are of considerable size relative to prices 'for money', the latter being the spot price for the promise of a third subscription receipt.[41] The Portland values for forward delivery of original shares are also depicted. The figure also illustrates the result of an exercise in which the smallest percentage forward premium found in the Duke's contracts (77 per cent per annum) is used to calculate some hypothetical spot original share values during the midsummer closing of the Company's transfer ledgers.[42] Without adding further clutter to figure 3, the reader can readily confirm that such hypothetical spot values would quite easily be below the values of either the first or second subscription displayed in figures 1 and 2. We might think of these hypothetical spot values as a kind of maximum lower bound on spot values in the midsummer period, whereas it is better to think of the DJT-imputed spot values as constituting an upper bound on spot values.

In this section the following has been shown:

a) A high proportion of available values for the first and second subscriptions were excluded from the DJT analysis. Rather than being 'distorted', these data came from periods in which either South Sea share values were relatively low (spring and autumn 1720) or from periods in which the subscription contracts were highly controversial (autumn 1720). Values for subscription shares clearly exceeded original share values in these periods, particularly in the autumn of 1720.

b) A high proportion of the share values that DJT used came from periods in which the Company transfer ledgers were closed. In these periods original share spot values were estimated as if they were approximately equal to forward prices. Forward

[41] supp. app. III. conclusion A.III.5.

[42] In this exercise we make an assumption that a forward premium was dissipated smoothly until it disappeared just before the date of forward delivery. This assumption was not necessary. Very large forward delivery premia could have persisted right up to the moment the delivery occurred and then disappeared all at once.

premia were effectively assumed to be zero, even in the acknowledged presence of counterparty risk. Direct measurements of forward premia show that counterparty risk was not only present, but its effects on forward values in 1720 were very probably huge. In consequence of this, spot values for shares were probably far below contemporaneous forward delivery values. We conclude that the selection, presentation and adjustment of data by DJT were unjustified historically and just happened to cast inequality 2 in the worst possible light.

## IV.

History shows how people have confronted problems and, in their attempts to solve them, have contributed something to the making of the modern world. In other words, one of the uses of history is that it helps us to understand 'how we got from there to here'. There are other uses for history as well. Many believe that there are certain lessons from history that are timeless, lessons that are just as relevant in the year 2006 as they were relevant in 1720. No doubt history can teach us some of these valuable lessons, but when pushed far enough, a historical analysis can be shaped to illustrate whatever 'timeless' lesson needs to be learned. Garber warns us that the historical bubble literature is full of such lessons that some writers feel that we need to be taught. He warns that 'History is a rhetorical weapon to be used in influencing modern policy outcomes' and that historical bubbles can be the perfect 'dream events for those who want to control the flow of capital'.[43] So, what lessons do DJT want us to learn from their history? 'These findings underline the important role that irrationality may play in stock markets and suggest that today's policymakers may need to counteract the potentially damaging effects of irrational pricing of financial assets'.[44] This is a good

[43] Garber, Famous first bubbles, p. 12.
[44] DJT, p. 233.

deal more than simply learning ‘how we got from there to here’. Perhaps we had better make sure that the foundations of the lesson are sound.

The soundest lessons that can be drawn from ‘Financial markets can go mad’ are about three in number. First, if you wish to demonstrate that financial contracts are irrationally priced, do not look too closely into the legal framework that governs those contracts. Second, your financial market analysis should not stray towards an examination of peoples’ opinions and attitudes with regard to the contracts and law. Third, the financial analyst should not allow a complete presentation of data to cloud any conclusions that can be supported by only a specially selected and adjusted subset of the data. In 1938 DuBois outlined the typical features of eighteenth-century corporate subscription share finance. Nearly 70 years afterward, we now have to rediscover that his research would have been the most useful starting point for an investigation into South Sea subscription finances, a starting point from which DJT’s historical lessons would have been very hard to discover.

The subscription contracts and their pricing do have much to teach us about the events of 1720, but the lessons may never support the idea that there was widespread irrationality in the markets for South Sea shares, an idea which not so long ago was accorded mythic status by Hoppit.[45] South Sea original shares and subscription shares were fundamentally different securities in law and in the minds of financially and politically astute individuals in 1720. But now these persons have been dragged back into the dock to face the most drearily familiar of charges: they are ‘prone to fits of mania’, their ‘excitement levels have risen to destructive levels’ and, worst of all, they are guilty of the ‘widespread use of heuristics’.[46] As long as it can be shown that

[45] Hoppit, ‘The myths of the South Sea Bubble’, p. 145.
[46] DJT, p. 263.

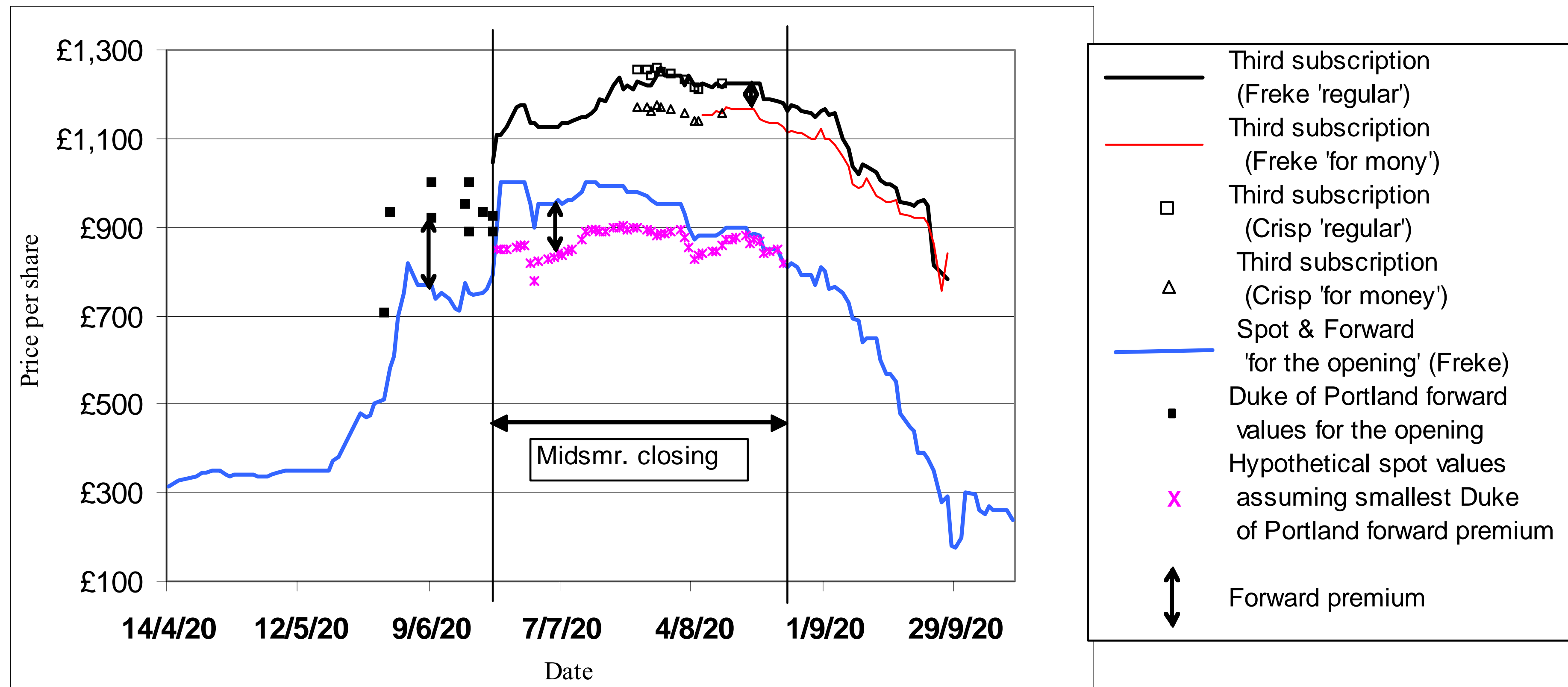


Figure 3. *Some South Sea forward delivery premia, 1720*

*Source:* Freke, *Prices of stocks* and Portland (London) MS (see text and supp. app. III.)

the people of 1720 had an interest in the contemporary law and the working of markets, an interest that was livelier than that possessed by their twenty-first-century prosecutors, we must in all fairness continue to return a verdict of ‘not guilty’.

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## Appendix I: Enforcement provisions from Acts of Parliament in 1720

### Concerning Additional South Sea Stock and instalments – the passage from 6 George 1, c. 4 (April 1720)

1 And for the better enabling the said Governor and Company of Merchants of Great
2 Britain, and their Successors, to raise Money to be Paid, for or in part of the said Sum
3 of Four million one hundred fifty six thousand three hundred and six Pounds, four
4 Shillings, and Eleven Pence, or for or in part of the said Sums to be paid after the said
5 Rates of Four Years and an half Purchase, and One Years Purchase respectively, or
6 for Purchasing or Paying off all or any the Annuities and Debts to be taken in or paid
7 off in pursuance of this Act, or for exchanging for Ready Money the New Exchequer
8 Bills to be made forth, as hereafter in this Act is mentioned, or for defraying the
9 Interest thereof, or for carrying on their Trade, and other necessary Occasions: Be it
10 further Enacted by the Authority aforesaid, That it shall and may be Lawful to and for
11 the said Governor and Company of Merchants of Great Britain, and their Successors,
12 from time to time, as they shall see cause, to call in or direct to be paid from and by
13 their respective Members for the time being, proportionably according to their
14 respective Interests in the Capital stock or Stocks which do or shall belong to the said
15 Governor and Company of Merchants of Great Britain, and which shall be increased,
16 as aforesaid, or by Opening Books of Subscription, or by Granting Annuities
17 redeemable by the same Governor and Company, and their Successors, or by any
18 other Method, Ways, and Means as they shall think proper to raise any Sum or Sums
19 of Money, as in a General Court of the same Governor and Company shall, from time
20 to time, be judged necessary, and ordered to be called in, or raised; and that all
21 Executors, Administrators, Guardians, Trustees, and Mortgagees, shall be indemnified
22 in paying, and are hereby impowered to pay in their respective Proportions of the
23 Money so called in or raised; and in case any such Member or Members shall refuse

24 or Neglect to pay his, her or their Share of the said Money so called for that Purpose,

25 by Notice inserted in the London Gazette, and fixed upon the Royal Exchange in

26 London, It shall and may be Lawful to and for the said Governor and Company of

27 Merchants of Great Britain, and their Successors, not only to stop the Share, Dividend,

28 Annuity, and Profits, which shall, from time to time, become payable to such Member

29 or Members so neglecting or refusing, of the Funds, Stocks, Annuities, or Profits of

30 the said Governor and Company of Merchants of Great Britain, and to apply the same,

31 from time to time, for or towards Payment of the Share of the Money so called for,

32 and which ought to have been paid by such member or Members, so neglecting or

33 Refusing, until the same shall be satisfied, but also to stop the Transfers or

34 Assignments of the Share and Shares of every such Defaulter and Defaulters with

35 Interest, after the Rate of Five Pounds per Centum per Annum, for the Money so by

36 him, her or them omitted to be paid, from the time the same was appointed to be paid

37 until the Payment thereof; and that the Share and Stock, Shares and Stocks of such

38 Defaulter and Defaulters shall be liable to make good and answer the said Monies so

39 appointed to be paid, and the Interest thereof, as aforesaid; and in case the Principal

40 and Interest, as aforesaid shall be unpaid by the space of Three Months, then the said

41 Governor and Company of Merchants of Great Britain, or their Successors, or their

42 Court of Directors for the time being, shall have Power to Authorize such Person or

43 Persons as they shall think fit, to Sell, Assign, and Transfer so much of the said Stock

44 or Stocks of such Defaulter or Defaulters as will satisfy and pay the same, rendring

45 the Overplus (if any be) to the Proprietor; And the said Governor and Company of

46 Merchants of Great Britain, or their Successors, in a General Court, from time to time,

47 when they shall judge their Affairs will admit thereof, shall or may cause any sum or

48 Sums of Money which shall be called in, or any Part thereof, to be divided and

49 distributed to and amongst the then members of that Corporation according and in

50 proportion to their respective Interests in the Capital Stock or Stocks of the same; And
51 former Law or Stature, Restriction, or other Matter or Thing whatsoever to the
52 contrary notwithstanding.

**Concerning circulation of Exchequer bills – the passage from 6 George 1, c. 10 (June 1720)**

53 (i)n case any such Receiver or Collector shall refuse or neglect to exchange such Bills
54 for ready Money by the Space of Twenty-four hours, then the Person or Persons
55 demanding the same, shall or may bring an Action of Debt, or on the Case, for the
56 Principal and Interest Monies due upon such Bill or Bills, against such Receiver or
57 Collector having Money in his Hands, as aforesaid, in which Action the Plaintiff shall
58 or may declare, that such Receiver or Collector is indebted to such Plaintiff in the
59 Money demanded upon every such Bill according to the form of the Statute, and hath
60 not paid the same, which shall be sufficient, and the Plaintiff in every such Action
61 shall recover against the Receiver or Collector, not only the Monies so refused or
62 neglected to be paid, but also his Damages besides full Costs of Suit, and such
63 Receiver or Collector shall be subject and liable thereunto; And in such Action no
64 Essoign, Protection, Privilege or Wager of Law shall be allowed, or more than one
65 Imparlance; and upon Payment of the Monies to be recovered, the Plaintiff, his
66 Executors, or Assigns shall deliver up such Bills to the defendant, his Executors or
67 Assigns.

## Appendix II: The contemporary legal and political debate on the subscription contracts

This debate has a prominent place in the primary South Sea literature. The literature covers a range of topics such as the doubtful legality of the first two subscription issues, the South Sea Company being in breach of its own obligations under the subscription contracts, the suspected and proven frauds perpetrated by the

Directors and the latter necessity for Parliamentary intervention. In this appendix we seek simply to demonstrate the existence of the debate, its contemporary importance and, finally, its lack of resolution in 1720.

There is an old controversy about the limits to which the South Sea Company could raise new financing. The possible illegality of the first two money subscriptions is a subtheme that runs through the controversy. In his authoritative history of the Bubble Act. Harris concluded that it would be safe to assume that contemporaries saw the increase in the Company's financing via public money subscriptions as controversial and perhaps of doubtful legality. One of the objects of the Bubble Act was to affirm the legality of the Company's subscriptions retrospectively.[47] Scott[48] and Neal[49] have argued that in the period prior to the Bubble Act the Company was treading on uncertain legal ground. Although 6 Geo.1, c. 4 allowed the Company to issue at least some additional stock to finance the purchase of government annuities and debts, the total amount of additional stock issuable was tied to the amount of government debt that the Company could obtain. It was thus not clear that issuing additional stock in order to start the Company's programmes for obtaining government debts was legal. Although DJT made much of the fact that, with the Bubble Act, 'there can be no doubt about the legally binding status of subscriptions (… ),' they neglected to inform the reader that nevertheless much doubt persisted in contemporary minds.[50]

Even if the public's qualms about the legality of the subscription issues had been settled by the Bubble Act, it quickly became apparent that the Company's subsequent

[47] Harris, Industrializing English law, p. 68.
[48] Scott, The finance and constitution of joint-stock companies, Vol. 3, p.308.
[49] Neal, The rise of financial capitalism, p. 97, fn. 14.
[50] DJT, p. 257. In Considerations on the present state of the nation (anonymous, abstracted in Boyer, The political state of Great Britain, Vol. 20, p. 547) the author asserts there was never any sanction for money subscriptions in Acts for the South Sea Company. Although patently false, this was a sentiment credible enough or widespread enough for Boyer to include it in his summary of events and opinions for November 1720.

behaviour towards subscribers would become cavalier. Suppliers of new finance may have required some reassurance that their monies would be well spent and this is why financing Acts, such as 6 Geo. 1, c. 4, were expected to specify a list of permitted uses for new funds.[51] As long as South Sea stock values were riding high, the Company was not even at pains to disguise the extra-contractual and unequal treatment it meted out to different subscribers. For example, the Company's Committee of Treasury determined that owners of the first subscription could possibly forfeit their deposit payments if they did not meet the second instalment due on 14 June,[52] but at the same time many participants in the third subscription did not make the required deposit payment for their subscriptions. No secret was made of this state of affairs, for it was openly discussed in a Committee of the Directors in late July 1720.[53] The most controversial behaviour on the part of the Company, however, was the application of subscription financing to uses other than those permitted under 6 Geo. 1, c. 4. As monies from the first two subscriptions started to come in, it was declared that the new financing would be used largely to support the Company's stock by lending the money back to shareholders and subscribers[54]

The debate about the validity of the subscription contracts reached its height in late 1720. Critics were emboldened by the continuing follies in South Sea financial management and the obvious decline in political support for the Company. There was an apparent increase in the flow of pamphlets in which the themes were the Company's failure in its public duties and its contractual duties to subscribers. There were, of course, some writers who recognised no such responsibilities for the Company so that the opinion in speeches and in pamphlets covered a wide range of

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[51] app. I, lines 1-10.
[52] cf. fn. 14.
[53] Boyer, The political state of Great Britain, Vol. 20, p. 132. A £100 deposit was required upon subscription, BL Add. MS 25,499, 15 June 1720.

views that persisted, in disagreement, for a long time after 1720. Whatever it means precisely when DJT write that people in 1720 were 'aware of the enforcement issue'[55] is difficult to fathom, but it gives the impression that people were actually in agreement about the continued validity of the subscription contracts and the enforcement provisions that DJT presumed were in place. There was actually a vociferous debate about whether the subscription contracts themselves were any longer valid.

Bringing the pamphlet literature into some sort of order is quite difficult. It was an era of vanity publishing and anonymous polemical works that were commissioned for fees. Writers' arguments were sometimes blatantly self-serving, but in other cases writers tried to make arguments balance on both sides of an issue. Some writing was precise, but much was written that was incoherent in style and logic. To bring some order to the plethora of contemporary pamphlets, table 1 presents a classification system for a selection of pamphlets whose subjects were most closely concerned with the money subscription contracts. In this table are listed the most commonly encountered questions regarding subscription contracts and the writers' brief opinions regarding them. Although the number of writings could be expanded from the eighteen listed, the selection at least contains opinions from one end of the spectrum to the other on any particular question. The pamphlets considered a large number of questions, but the most important are the following three:

> 1) Are the Public's subscription contracts with the Company null and void? This could have been answered in the affirmative if the writer thought the contracts never had validity, or if the answer to the next question was affirmative.
>
> 2) Is the South Sea Company in breach of its subscription contractual obligations? The writer could presume that the subscription contracts were valid at one time, but because of the Directors' misbehaviour with regard to the use of

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[54] BL Add. MS 25,499, Court minutes, 21 April 1720, p. 140. The only possible sanction for such a use of funds could have been found in a catchall phrase of the Act. See app. I, line 9.
[55] DJT, p. 257.

> subscription finance, their inequitable treatment of subscribers, or their unilateral alteration of the terms of the contracts, the contracts no longer had legal standing. If either question 1 or 2 was answered in the affirmative, then the next question was raised usually.
>
> 3) Are private financial bargains based upon subscription contracts null and void? The problem addressed here was whether the Company was a culpable third party who prevented one or both parties in a private financial contract from performing their part of the bargain.

The rest of the questions in the table are ancillary to the first three. That is, they concern possible reasons why the subscription contracts or private bargains based on them were invalid or reasons why the Company was in breach of its contracts. There are also questions that concern the consequences and subsequent actions that should be taken with regard to the subscription contracts. In question 4 the issue concerned whether the public should be exposed to the full rigours of their private contractual obligations. Was the public the victim of the duplicitous actions of the South Sea Directors or not? Would it be in the public interest to wind back all private contractual positions to those of some earlier state? Could the South Sea Company itself do it unilaterally by altering the terms of the subscription agreements? This was question 5. Did the Company's contracts with the public have the same standing as private contracts in law, or were they contracts between the government and the public, only meditated by the Company in trust? If the latter was true, was not Parliamentary intervention required to regulate the contracts between the Company and the public (question 6)? Were the interests of the public now best served by the Company delivering the receipts for the third and fourth subscriptions (question 7)? Even though the Company had a private obligation to subscribers to deliver the receipts, perhaps a wider public interest argued against it. Could the Company make such decisions unilaterally without breaching its private duties and thereby relieving subscribers of their obligations to fulfil their end of the subscription bargains? Was

not the Company already in breach of its contracts with the public with its high-handed behaviour: shutting the transaction ledgers for long periods, then opening/shutting them again, apparently at whim, and failing to deliver subscription receipts in a timely fashion, thereby denying share owners of what some writers called 'the chance of the market' (question 8)?[56] Finally, the writers had a full range of opinions of the character and performance of the Directors and their fitness (question 9).

This printed literature is thus evidence for a wide range of dispute about both the initial and continued legality of the subscription contracts. The disputes continued into the Parliamentary debates. Parliament was due to reconvene on 25 November 1720, but was delayed from meeting until the 8 December while it waited for a report and a financial recovery plan from Robert Walpole. On 19 December Walpole wished to know if, before he presented his plans, he could trust that the House would not do anything to change the standing of subscription contracts. He could not have asked this for the sake of achieving constancy in these contracts; the Company itself was still in the process of changing them and, for example, had still not come to any resolution about the disposition of the third and fourth subscription receipts. Indeed, the resolution for which Walpole sought consent was a resolution that would say that Parliament would not intervene between the Company and subscribers – that disputes would be left to privately negotiated resolution or legal action. That this was understood to be the practical import of the House's resolution is amply revealed in the pamphlet literature. Parliamentary opposition to Walpole also understood that the House resolution would not be the final word on the subscription contracts. [57] The opposition were on the attack the next day (20 December) making forcefully the

[56] cf. fn. 36.
[57] My summary of Parliamentary debates and actions taken in 1720-1 depend upon Boyer, The political state of Great Britain, Vols. 21-2, 1721.

argument once more for an annulling Act. They argued that subscribers were wronged by breach of a public trust given to the South Sea Directors by Parliament. Parliament therefore was the only reasonable place in which subscribers could seek redress. A resolution to that effect was rejected by a large majority. The resolution of 19 December gave Walpole the time and the room to manoeuvre that he needed to manage the Commons and the chartered companies towards his plan for financial recovery.

The political victory for the annulling party came soon after January 1721. The reports published by the Committee of Secrecy were too damning to prevent the growth of a vengeful 'country party' in Parliament. By February, however, Walpole was situated so that the politics of vengeance could work in his favour. The original South Sea Directors had been disabled and disenfranchised politically. Their government supporters had been discredited and neutralised. There were new Directors in place who were eager to wind up the subscriptions in ways that were acceptable to Walpole and the other chartered companies. Measures were taken in the Company's General Court on 9 March that would effectively wind up the money subscriptions and turn them into conventional South Sea stock. Once it was seen that the terms were broadly acceptable, these resolutions became law in 7 Geo. 1, stat 2. How the subscription shares were turned into South Sea stock was quite close to what the Company itself had proposed back on 30 September 1720. Only in that sense could one say that the Commons' resolution of 19 December 1720 was sustained. In December 1720, however, few people understood that when the subscription shares finally would disappear, so would the South Sea Company's pretensions for a large role in national financial and political affairs.

Table 1 – Pamphlets and tracts relevant to the money subscription contracts, 1720-1722

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | |
|---|---|---|---|---|---|---|---|---|---|
| Public's subscription contracts with the Company null & void | South Sea Company in breach of its subscription contracts | Private contacts based on subscription contracts null & void | The public interest dictates that the generality of private bargains should be void | South Sea Company may alter the subscription terms | Annulling Act must be brought in | Third & fourth subscription receipts must be issued | Denied chance of the market | Pro-South Sea Directors | Pamphlet/tract |
| nr | **Y** (5-6) | **Y** (6) | nr | nr | nr | nr | nr | nr | *The case of contracts* |
| nr | **Y** | nr | **Y** | nr | nr | nr | nr | **N** | *The case of the purchasers* |
| nr | **N** | **N** | **N** | **Y** | nr | nr | **N** | nr | *The case of the sellers* |
| **N** (9-10) | **Y** (14) | **N** (9-10) | **N** | **Y** | nr | **N** (8-9) | nr | **N** (9) | *A full confutation* |
| nr | nr | nr | nr | **Y** (13) | nr | nr | nr | **Y** (4-5,14) | *A letter to a friend* |
| **N** (10) | **N** (12) | **N** (4,13-14) | **N** (7) | **Y** | nr | **N** | nr | **N** | *The nature of the contracts* |
| nr | **Y** | **Y** | **Y** | nr | nr | nr | nr | **N** | *Queries* |
| **Y** (1,2) | **Y** (1,2) | **Y** (3-4) | **Y** (2) | nr | **Y** (1,3-4) | nr | **Y** (2) | **N** (1,2) | *Reasons for making void* |
| **Y** (3) | **Y** (3) | **Y** (3) | **Y** (4,5) | nr | **Y** (5) | **N** (6) | **Y** (4) | **N** | *Further reasons offer'd* |
| nr | nr | **N** (1) | **N** (3) | nr | **N** (3-4) | nr | nr | **Y** (1) | *An answer to the reasons* |
| nr | **Y** (2) | **Y** (1-2) | **Y** (2) | **Y** (1) | **Y** (3) | **N** (1) | nr | **N** (2) | *Restitution: a law of the land* |
| nr | **Y** (5) | **N** (14-15) | **Y** | **N** (5-7) | **Y** (23-24) | **Y** (5) | **N** (12) | nr | *A true state of the contracts* |
| **N** (9) | nr | **N** (11-12) | **N** (15-16) | **Y** (13-14) | nr | **Y** (7) | nr | **Y** (15) | *A vindication of E----ce B-g—l* |
| **N** | **N** (27) | Nr | nr | nr | nr | nr | nr | **Y** | Blunt, *A true state* |
| nr | nr | Nr | nr | **Y** (4) | nr | nr | nr | **N** (4) | Budgell, *The speech* |
| nr | **Y** (18-19) | **Y** (21) | **Y** (24-25) | nr | **Y** (20-21,37) | **N** (3-4,29) | **Y** (18-19,26) | **N** (20,25) | Budgell, *A letter to a friend* |
| **Y** (15-17) | **Y** (36-38) | **Y** (12-13) | **Y** (5,41-42) | **N** (36-37,40) | **Y** (5,41-42) | nr | nr | **N** (15) | Dalrymple, *Time bargains* |
| **Y** (12) | **Y** (9) | **N** (11,14,16) & **Y** (12) | **N** (17-18) | **Y** (17) | **N** (16) | **Y** (8,12) | nr | **N** (15) | Way, *The case of contracts* |

Notes: **N** = No; **Y** = Yes; nr = 'no reference, or question was not discussed'; numbers in brackets are page references.
Source: see text.

**Supplementary Appendix III: Data sources – a comparative analysis of Freke, Castaing and South Sea directors' dealings through brokers**

The data that come from Freke's Prices of stocks and Castaing's The course will appear to be practically the same data if some care is taken in the adjustments that will make the two datasets properly comparable. It is useful to do this comparison, not to show that one dataset is superior to the other (that is usually not the case), but to understand what both datasets have tell us about South Sea values. The data in Freke and Castaing are at times ambiguous because neither source bothers to define the terminology it uses. We must sometimes look at external sources to understand what Castaing and Freke show. The previously unanalysed data contained in the abstracts of brokers' ledgers that were gathered up by the investigating Committee of Secrecy in 1721 could be of potential help here.[58]

At the height of the South Sea Bubble, Freke and Castaing reported several South Sea original share values per day. We know not the time of day of either the first or the last of the quoted values; we can only hope that the data were reported in some time-consistent manner, but in the end there were no time-stamped data in 1720. If we take the last daily value figures from both Castaing and Freke, the following comparative picture emerges.

[58] The Committee of Secrecy made its reports to the House of Commons in 1721 and left behind a valuable, but little used collection of papers at the House of Lords Record Office. The Committee was keenly interested in Directors' trade in South Sea liabilities and thus we have a number of abstracts of ledgers belonging to brokers who had dealings with South Sea directors. From these ledger abstracts I have recorded as many trades and in as great detail as possible. These records themselves are far from perfect. They do not cover the entirety of Directors' dealings, only those dealings accomplished through brokers, and they most certainly exclude some accounts that the Committee of Secrecy would have liked to have seen, but were to remain missing. (HLRO Box 158).

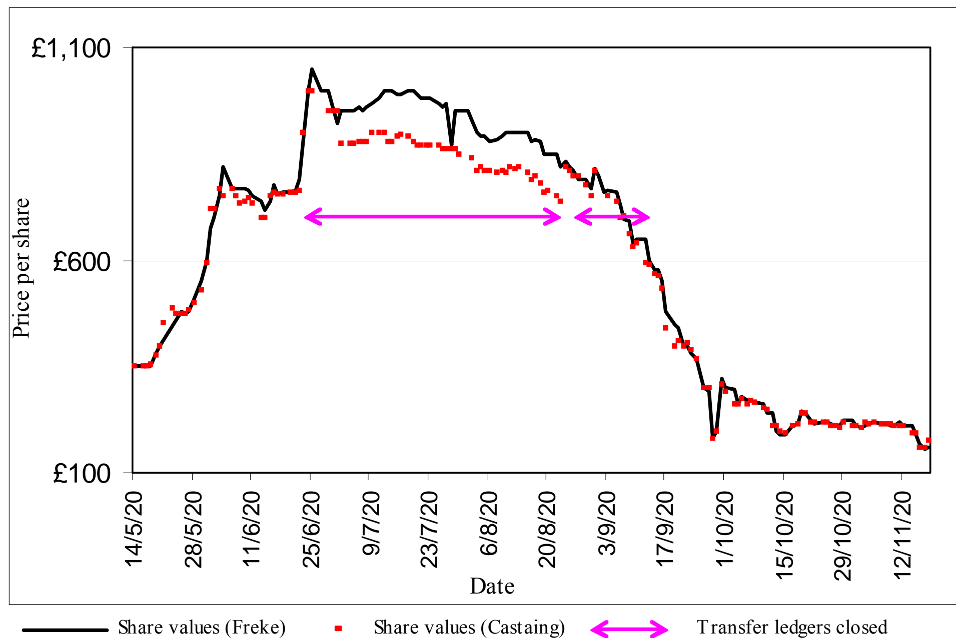


Figure A.III.1. *South Sea original share values with closings, 1720*

*Source:* Freke, *Prices of stocks*, Castaing, *The course*, and BL, Add. MS 25,499.

The numbers from the two sources are practically the same except in the significant period of the midsummer closing of the Company's transaction ledgers when, for some set of future delivery contracts (in both sources associated with contracts 'for the opening' of the transfer ledgers – widely understood to be about 22 August), Freke reported values that included rights to the 10 per cent midsummer stock dividend; The course values were for a set of contracts that did not include rights to the declared 10 per cent dividend. Given that there is no way of ascertaining whether Freke and Castaing were looking at the same set of future delivery contracts, it must be remarked that in the figure it looks very much as if they were. In the period of 23 June - 22 August 1720, if we deflate the Freke spot value data by a 10 per cent discount factor (1/1.1), we obtain data that very closely mimic, in level and variation, the Castaing data from the same period.

There are some minor modifications to this story that we should note. At the beginning of the 'closing' period, there were clearly a few days in which both Freke and Castaing were reporting the same values – some future delivery values with the 10 per cent stock dividend. It is not until about 2 July that Castaing clearly starts to report differently from Freke. There is also a one-day downward-pointing spike in the Freke data on 28 July. This spike represents a £100 one-day drop and rebound. This is most unlikely to have occurred and is not mirrored in the Castaing data. A printer's error is not a likely explanation since the spike is reflected in the entire range of values reported by Freke on that day. The most likely explanation is that for one day, and for one day only, Freke reported values without rights to the midsummer dividend. That the bottom of the spike is precisely coincident with the Castaing data is consistent with that explanation. Finally, there is a short, but significant, period of the closing of the transfer ledgers in early September. Neither Freke nor Castaing (nor DJT) take note of this closing.[59] Consequently, we have no information about the nature of the values being reported by either Freke or Castaing in that short period. Were these some sort of future delivery values for the re-opening of the transfer ledgers?[60] Whatever they were, they were clearly reported in both Freke and Castaing in the same way.

[59] BL Add. MS 25,499, Court minutes, 25 August 1720. The books were ordered to be shut till 21 September. The closing was thought opportune while the management of subscriptions was discussed. There was discussion of a possible rights issue for those persons who were subscribing government annuities into South Sea stock. This idea was abandoned and there was discussion about a possible further money subscription. In the end this idea too was also abandoned and the transfer books were ordered (11 September) to be re-opened on the next day.

[60] The forward delivery contract in dispute in Maber vs. Thornton, The cases of the defendant and plaintiff, was undertaken 7 September for 'the next opening'. On 12 September Maber

So, after 23 August Freke and Castaing report practically the same values, but how are these post-summer values comparable to pre-summer values? 22 June was the ex-dividend date for shares, but the Company did not order the 10 per cent midsummer stock dividend to be made out until 6 August 1720.[61] And regardless of what the Company ordered in that way, we know that persons continued to privately trade in original shares 'with dividend' long after the summer of 1720.[62] There is a September 1720 note in Freke that suggests he was reporting prices with the midsummer dividend. On the other hand, Castaing was reporting quite the same values as was Freke at that time, but in midsummer had reported values without dividend. Castaing made the change from one reporting regime to the other without comment. The HLRO broker ledgers are no help to us here in determining what the two price courants are reliably reporting. We find only one instance in which a Company officer (Robert Knight) made a trade in original shares with an explicit mention that the trade carried the midsummer dividend. More archival research will be required to discover post-summer trades that distinguish clearly between values that contain the midsummer dividend and those that do not. It appears most safe at this point to take Freke at face value and treat his (and Castaing's) as entirely 'with dividend' in the post-summer period.

The HLRO broker ledgers record nearly one-thousand separate spot transactions at more than six-hundred unique prices and dates. Before and

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failed to take delivery of the stock, which precipitated Thornton's successful suit. The forward price was £690, which was precisely in the middle of the prices reported by Freke on that day.

[61] BL Add. MS 25,499, 6 August 1720.

[62] Post-summer trade in shares 'with dividend' was common enough that primary sources are at pains to specify when a trade excluded the dividend. For example, Pheasant (or Phoesuant) Crisp (a broker), in arranging a contract between the Duke of Portland and Sir John Meres, takes care to tell the Duke that the shares in question will be without the midsummer dividend (Portland (London) MS, Pw B 8, 20).

after midsummer 1720 these transaction values cluster very closely round both Freke and Castaing values. There were also a number of Directors dealing in the midsummer period 'for the opening'. These latter trades all appear to be with the midsummer dividend since they cluster around the values reported by Freke in that period.

> **Conclusion A.III.1**: The Freke and Castaing data on 'spot' South Sea share values are mutually consistent with each other. To make data from the two sources strictly comparable in midsummer 1720, an adjustment factor of 1.1 needs to be applied. In the case of the Freke data, the midsummer 'future' share values and later values already incorporate that adjustment factor. In the case of the Castaing data, the adjustment factor needs to be applied from the closing of the transfer ledgers, 23 June up to 23 August. After 23 August, it appears that Castaing reports spot values in precisely the same way as does Freke. The Freke and Castaing data also appear to be adequate *sources of record* for spot values. For the transfer of original South Sea shares dated transaction prices that are found in archives, such as the abstracts of broker' ledgers at the HLRO, usually are quite close to values reported in Freke and Castaing.

We turn our attention now to the South Sea subscription issues. The values of first and second subscription shares did not appear in The course until 28 May. Values appeared earlier in Freke's lists with Issue No. 94 on 17 May, 1720. Subscription share values were reported almost as frequently as were the values of original South Sea shares, but by the reopening of Company share transfer ledgers in late August, The course was reporting the values of subscription issues about twice in a week while Freke continued to report subscription share values on a daily basis until mid-November. The course continued to report intermittently through the rest of 1720.

Traded subscription share values are found also in the HLRO abstracts of brokers' ledgers. Directors' trades that appear in these ledger abstracts may reflect their private trading as well as sales and purchases directly from and to

the subscription lists, which were under the control of various Directors. Almost all of the Directors' trades that appear in these ledger abstracts took place before September 1720 and most of them were quite early in the life of the subscription issues. This suggests that the Directors used some broker services to place a number of subscriptions in the hands of subscribers. The vast bulk of placements of subscriptions, however, must have been achieved by Directors direct dealings with subscribers.[63]

As with the spot values for South Sea shares, the values for subscription shares that come from Freke and Castaing are quite close to each other if one but takes some care in making the proper adjustments to the raw data from the two sources. Castaing follows a more consistent method than does Freke in reporting subscription values. Throughout 1720 Castaing reports subscription values as premia over and above payments made on the shares.[64] There is no clear indication in The course that this is what is being done at all times, but we can infer Castaing's method from concurrent recorded transactions in subscription shares that appear in the HLRO broker ledger abstracts. In those abstracts there are a number of entries that record transactions under a Castaing-like price and then also record the total value of the transaction by adding in the instalment payments that were due on the subscription share

[63] The Committee of Secrecy was most interested in tracking down owners of 'fictitious' stock – primarily influential persons who were credited (in secret ledgers) with stock earlier in 1720. The Committee, however, also came to learn that a similar phenomenon arose with the subscriptions, particularly the third subscription.

[64] Detailed knowledge of the instalment schedules for subscription shares is, of course, necessary before accurate subscription share values can be calculated from the data contained in The course or Prices of stocks. There were changes in all four subscription series' instalment schedules at several points in 1720. The changes were few and simple for the first two subscriptions and frequent and complex for the third and fourth subscriptions. See supp. app. IV.

being traded.[65] The same method is followed by Freke until 25 June when the words ‘included’ appear by the side of subscription values. Sure enough on that date the reported values in Freke make an upward jump of approximately the size of the instalments already due to be paid on the shares. Thereafter the Freke subscription values are separated from the Castaing values by the approximate total of the instalments due on subscription shares. By later October the methods that Freke uses in reporting subscription values appear to become erratic in that they seem to vary from premium/discount-reporting, such as was consistently followed in The course, to reporting values with instalments ‘included’.

How do the subscription values from Freke and Castaing compare? Looking first at the first subscription we can see there are no noticeable differences between the two value series in the figure A.III.2. There is no visible separation between the levels of the two series except for a few observations in September 1720 when it appears that the Castaing values are distinctly higher than those produced by Freke. This difference, however, is well within the bounds of the interday variation of subscription values displayed by both series; given that all share values were falling very rapidly in September, values for shares may appear to be consistently higher when coming from a reporter who is being a bit slow in reporting values. Castaing was reporting subscription share values only twice a week in this period and Freke was reporting them for all trading days of the week, so it would not be surprising if Freke’s reports were a bit fresher than were Castaing’s.

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[65] HLRO Box 158, Accounts of South Sea stock, bought-and-sold by James Testard, Thomas Lockyer, Charles Lockyer, Edward Owen, Joseph Shaw.

The final observation to make on the figure is the close correspondence of the Directors' transaction prices to both Freke and Castaing, except in that significant period when the Company's share transaction ledgers were closed. There were a number of Directors' dealings at values that correspond precisely with values indicated by both Freke and Castaing in this period. At the same time there are an equal number of Directors' dealings in subscription shares at values at substantial variance with those reported by Freke or Castaing. It is difficult to judge what possible sources for such variation might have been. It is possible that some of the Directors' trades might have been recorded in ways that suggest the trades were spot trades from or to subscription lists when, in fact, some of the trades might have been forward delivery agreements for the delivery of subscription receipts. (This is actually a preliminary conclusion because the ledger abstracts do offer some limited means for distinguishing between spot and forward trades in subscription shares that we have not exploited yet.) This should not have been likely in the midsummer period – the first subscription receipts would have largely been delivered out by that time.[66] We do have some evidence, however, that the receipts for the second subscription were considerably delayed.[67] If such was still the case for some first subscription receipts, then it is conceivable that

[66] The Duke of Portland had to wait until the end of May before he received the receipts for his very substantial purchases of the first subscription (Portland (London) MS, Pw B 165, pp.13-4).

[67] An account of the subscriptions, pp. 15-6. When the third subscription lists were being made out (17-21 June), there were still people trying to obtain receipts for the earlier subscriptions When an instalment was paid, the owner of a receipt was supposed to have the payment acknowledged by endorsement entered onto the receipt by one of Company's clerks or officials. Subscribers thus could not easily present evidence to buyers of their receipts that instalments had been paid without having had their receipts endorsed by a Company official. Pheasant Crisp in one of his many newsletters to the Duke of Portland related how the Company was making an effort to issue receipts for the second subscription as late as 25 July 1720 (Portland (London) MS, Pw B 8, 10).

some Directors were still selling first subscription shares on a forward delivery basis in which substantial premia for counterparty risk might have played a role in determining transaction prices. There is just not enough evidence yet to judge. Given that both Freke and Castaing appear to be good records of the Directors' transaction prices outside of the midsummer period and that both reflect occasionally such transaction values within the midsummer period, it is probably safe to conclude that both Freke and Castaing are accurate sources of record for first subscription share values.

> Conclusion A.III.2: Both Freke and Castaing give up essentially the same measures of first subscription shares values once proper account of the two different methods used for reporting such values were followed in the two sources. Both sources also appear to be reliable sources of record for transaction prices. Either time series illustrated in figure A.III.2 will be comparable to spot value time series from either source. No adjustment factor need be applied to subscription share values across the midsummer (22 June) divide. The reason for this was the declaration (from April) that subscriptions would carry the midsummer 10 per cent stock dividend until such time as the subscriptions were 'made stock'. That is, all subscription shares would have rights to the 10 per cent stock dividend until they were fully paid up.[68] This rule applied until the end of 1720. The HLRO broker ledger data also appear to splice well with the Freke data and we conclude that the HLRO data is an adequate record of first subscription values for dates prior to 14 May 1720.

[68] The fourth subscription was granted the 10% midsummer dividend even though it came after the midsummer ex-dividend date. See BL Add. MS 25,499, Court minutes, 25 August 1720, p. 173.

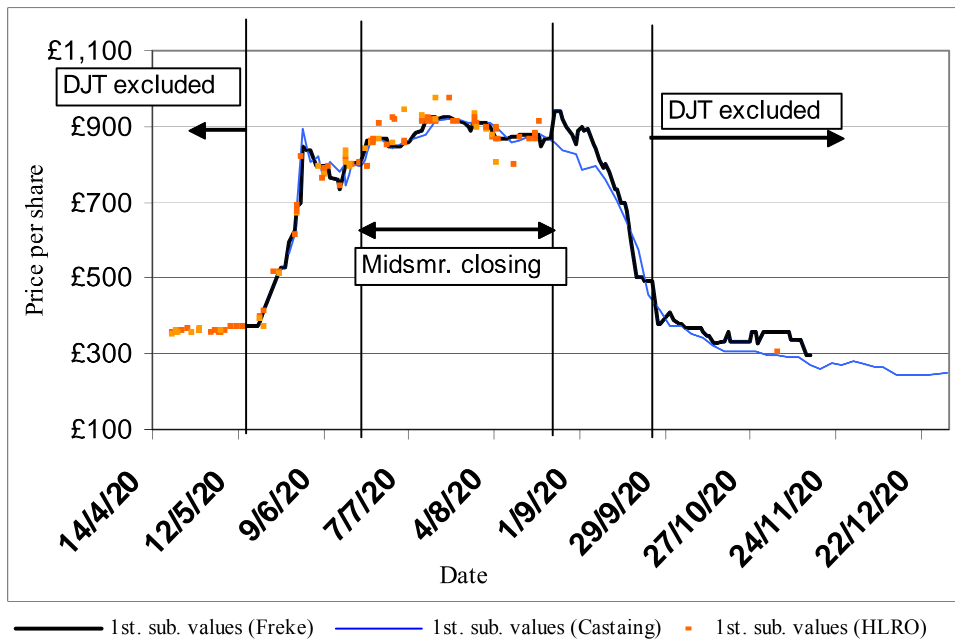


Figure A.III.2. *South Sea first subscription share values, 1720*

*Source:* Freke, *Prices of stocks*, Castaing, *The course*, and HLRO Box 158

When we turn our attention next to the second subscription shares, the comparison of Freke and Castaing becomes more problematic. Castaing reports values for second subscription shares in the same way as he did for first subscription shares; they were reported as premia exclusive of instalments already paid or due. Likewise, Freke reports his values in the same way until midsummer, when he starts to report them on an 'included' basis, just as he did for the first subscription shares. There are some Directors' transaction prices in the second subscription shares that we can use for comparison although they are unfortunately not as numerous as they were for the first subscription shares. As was the case for the first subscription shares, there are a number of early transactions in second subscription shares that predate the midMay period from which Freke starts to report prices. These observed Directors' transaction values meld nicely into those reported by Freke from midMay. There is also a rough correspondence between these

transaction values and the Freke/Castaing values up through the midsummer period. It is unfortunate, however, we have not yet any good sources for second subscription transaction values after the midsummer period because it is in that period that comparison between Freke and Castaing becomes more of a problem. The problem is apparent in figure A.III.3. Castaing-reported values are higher than are Freke-reported values from about mid-September onwards. This was the case for the first subscription values as well, as we saw, but in the case of the second subscription values it is noticeably persistent into the post-September period.

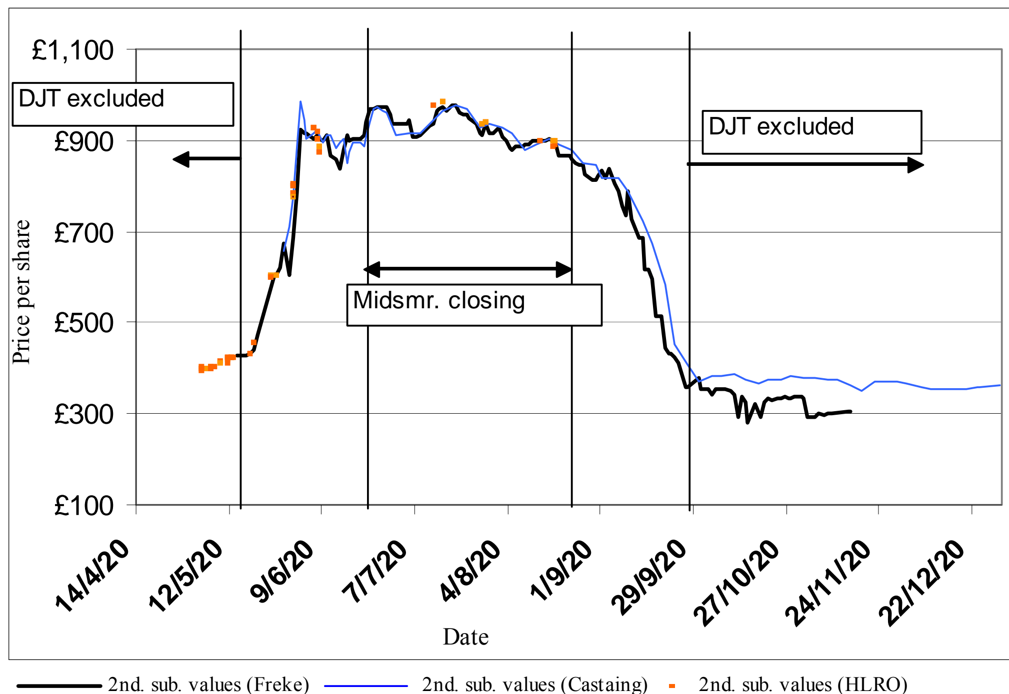


Figure A.III.3. *South Sea second subscription share values, 1720*

*Source:* Freke, *Prices of stocks*, Castaing, *The course*, and HLRO Box 158

Freke values are somehow 'too low' or Castaing values are 'too high'. The first thing to note is that, neither series is 'too low' relative to spot share values; both the Freke and Castaing series are well above share spot values in this period. Figure A.III.4 illustrates this. The interesting question concerns what adjustments to either series would reconcile one series to the other. There are actually several possibilities. All possible adjustments have to take into account the following facts. In the original instalment schedule for the second subscription, the second instalment was due on 14 September.[69] This is very close to the date on which both series visibly part company from each other. Then on approximately the 2 November there is a large drop in the level of Freke's second subscription values that is consistent with his reportage shifting to an 'excluded' basis only a short time before his reportage of subscription share values comes to an end. That is, if £80 (the amounts of money due on the second subscription) is added to Freke's values, a series of numbers consistent with Castaing's reportage emerges on or after the 2 November.

[69] DJT, p. 264, believed mistakenly that the instalment schedule was changed completely and permanently around 22 July 1720. Being dependent upon the reports of instalment schedules printed by Freke and Castaing, their confusion is understandable. Castaing, for example, printed a schedule on 15 July that was similar to the 'original' schedule that DJT report in table 1 (p. 235). The next week on 22 July Castaing printed a schedule similar to the 'revised' schedule that DJT have in table 1. On 9 August Castaing printed a more refined version of this schedule that has the second payment date at the 14 September. What DJT believed was a changed schedule of instalment payments was actually, however, the original schedule as it first appeared in the Copy of the minute books of the general courts of the directors, pp. 66-7, 29 April 1720 (HLRO Bundle P2). It took a mere three months for Castaing and Freke to print an accurate version of this schedule and why this was so can only be guessed.

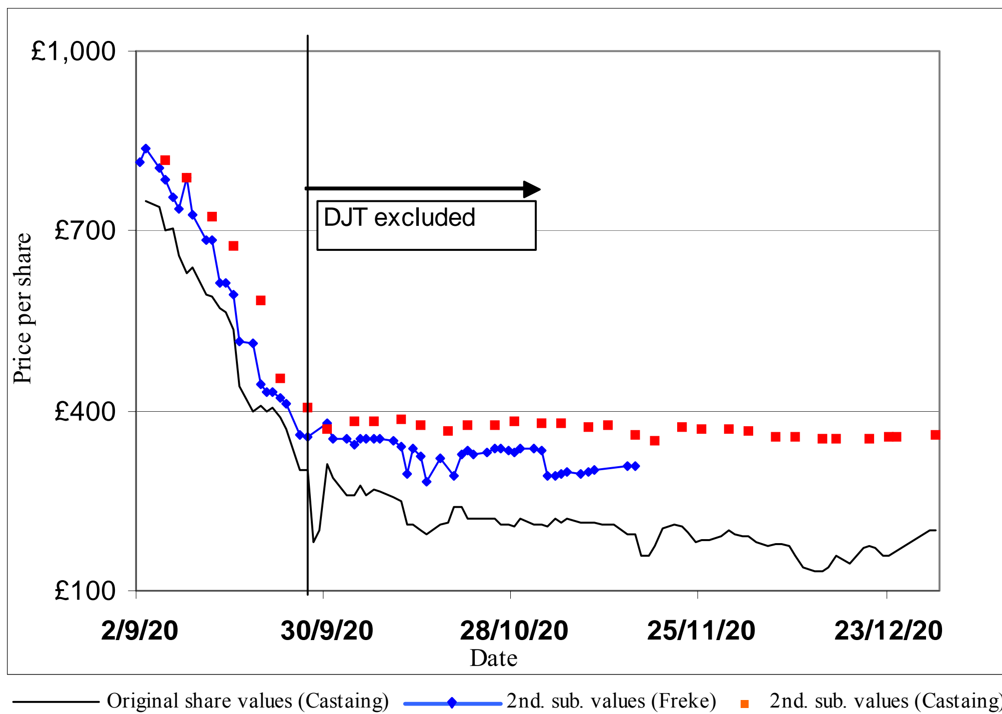


Figure A.III.4. *Second subscription share values, unadjusted, autumn 1720*

*Source:* Freke, *Prices of stocks* and Castaing, *The course.*

Three possible ways to reconcile the two datasets suggest themselves – from the least likely to the most likely they are:

1) There was an alteration in the instalment schedule that delayed the payment of the second instalment of £40 from 14 September to approximately 2 November. The Freke values, being reported on an 'included' basis would therefore be the correct values and the Castaing values depicted are too high by about £40 because they appear in the figure with an imputed £40 instalment in their value that was not yet due to be paid. This explanation is unlikely for several reasons. First, the record of such an alteration would have had to disappear simultaneously from several historical sources. Amongst the minutes of the General

Court and the Treasury Committee such an alteration would have been noted as were all the other alterations in instalment schedules for the other subscription series. The Proceedings of the Court of Directors as well as Boyer's The Political State of Great Britain reported a few otherwise unnoted motions and debates amongst the South Sea Directors and ownership. All of these sources would have to have omitted reports of events that in other circumstances were considered quite important and were usually reported duly. The argument for this explanation is that such an event, if it occurred, might well have been crowded out of the reportage. Recorded minutes on the Company's actions in mid-September were largely about discussions of the fourth subscription and a possible new subscription for shares by rights for the annuitants. There was also extensive analysis of the initial discussions with the Bank of England in the negotiations surrounding the Bank Contract.[70] A delay in an instalment payment on a subscription, before the full extent of the coming crisis would become fully appreciated, might well have disappeared underneath more momentous news.

2) Freke was simply getting sloppy and forgetting to include the second £40 instalment in his 'included' values. Then about 2 November, he alters his reportage to an 'excluded' basis without passing a note about it to his readers. The argument against this was that 14 September to 2 November is a very long period for

[70] BL Add. MS 25,499, Court minutes, September 1720, pp. 186-93.

such sloppiness to persist. The best argument for 'Freke-sloppiness' is that by October 1720 Prices of stocks contains quite variable reporting in some fashion or another that is difficult to determine. There is an interday variation in his reported values that are not reflected in Castaing's series. It must be admitted that since Castaing reported less frequently than did Freke, it is possible that Castaing's reported subscription values just happen to miss out a higher–frequency variation in values that is captured in Freke's data. To take some examples (as they are reported in the raw figures), Freke reports a value of £50 (11 October), £5 for the (12 October) and £50 again on 13 October. The intervening £5 value might reflect a true fluctuation in value and we cannot compare it easily to Castaing's data because Castaing simply reports values for the 11th (£15) and the 14th (£10). Both Freke and Castaing contain some examples in which broken typeface or obvious printer's errors make data difficult to decipher. Could the printer have dropped a '0' after the '£5' reported for the 12 October? Perhaps, but this kind of variation in the Freke data, which is absent in the Castaing data, happens twice more before 2 November. Neither is this interday variation reflected in Freke's reporting of any other subscription values, nor is it reflected in any coincident variation in either Freke or Castaing spot share values. Something is happening to Freke's method of reporting of second subscription share values that is

unique to those shares alone. Whatever it is, its presence becomes obvious only in October.

3) A third possibility is related to the second that we have just discussed, but I believe it is more likely. In early September it was resolved at a General Court of the Directors that subscribers could 'use' all promised dividends (including the midsummer stock dividend) to meet forthcoming instalment payments.[71] The first such instalment that could be met this way was the second payment on the second subscription. Since instalments on the second subscription (as well as the first and third subscriptions) were all 10 per cent of the subscription's issue price, the Directors' intention behind the announcement was clearly to tell subscribers that they could miss their next instalment payment as long as they were willing to forego a 10 per cent stock dividend on those shares whenever they were 'made stock'. From that point forward it would have been up to Freke and Castaing to decide how subscription share values would be reported – without or with the stock dividend. So, for argument's sake, suppose for the moment that Castaing consistently reported subscription values 'with dividend' but 'excluding' actual cash instalments due. At the same time, suppose that Freke reported second subscription share values 'without dividend' but 'including' actual cash instalments paid. If you then additionally suppose that on about 2 November Freke simply switched to

reporting share values 'excluding' instalments (as did Castaing), but still without the dividend, then you could correct the Freke values to put them on a comparable basis with Castaing's. The picture that would be obtained is in figure A.III.5.

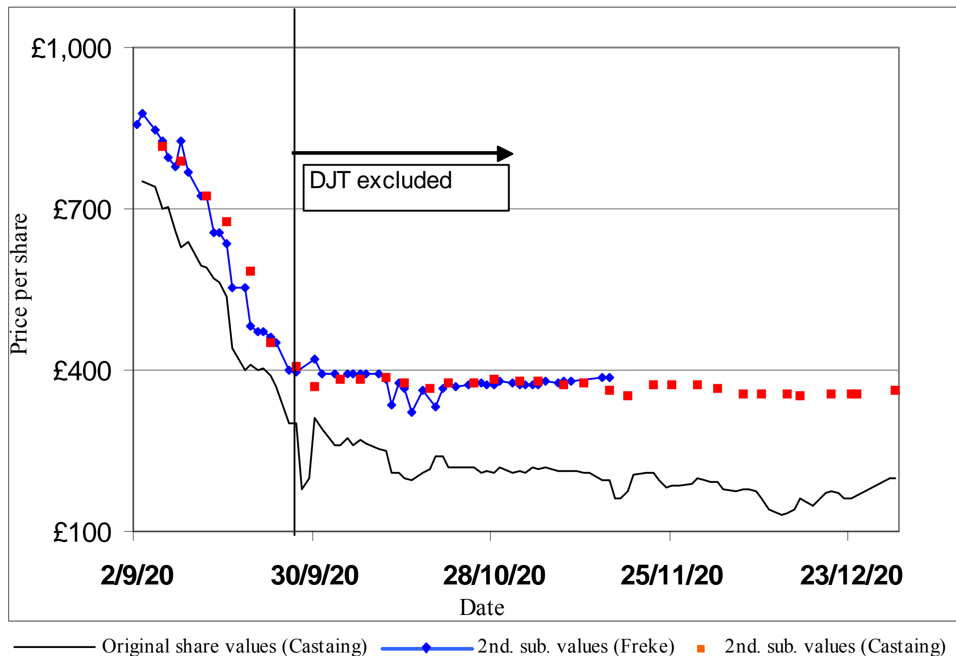


Figure A.III.5. *Second subscription share values, adjusted, autumn 1720*

*Source:* Freke, *Prices of stocks* and Castaing, *The course.*

We are not going to argue that the adjustments depicted in the figure are to be preferred before Freke's data are used in analysis. More evidence is needed before it can be definitively stated that either Freke's or Castaing's second subscription series need such adjustments.

Conclusion A.III.3: Until mid-September 1720, both Freke and Castaing give up essentially the same measures of second subscription share values once proper account of the two different methods used for reporting such values were followed in the two sources. Both sources also appear to be reliable sources of record for transaction prices through the midsummer period as well. From mid-September Freke reports consistently lower subscription share values than does Castaing, for reasons that cannot yet be easily determined. We would therefore conclude that for testing hypotheses that depend upon the

[71] HLRO Bundle P2, Copy of the minute books of the general courts of the directors, p. 137, 8 September.

level of subscription values, one dataset or the other will be the conservative and preferred choice. Since the DJT hypothesis, for example, is favoured by lower subscription value data, the Castaing data would be the conservative dataset of choice. The early HLRO data again splices nicely with the Freke data and it would appear to be fair to treat it as an extension of the Freke data.

We come now to the third subscription issue, which was created from about 17 June and traded (apparently) only till the end of September. The Castaing-based values along with two varieties of values from Freke are depicted in figure A.III.6. Along with these values are transaction values garnered from the HLRO broker-ledger abstracts. One of the Freke-based price series started only in early August and was labelled 'for mony'. DJT quite reasonably presume[72] that the 'for mony' price was the spot price for the promise of the future delivery of a subscription receipt. They presume - equally reasonably - that the other price corresponded to a forward delivery contract that would be settled later, perhaps at some fixed date or upon delivery of third subscription receipts. DJT refer to the latter prices as 'regular' or 'forward/forward'.

[72] DJT, p. 243, assert that the distinction between the two types of contracts 'is clearly described in the contemporary pamphlet literature' and cite (fn. 50) the anonymous pamphlet A full confutation, p. 11. This is a good example of the many texts in which the contemporary terminology of contracts is used and in which it is clear that the writer is assuming that his readers know what he is writing about. DJT also cite Paterson vs. Graham (fn. 51) as an example of a legal case in which the distinction between the types of contracts is made clear. This is not a good example, at all. There is one and only one forward delivery agreement for South Sea stock involved in the case and there is nothing in the case that speaks to two different types of forward agreements. The forward agreement in question is actually a combination of the two types of contract and, to make matters more complicated, forward delivery was going to be shared by two individuals. The dispute in the suit was about who had been given the agency powers for arranging this forward agreement. DJT's distinction between what they call 'forward/forward contracts' and 'spot/forward contracts' is a quite reasonable one because the distinction makes sense in a wide range of contexts in which the terminology appears. The best example of such sources that we use in this paper is the Pheasant Crisp's letters to the Duke of Portland. In several letters he reports prices for the third subscription 'for the delivery of the receipts' (Portland (London) MS, Pw B 8, 8-19), the same term used by the writer of A full confutation. These prices clearly match up with the Freke prices that DJT call 'regular' or 'forward/forward' prices. Thus we have another piece of contextual evidence that Freke prices are forward prices for some unspecified delivery date of the receipts. It would be very convenient if all words and phrases used in 1720 were as easy

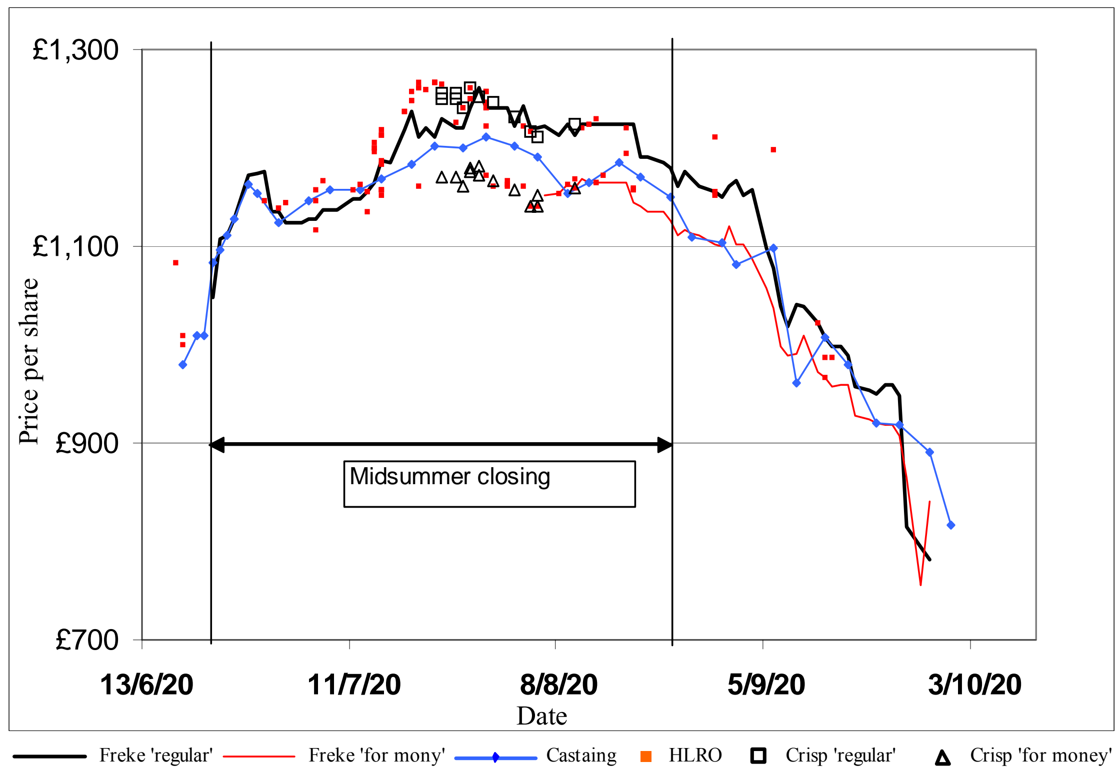


Figure A.III.6. *Third subscription share values, 1720*

*Source:* Freke, *Prices of stocks*, Castaing, *The course*, HLRO Box 158, and Portland (London) MS

The first thing to notice about figure A.III.6 is that the apparent distances between Freke's 'regular' and 'for mony' prices are actually quite large. The difference between the two prices is about £60, narrowing only to about £40 before the values disappear from the listings. A few earlier examples of the same kind of prices were reported to the Duke of Portland in a series of letters from his broker, Pheasant Crisp.[73] These prices indicate an earlier gap of about £70 to £80. The second thing to notice about the figure is that all the depicted transaction prices (except two) that come from the HLRO ledger abstracts are 'selling' prices. That is, they are prices at which South Sea Directors or other Company officers sold (via brokers) the third subscription

to decipher from their contexts. It would be better still if clear financial definitions appeared in early eighteenth century works, but they rarely do.

to the public.[74] The Crisp prices indicate a very clear connection between Directors' high selling prices and the Freke 'regular' prices. A significant exception to this observation is that in the middle weeks of July some Directors' selling prices are significantly higher than any of the values reported by Freke or Castaing. There is also a very clear Crisp connection between the lowest prices at which Directors sold and the Freke 'for mony' prices. Although there are some Director sales of the third subscription 'for mony', the HLRO data clearly indicate that Directors were more heavily into the sale of receipts 'for time', just as many pamphlet writers suspected and complained of. What is interesting about the HLRO data is that for an identifiable group of subscription sellers (the Directors), the differences between 'for time' and 'for mony' prices are about the same as the differences between the respective prices reported by Freke. The differences are described by DJT in the following way.

> Contracts for money were risky, since they involved in effect an unsecured loan to the seller of receipts, and they also implied loss of interest to the buyer on the money deposited. Accordingly, the ( … ) 'for money' quoted prices are significantly lower than the regular forward/forward prices quoted by Freke.[75]

Of course, the buyer 'for mony' loses interest if he cannot immediately obtain a tradable receipt (which was indeed the case), but this could not conceivably have given rise to such large differences between 'regular' and 'for mony'

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[73] cf. fn. 72. The broker's name may indeed have been avian, but the variance of spelling with which it appears in the archives (ex. Phoesuant) is considerable.

[74] Some pamphlet writers state a belief that the highest prices commanded in sales of the third subscription were attained in sales by the Directors themselves. We find in Restitution: a law of the land (p. 2), '(t)he Sellers, who are they? They are the late ***Directors***, and their ***Agents***, &c ( … )' and in Reasons for making void 'those very Persons, who have sold for Time, have since reduced those Subscriptions in such a manner that the Stock is thereby ( … ) worse than it was'.

[75] DJT, p. 243.

prices as are observed in figure A.III.6. Perhaps it could be argued that the risk the seller would not deliver a receipt was greater in a 'for mony' contract than it would be in a 'for time' contract, but why would that have to be? The price difference could just as easily be justified as a seller's premium in the face of the risk that a buyer 'for time' will default.

Default by a buyer of a subscription 'for time' would encompass a default on not only the value of the deposit on a subscription, but also the promised premium. Such a default would thus be a larger default than the default committed by a subscriber who simply fails to pay his subscription deposit, but there should be some proportionality between the two risks. We have already seen that many so-called subscribers did not pay a deposit, but still managed to secure a place in the third subscription from accommodating Directors.[76] The highest selling prices that Directors would ever demand from anyone in a 'for time' bargain for a subscription receipt would probably be demanded from just such people. The highest selling prices by Directors best correspond to Freke's 'regular' prices and Crisp prices 'for the delivery of the receipts'.

Conclusion A.III.4: The substantial difference between Freke's and Crisp's 'regular' and 'for mony' prices for the third subscription could possibly have reflected a seller's premium in the face of default risk from buyers. Many of the sellers were Directors.

How big are the differences between 'regular' and 'for mony' values in percentage terms? On the basis of the Freke values that appear in figure A.III.6 they are at least 3 per cent and no more than 7 per cent of the 'for mony' values. These are actually huge numbers. DJT are willing to assume

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[76] cf. fns. 53, 54.

that subscription receipts 'are expected ( … ) to be delivered out two months after the issue date'.[77] So, on an annual basis the 'regular'-relative-to-'for mony' price premia would be about 18 per cent to 42 per cent, the larger figure being prevalent in the late summer period in which the share transfer ledgers were still closed. We have already noted that in the earlier Crisp values the nominal premia appear to be even larger. Crisp also had some thoughts on this issue. In the pamphlet literature we have discovered the accusation that the highest prices at which the third subscription were sold were sales by the Directors.[78] One of the Crisp letters pitches in on this theme,

> ( … ) I have a private hint from the S Sea Treasury that the receipts for the same will be out in less than 2 months, & in consequence as the price for ready money is but 240 p.c. advance, it ought not be above 270 or 80 at most for the coming out of the receipts, whereas they keep it up at 320, upon the false notion of having 4 or 5 months time for payment ( … ).[79]

Crisp implies that, under a false rumour put about by the Directors, subscription receipts (and the payments that would be due upon them) are supposed to be long delayed. Thus a larger forward premium than otherwise would be expected appears in the forward delivery prices for the third subscription. The added premium is quite large in percentage terms. It is nominally about £40 (£320 - £280), which is about 3.5 per cent of 'the money' value (£800 [$PV_{calls}$] + £240 advance + £100 deposit) for that subscription. In other words, in Crisp's mind an extra two to three month's wait for a subscription receipt should add (in percentage annual terms) at least 14 per cent per annum (4×3.5 p.c.) and as much as 21 per cent per annum (6×3.5 p.c.) to the forward premium.

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[77] In note (j) app. III (p. 267).
[78] cf. fn. 74.

Conclusion A.III.5: The price premia in the third subscription 'forward/forward' contracts versus the 'spot/forward' contracts, as they are defined by DJT, are at least as large as 18 per cent per annum and could be as large as 42 per cent per annum in the Freke data. The Crisp data would appear to contain premia of about the same size.
..

We could proceed further in our analysis with a comparison of fourth subscription values given by Freke and Castaing. We would have, unfortunately, no help from the record of the broker-ledger abstracts, for no record of Directors' dealings (excepting three sales by Robert Knight) will be found there for the fourth subscription. There are very few observations of values of the fourth subscription (DJT use the only 29 available daily observations in their analyses) from either Freke or Castaing in any case. Whether these observations are much use in econometric analysis is debatable, but there is certainly one observation about the fourth subscription values that can be stated with assurance (and can be equally well stated for the third subscription values as well):

Conclusion A.III.6: No third or fourth subscription share value is below or even remotely close to the 'spot' values for South Sea shares. This requires no detailed examination or comparison of sources, but is immediately observable in DJT's Figure 1.

## Supplementary Appendix IV: South Sea subscription shares, instalment payments, and their present values

In this Appendix is described the mechanics of the South Sea Company's subscription issues. There were four issues. The first two issues in April 1720 provide the most useable data. The third and fourth subscriptions priced shares initially at £1000 each. The fourth subscription indeed offers very little in the

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[79] Portland (London) MS, Pw B 8, 9, 23 July 1720.

way of value data. Each issue is described below along with its instalment schedules. At the end of the Appendix we explain how the present values of instalments are calculated.

### First and Second Subscription Issues

The first subscription issue was planned soon after 6 Geo. 1, c. 4 came into force on 7 April 1720. Formal issues began in the week of 14 April and in the Court minutes of the 19 and 20 April the management of the first issue and the newly planned second issue were discussed. The subscription price was set to £300 to be paid in 9 instalments. The first issue's instalment schedule was thus:

| First subscription shares instalment schedule | |
|---|---|
| 14 April 1720 | £60 |
| 14 June 1720 | £30 |
| 15 August 1720 | £30 |
| 14 October 1720 | £30 |
| 14 December 1720 | £30 |
| 14 February 1721 | £30 |
| 14 April 1721 | £30 |
| 14 June 1721 | £30 |
| 14 August 1721 | £30 |

In the 29 April meetings of the Company's General Court a schedule for the second subscription was determined. The subscription price was £400 to be paid in 10 equal instalments.

| Second subscription shares instalment schedule | |
|---|---|
| 29 April 1720 | £40 |
| 14 September 1720 | £40 |
| 14 January 1721 | £40 |
| 14 May 1721 | £40 |
| 14 September 1721 | £40 |
| 14 December 1721 | £40 |
| 14 March 1722 | £40 |
| 14 June 1722 | £40 |
| 14 September 1722 | £40 |
| 14 December 1722 | £40 |

These schedules were printed from time to time, and with more or less accuracy, in The course from mid-July 1720, but it was not until the 9 August that The course began to print accurate instalment schedules. The first mention of instalment schedules appears in Freke's Prices of stocks (No. 75, 24 June 1720) and a detailed set of schedules for subscriptions No. 1 through 3 appears in the next issue and subsequent issues. On 13 October the Court of Directors thought it advisable to delay the payment of the fourth instalment on the First subscription till 15 November with interest to be charged at 5 per cent per annum.[80]

### Third and Fourth Subscription Issues

The last two series of subscription shares were issues of expensive shares. South Sea share values were perhaps near their peak and the total subscription price was set at £1000 for both issues. The first accurate reporting of the instalment schedule for the third subscription does not appear in The course

[80] BL Add. MS 25,499, 13 October 1720, p. 7. Freke's Prices of stocks reports this change in the instalment schedule the next day and thereafter from Issue No.107.

until the 9 August issue, but the schedule printed there was adopted on 15 June.[81] That schedule was:

| Third subscription shares instalment schedule, 15 June 1720 | |
|---|---|
| 16 June 1720 | £100 |
| 2 January 1721 | £100 |
| 2 July 1721 | £100 |
| 2 January 1722 | £100 |
| 2 July 1722 | £100 |
| 2 January 1723 | £100 |
| 2 July 1723 | £100 |
| 2 January 1724 | £100 |
| 2 July 1724 | £100 |
| 2 January 1725 | £100 |

By mid-August 1720 it was clear that the firm was starved for cash. There was a noticeable panic in the measures the Directors proposed for raising more cash. The Court minutes record a proposed unworkable scheme for getting subscribers to pre-pay their instalments and then at the same meeting the 4th and final cash subscription of shares was proposed, again at a subscription price of £1000 and with the following instalment schedule.[82]

| Fourth subscription shares instalment schedule, 12 August 1720 | |
|---|---|
| 25 September 1720 | £200 |
| 25 August 1721 | £200 |
| 25 August 1722 | £100 |
| 25 August 1723 | £100 |
| 25 August 1724 | £100 |
| 25 February 1725 | £100 |
| 25 August 1725 | £100 |
| 25 February 1726 | £100 |

At the same meeting, however, they also decided to amend the instalment schedule for the third subscription (£100 supposed to have been

[81] BL Add. MS 25,499, 15 June 1720, p.136. Freke's Prices of stocks reports a rough instalment schedule until, in the 2 August issue (No.86), there appears a fairly accurate version of the schedule adopted on 15 June.

already paid). One indication that the third subscription issue was now failing was that the schedule was greatly lengthened and the Company allowed a 25 September deadline for the first £100 to those individuals who had not yet paid their deposit:

| Third subscription shares instalment schedule, 12 August 1720 | |
|---|---|
| 25 September 1720 | £100 |
| 15 August 1721 | £100 |
| 15 August 1722 | £100 |
| 25 August 1723 | £100 |
| 25 August 1724 | £100 |
| 25 February 1725 | £100 |
| 25 August 1725 | £100 |
| 25 February 1726 | £100 |
| 25 August 1726 | £100 |
| 25 February 1727 | £100 |

Neither The course nor Prices of stocks ever displayed this revised schedule. Both price courants continued to print the 15 June-published schedule until the Company radically altered the terms of the third and fourth subscriptions on 30 September.

The Company soon changed its mind yet again with respect to the fourth subscription and put forward the following revised shortened instalment schedule[83], which would again be quickly relengthened:

| Fourth subscription shares instalment schedule, 23 August 1720 | |
|---|---|
| at subscription | £200 |
| 25 March 1721 | £200 |
| 25 September 1721 | £200 |
| 25 March 1722 | £200 |
| 25 September 1722 | £200 |

[82] BL Add. MS 25,499, 12 August 1720, pp. 158-64.
[83] This schedule appears briefly in the Prices of stocks from 26 August (No. 93) through 13 September (No. 98).

On 25 August the Court resolved that the fourth subscription would follow the same instalment schedule followed by the third subscription, but the Court minutes did not say what that joint schedule would be. In the 16 September issue (No. 99) of Freke's Prices of stocks a new schedule for the fourth subscription is shown alongside Freke's long-running 15-June schedule for the third subscription. The two schedules are almost the same and may have accurately reflected the adjustments referred to in the 25 August Court minutes. The newly reported schedule for the fourth subscriptions instalments was:

| Fourth subscription shares instalment schedule, reported Freke, 16 September 1720 | |
|---|---|
| August 1720 | £200 |
| February 1721 | £100 |
| August 1721 | £100 |
| February 1722 | £100 |
| August 1722 | £100 |
| February 1723 | £100 |
| August 1723 | £100 |
| February 1724 | £100 |
| August 1724 | £100 |

The Court minutes recorded (25 August) that something had to be done to make the payment schedules on the third and fourth subscriptions more equitable, but we do not see a resolution of this issue until after share values have largely collapsed. At the Court of Directors on 30 September the third and fourth subscriptions' subscription prices were announced to both be revised downwards to £400 per share Two new instalment schedules were devised as shown below.[84] The revised terms and schedules appeared in the

[84] BL Add. MS 25,499, 30 September 1720, pp. 201-2.

respective 4 October and 7 October issues of The course and in the 4 October issue (No. 104) of Prices of stocks.

| Third subscription shares instalment schedule, 30 September 1720 | |
|---|---|
| 16 June 1720 | £100 |
| 2 July 1721 | £40 |
| 2 January 1722 | £40 |
| 2 July 1722 | £40 |
| 2 January 1723 | £30 |
| 2 July 1723 | £30 |
| 2 January 1724 | £30 |
| 2 July 1724 | £30 |
| 2 January 1725 | £30 |
| 2 July 1725 | £30 |

| Fourth subscription shares instalment schedule, 30 September 1720 | |
|---|---|
| 6 August 1720 | £200 |
| 26 September 1721 | £25 |
| 26 March 1722 | £25 |
| 26 September 1722 | £25 |
| 26 March 1723 | £25 |
| 26 September 1723 | £25 |
| 26 March 1724 | £25 |
| 26 September 1724 | £25 |
| 26 March 1725 | £25 |

Using these instalment schedules we are able to calculate a time-series of the present-value of outstanding calls for each of the four subscription series. We have used 5 per cent per annum as the discount rate (the practice followed by DJT) and have in this paper used the discount yields on medium-term East India Bonds. Either choice gives practically the same results.

There are two controversies about the use of discount rates in 1720 that are unnecessarily conflated together. One controversy is about the general expensiveness of credit and whether it contributed to the decline in South Sea

values, perhaps even as early as June 1720. The basic position taken by Neal is that there was a general rise in the expensiveness of credit and its availability as early as June 1720.[85] Opposed to that view are DJT who argue that there was no sign of restriction in credit or decline in liquidity because there is plenty of evidence that throughout the Bubble institutions such as the Bank of England lent money and the East India Company could borrow money at rates of about 4 to 5 per cent per annum.[86] Neal argues quite correctly that the special rates at which the East India Company could borrow on its bonds had something to do with the special provisions of the bonds as well as the high credit-standing of the Company itself, but such terms for borrowing did not describe the generality of credit conditions in 1720.[87] DJT were quite incorrect, for example, to implicitly assume that premia for the forward delivery of South Sea shares were small simply because examples of cheap borrowing terms could be found. The position taken by this paper in section IV, afterall, agrees with Neal in this controversy. The evidence in the Duke of Portland's forward premia, for example, and the high lending rates for many persons (but not all) that feature in primary and secondary sources are all too numerous to be ignored.[88]

The second controversy concerns the discount rate to be used in calculating the present value of subscription instalments. This is a very different issue, as we will show, but it has been lumped together with the first controversy. Just as he argues that high lending rates, driven by peoples'

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[85] Neal, The rise of financial capitalism, pp. 101 and 111 and Neal, 'Review of Richard Dale, The first crash, p. 4.
[86] DJT, p. 245.
[87] Neal, 'Review of Richard Dale, The first crash, p. 3.
[88] Neal, 'For God's sake, remitt me', p. 40.

unwillingness to hold other peoples' paper (a liquidity crisis), was a prime cause in bringing down South Sea share values, Neal argues that low rates should not be used to calculate $PV_{call}$.[89] DJT argue for the use of low discount rates in this application because there is evidence that were a large number of individuals that still had access to credit on those terms.[90] Neither of the protagonists in this controversy appears to be in much disagreement about the location of what amounts to the risk-free rate of interest. It is on the order of 5 per cent per annum. Where Neal really differs from DJT is about the extent of access to the market for such risk-free loans. Neal argues that such access became actually quite limited and this served to 'prick' the South Sea Bubble. DJT argue that access to the market was quite wide and that the peak of the South Sea Bubble was not pricked in this way and, indeed, carried on for a period after June.

When it comes to using a discount rate for calculating $PV_{call}$, however, the relevant question about access to the market for risk-free loans is not whether such access was widely extensive, but whether such access existed to any degree at all. Under the 'no barriers to arbitrage' principle that underlies inequality 2 in section I of this paper, all that is required is some degree of access to the market for risk-free loans. The power of the arbitrage principle will then work in such a way to suggest that the risk-free discount rate is the appropriate rate to use in calculating $PV_{call}$.[91] The argument is as follows. Imagine that inequality 2 was reversed and there existed under-priced subscription shares. The smallest underpricing that can be imagined is one in

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[89] Neal, 'Review of Richard Dale, The first crash, p. 4.
[90] DJT, p. 245.

which $PV_{call}$ is calculated using the risk-free discount rate. Any one person who had access to the market for risk-free loans could borrow the subscription price and the present value of calls, pay the calls, and thereby obtain an original share at a lower cost than required in the original share market. By selling his newly obtained share in the original share market, this person makes enough money to repay his loan and a profit besides. Why could he not perform this operation many times? So, even when access to the market for risk-free loans is highly limited, some arbitrageurs should still be able to generate large arbitrage profits. If we additionally assume that the markets for loans are accessible to more than just one person, then there is no reason we cannot suppose that arbitrageurs would compete with each other for profits until the original arbitrage opportunity that gave rise to the process disappears. This is what we mean by the power of the arbitrage principal; it need not depend upon a very extensive access to the market for risk-free loans.

[91] The simplest exposition of the arbitrage principle is found in Varian, 'The arbitrage principle in financial economics'.

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