

The profitability of the transatlantic slave trade: aggregate estimates and explanatory factors¹

Klas Rönnbäck, professor in economic history, University of Gothenburg, Sweden
(corresponding author)

Guillaume Daudin, professor in economics, Université Paris-Dauphine, Université PSL,
LEDA, CNRS, IRD, DIAL, 75016 Paris, France

Gerhard de Kok, postdoctoral researcher, Leiden University, Netherlands

David Richardson, professor in economic history, Wilberforce Institute, University of Hull,
United Kingdom

Miguel Geraudes Rodrigues, PhD researcher, IEM, Faculdade de Ciências Sociais e Humanas
(NOVA FCSH), Portugal

Abstract

The transatlantic slave trade has attracted a lot of scholarly attention. One of the most contentious issues in this field of research is the profitability of the trade. The range of estimates in previous research is very wide: ranging from negative returns in some studies, to returns exceeding 30 per cent per venture in some other studies. The previous research has been marred by limited sample sizes, different methodologies, and delimitations by national identity of the traders. This has made it hard to draw more general conclusions about the profitability of the trade. In this paper, we contribute by pooling all available data on transatlantic slave ship voyage accounts into a joint dataset. Our sample of 371 English, Dutch, French and Danish ventures is almost four times the size of the largest dataset used in previous research on this topic. Much of these data have been collected from primary sources that have never been used before. The sample allows us to estimate the average profitability for the European investors, as well as differences between the nations involved in the slave trade. Our results suggest that the profitability (total returns over outlay) on average was around 9 per cent per venture, but with a very high variance. Some ventures certainly were fabulously successful, and others culminated in great losses. We give some indication that diversification was possible. We econometrically test factors that could have had an effect on profitability. Among the context variables, war and neutrality do not seem to have had an effect, but the trade was becoming more and more profitable from 1776. Two key outcome variables of a venture - the on-board slave mortality during the Middle Passage, and the price of slaves in Africa (as measured by net venture expenditure by slave bought there) – on the other hand show a significant relationship with venture profitability. Both these variables were essentially beyond the control of the individual trader, making the profitability of the trade very much a gamble for the investor. Two significant factors that the investors could control were scale of the ventures and the identity of the captain. There were decreasing returns to scale and captain that had already led at least one voyage were consistently more successful. Furthermore, we can plausibly impute returns to a further 82 ventures using the number of slaves they transported to the Western Hemisphere. The study of the augmented sample leads to the same conclusions.

¹ The authors would furthermore like to thank Kåre Lauring and Nicholas Radburn, for generously sharing their datasets and for help in identifying potential sources including voyage accounts. They also thank Silvia Marzagalli for sharing archival sources.

Introduction

The transatlantic slave trade was a horrible chapter in human history. More than 12 million people have been estimated to have been forced to leave the African continent, carried on board slave ships to the Americas. In addition to the suffering of the forced transportation, the conditions on board the ships were horrendous. More than one million of those enslaved would not survive the voyage across the Atlantic, but died from diseases, thirst or accidents. The horrors of the transatlantic slave trade beg the question how come humans can impose such atrocious acts upon fellow human beings.

One key explanation is simply that there was money to be made from the trade. Some traders undoubtedly made a lot of money from this business. A commonly held idea – both in much scholarly literature and in the broader social debate on the historical legacy of slavery – is then that the transatlantic slave trade was an extraordinarily profitable business in general. This would contribute to explaining why so many people would have chosen to turn a blind eye to the horrors of the trade.

Yet this idea of an extraordinarily profitable line of business has not found unanimous support in the empirical scholarly literature. While there certainly are some studies suggesting a comparatively high profitability of the trade, other studies on the contrary even suggest that the profits from the trade in reality were low – or in some cases even negative. Previous research in the field has, however, suffered from using samples from single slave trading nations that were often small, unrepresentative, or marred by incomplete information. This paper contributes with novel estimates of the profitability of the European slave trade. For that purpose, we pool all available data from voyage accounts from the main slave-trading nations in Europe. The pooled dataset is almost four times the size of the largest of any previous research in the field. Our estimates show that the average profitability of a slave-trading venture (defined as net returns in Europe divided by net outlays in Europe before the venture minus one) was around 9 per cent on the capital invested in the venture. This is in line with some previous research, but considerably lower than some of the highest estimates proposed in previous research. The variance was furthermore high in the sample, so whereas some ventures were highly profitable, others exhibited great losses for the investors. This shows the importance of not generalizing from small, and potentially unrepresentative, samples of data.

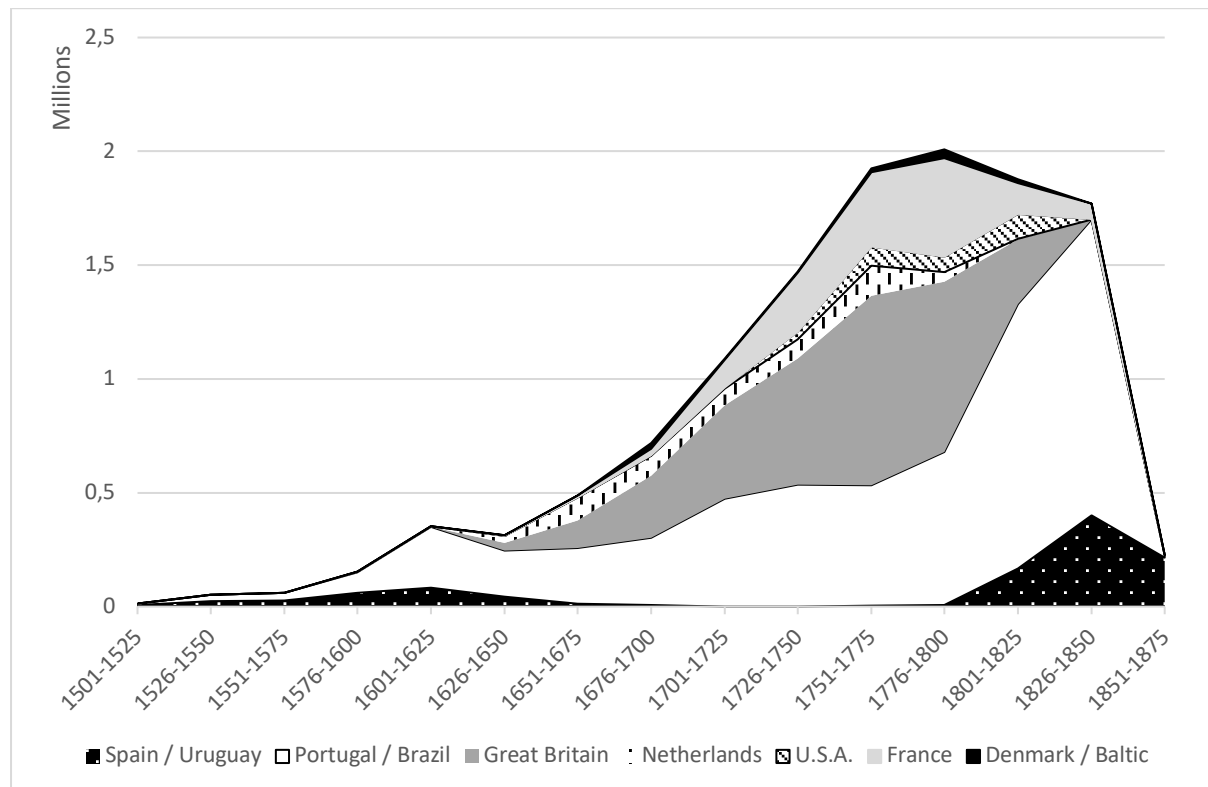
By linking the sample to the Trans-Atlantic Slave Trade Database (TSTD), we are also able to analyze factors influencing the profitability of the trade. We test econometrically numerous hypotheses generated from claims made in previous research. We distinguish between context variables (e.g. the period that the venture was undertaken), input variables that the trader could influence (e.g. the human capital and economies of scale) and proxy outcome variables (the prices for slaves in the West Indies, and the on-board slave mortality). We find support for some of the factors proposed in previous research. Of the outcome variables, both the prices paid for slaves in Africa, and the slave mortality during the Middle Passage were important for venture profitability, as would be expected. Of the input variables that the traders could control directly or indirectly, choosing an experienced captain had a substantial impact upon venture profitability. Among the context variables, war and neutrality did not matter, but the period of the voyage mattered: surprisingly, our estimates suggest that profitability actually might have increased over time. This is possibly a consequence of some omitted variable we have been unable to measure.

Previous research

The historical context of the transatlantic slave trade is well-known from much previous research in the field (for excellent overviews, see Eltis and Engerman 2011; Eltis et al. 2017).

We now also know the magnitude of the trade quite specifically: estimates are that around 12.5 million people were embarked from ports in Africa over the whole period from 1501 to 1866, and that 10.7 million of them arrived alive in the Americas. More than 36,000 voyages are estimated to have participated in the trade, and it is believed that this is a fairly accurate estimate of the magnitude of the trade (Eltis and Richardson 2008).

Figure 1. The transatlantic slave trade, embarked number of slave by 25-year period and nationality of trader, 1501-1875



Source: The Trans-Atlantic Slave Trade Database (TSTD), Estimates, available online at <https://www.slavevoyages.org/assessment/estimates> [accessed 2023-01-13].

In recent years, scholars have researched a wide spectrum of issues related to the trade, including the slave trade's connection to the development of accounting practices (McWatters and Lemarchand 2009; Stevenson-Clarke and Bowden 2023), marine insurance (Pearson and Richardson 2019; Lurvink 2019), credit markets (Morgan 2005; Radburn 2015b) or other trades (Zahedieh 2021), as well as studies of the characteristics of the trade (Solar and Rönnbäck 2015; Solar and Duquette 2017; Richardson 2022). A growing body of literature has, in addition, discussed the broader socio-economic impact of the slave trade in Europe (Rönnbäck 2014; Eltis, Emmer, and Lewis 2016; de Kok 2016; Eltis, Emmer, and Lewis 2016; Rönnbäck 2018; Brandon and Bosma 2021; Daudin 2021). Other scholars have instead attempted to study drivers of the slave trade (Rönnbäck and Theodoridis 2018), or the long-term consequences of the transatlantic slave trade, most importantly for development in Africa (Nunn 2008; Whatley and Gillezeau 2011; Whatley 2018; 2022). The role that slavery played for the industrial revolution and for the emergence of capitalism has also been highly debated in recent years (see for example Beckert 2014; Beckert and Rockman 2016; Hilt 2017; Olmstead and Rhode 2018; Burnard and Riello 2020; Stelzner 2020; 2020; Wright 2020; Scanlan 2020; Sell 2021; Combrink and Rossum 2022; Walvin 2022; Hebllich, Redding, and Voth 2022).

The profitability of the trade has been a long-standing theme of scholarly interest among economic historians. The interest was raised already by Eric Williams, with his claim that the

profits from the slave trade – which he believed to be very high – had fueled the English industrial revolution (Williams 2014 [1944]). This claim initiated a long-standing controversy in the field (Engerman 1972; Thomas and Bean 1974; O’Brien 1982; Solow 1985; 1987; Solow and Engerman 1987; Solow 1991; Eltis and Engerman 2000). Previous research has shown that some of the chartered slave-trading companies, such as the Dutch West India Company, the Pernambuco Company, or the Royal African Company of England, exhibited a comparatively low or even negative profitability, even in cases when they had legal monopoly rights to the trade (see for example Scott 1903; Davies 1975; Anstey 1975a; Postma 1990; Heijer 2003a, tbl. 4.8; Luring 2010; 2011; Menz 2013; de Kok 2019). Much of the transatlantic slave trade was, however, undertaken by private traders. This was the case for the Portuguese trade already in the 16th century, and other European nations deregulated the trade particularly in the eighteenth century. Several authors have argued that this deregulated slave trade oftentimes was highly competitive (Thomas and Bean 1974; Richardson 1987; Behrendt 2001). Under such conditions, Robert Paul Thomas and Richard Nelson Bean assumed – based on theoretical reasoning – that the profits achievable were quite low.

The controversy has, however, also spawned much empirical research into the profitability of the trade, starting already at an early date (Behrendt 2010, 258). Some scholars have attempted to estimate the overall profitability of the slave trade empirically using a cost-revenue analysis. The method is, however, highly sensitive to the assumptions made in the analysis (Daudin 2002). These assumptions have also been the object of fierce debate in previous research, and the range of estimates from previous research is very large: from 7 to 32 per cent per year (Anstey 1975b; 1975a, table 1; Darity 1985, table 3; Behrendt 1993, 108; Florentino 1997; da Silva 2021). Many scholars have instead turned to samples of slave-trading voyage accounts to estimate the profitability of the slave trade. The results from these studies are summarized in Table 1.

Table 1. Previous estimates of the profitability per voyage of the transatlantic slave trade

Nationality	Sample size	Slave-trader(s)	Estimated return (per cent)	Source
British	5	Thomas Leyland	+71*	(Dumbell 1931)
	3	William Davenport	+38*	(Hyde, Parkinson, and Marriner 1953)
	59	Various private slave traders	+62*	(Merritt 1959, tbl. IX)
	104	Various private slave traders	+22	(Inikori 1973, tbl. VIII)
	67	William Davenport	+17	(Richardson 1975, 301–8)
	74	William Davenport	+11	(Richardson 1976)
	24	Various private slave traders	+27	(Inikori 1981, table 5)
	34	The London Associates	+6	(Hancock 1995, table AIV.3)
	28	Various Bristol slave traders	+8	(Richardson 1996, tbl. 4)
	110	William Davenport	+11	(Radburn 2009, table 14)
Dutch	98	Middelburg Company	+3	(Anstey 1975a, table 2)
	81	Middelburg Company	+6	(Postma 1990, appendix table 25)
	86 **	Middelburg Company	+4	(de Kok 2019, table 3-2)
French	25	Various private slave traders	-1	(R. Stein 1975, table 2; R. L. Stein 1979, table 10.3)
	82***	Bertrand de Coeuvre and other traders	+15 to +30	(Daudin 2004b, table 2; 2005, tables 24 and 44)
	3	François Deguer	+10	(McWatters 2008)
Danish	15	Dansh-Guinean Company (Bargum Society)	-38	(Lauring 2010, table 8)
	5	Baltic-Guinean Company	+32	(Lauring 2011, 66)
Portuguese/ Brazilian	1	José Freitas Sacoto	+3	(Accioli 2008)

* = These studies do not calculate the average profit of their samples, so this is here calculated based on the figures reported for the individual voyages studied.

** = the study included 114 voyages in total, but the data on profitability is only possible to calculate for 86 of the voyages.

*** = sample includes both clear-cut slave-trading voyages (12 with a profit rate of 15%), and voyages where it is uncertain whether they are West Indian trade or slave trade (70 with a profit rate of 30%).

As can be seen in Table 1, there is an even larger range in the estimates of profitability based on voyage accounts. In this case, the large difference is to some extent due to different methodologies. The major difference is, however, due to the different samples underlying each study; the lowest return can thus be found in one of the Danish samples of data, whereas the highest estimated return is from a small sample of voyages where the English trader Thomas Leyland was involved. Studies that have been based on essentially the same sample

of data (e.g. the British Davenport papers, or the Dutch Middelburg Company) have reached comparatively similar results.

A further limitation of the previous research is that the very limited sample sizes – ranging from a handful of observations in some studies to at most 114 observations in the largest single study previously undertaken – prohibit any econometric analysis of the factors influencing the profitability of the trade.

Aim and contribution

The aim of this paper is to study the profitability of the European transatlantic slave trade. To do so, we pool all available data on private slave voyages from European nations participating in the trade into a single dataset. We thus make two important contributions to the literature:

Firstly, we draw more reliable conclusions about the average profitability of the private European slave trade.

Secondly, as the sample size is substantially larger than in any previous study in the field, we are able to analyze econometrically some of the factors that might be linked to the profitability of the trade (see Table 2). We distinguish between context (H1-H4), input (H5-H8) and outcome variables (H9-H11). The context variables are variables describing the general context of the particular venture; they are beyond the control of the individual trader. The input variables are factors that a trader is able to control directly or (via the ship's captain) indirectly. The outcome variables all show data related to the eventual fate of the venture, and are thereby potentially proxies for the venture's profitability.

- *H1. Nationality of the trader*

The transatlantic slave trade was organized along different business models. Traders of different nationalities were thus for example subject to differences in terms of regulations, state support, the sourcing of cargoes, financial system (McWatters and Lemarchand 2009, 191). It is, however, not possible to theorize about *a priori* exactly which business model would be the most apparently profitable.

- *H2-H3. War and Neutrality*

It seems plausible to assume that the profits might have changed considerably over time. During years of wars, the costs of insurance, as well as losses inflicted by war, would have increased and thereby decreased profitability for many traders. Traders from nations not involved in the war would not necessarily have experienced the same effects, and might even have been able to capture a larger share of the trade.

- *H4. Time*

We are furthermore going to test whether there is significant changes over time, either because of commoditization of the trade (Daudin 2004b), or as a proxy for developments that we are unable to test directly for (e.g. the introduction of novel technologies, such as copper sheathing (Solar and Rönnbäck 2015). We can *a priori* not hypothesize about which effect would dominate.

- *H5. Economies of scale*

The slave trade required quite considerable investments in a ship, outfitting and wage costs, and it has been hypothesized in previous research that there were economies of scale involved in the trade (Gemery and Hogendorn 1974, 242; Inikori 1981, 762–67).

- *H6. Crowding*
One aspect of the Middle Passage was the high degree of crowding of slaves on board a ship. Increased crowding might have seemed rational for many traders, as they then potentially could have traded more slaves, given the same fixed costs for the ship. It been shown that crowding was associated with a higher level of mortality among the slaves (Duquette 2014; Solar and Duquette 2017). Controlling for slave mortality, however, we would expect a positive relationship between crowding and profitability.
- *H7-H8. Human capital*
Several scholars have noted the importance of skills in the slave trade – both of the investor and/or the outfitter, and of the captains in charge of the actual slave ships (Daudin 2004b; Behrendt 2007; McDade 2011).
- *H9. Middle Passage mortality*
That a high mortality rate among the slaves during the Middle Passage would have an impact would seem quite obvious in theory, and has also been suggested in previous research (Richardson 1987; Morgan 2003, 200).
- *H10-H11. Slave prices in Africa and price mark-ups*
The price that the traders would have had to pay for a slave in Africa, and the price they received when selling them in the Americas, has been suggested to have had an important impact upon the returns from a voyage (Morgan 2003, 195–96).

Table 2. Hypotheses of variables explaining the profitability of the slave trade

	Factor	Hypothesized relationship with venture profitability
<i>Context variables</i>		
H1	Nationality of trader	Significant, but undetermined.
H2	War (involving nation of trader)	Negative.
H3	Neutrality (during war involving others)	Positive.
H4	Time-period	Undetermined.
<i>Input variables</i>		
H5	Economies of scale	Positive.
H6	Ship crowding	Positive.
H7	Skill of outfitter	Positive.
H8	Skill of ship captain	Positive.
<i>Outcome variables</i>		
H9	Middle Passage mortality	Negative.
H10	Price of slaves in Africa	Negative.
H11	Price markup of slaves between Africa and America	Positive.

Method and data

Composition of the dataset and sample

As the aim of the paper is to provide a comprehensive picture of the profitability of the European slave trade, we have attempted to pool data from all available private voyage accounts into a joint dataset. Voyage accounts have been identified through a snowballing technique starting from voyage accounts employed in previous research. The authors have then assembled data on ventures of their respective nationality of expertise of five key slave-

trading nationalities: Britain, France, the Netherlands, Portugal and Denmark. In the process of identifying and processing voyage accounts from primary sources, further accounts never used in previous research have been unearthed in various archives. The sources employed are described in detail in appendix 1 to the paper.

The estimates presented in this paper are based on the profitability of slave trading *per venture*. A venture is here defined as one or more slave-trading voyages by any number of ships sailing together. Most of the ventures in our database refer to a single slave-trading voyage by a single ship. There are, however, a few ventures that refer to more than one voyage – most often two but with a maximum of seven voyages reported together.

Our total dataset is made up of 616 observations of slave-trading ventures. Out these, only 371 ventures have enough information to allow for the computation of profit, with a limited number of assumptions. As some of these ventures encompass multiple voyages, the database in total covers 429 slave-trading voyages. These 371 ventures constitute the sample of the current study. It is thus roughly a 1 per cent sample of the total number of 36,108 single-ship voyages recorded in the TSTD from the fifteenth to the nineteenth century. For an additional 82 ventures where returns are lacking, but we know how many slaves the brought to the West Indies, it is also possible to give some return estimates (see Appendix 3 “Out-of-sample predictions”).

Our sample is not statistically representative of the whole of the transatlantic slave trade. As can be seen in Table 3, our dataset has a bias as to the nationalities of the traders. Most importantly, Portuguese-Brazilian and Spanish slave traders are completely missing. Our attempts to find accounts of slave-trading voyages under these flags that would allow us to calculate the profitability of the voyage have unfortunately all been futile. There does exist scattered financial data in various records related to the slave trade to Brazil and Spanish America. Some previous scholars have used such data as illustrative examples for data related to the profitability of Portuguese-Brazilian and Spanish slave voyages (Klein 1972; Miller 1986; Florentino 1997; Bergad 1999; Newson and Minchin 2007; Lopes 2008; Menz 2013; Da Silva 2017). There have also been research on the merchant letters and accounts of various Portuguese-Brazilian slave traders (Torrão 1995; Newson 2013; Menz 2019; Pérez García 2021). The sources used for all these studies are, however, extremely fragmentary and incomplete in terms of the variables of interest for our study. No Portuguese-Brazilian or Spanish slave trading ventures could therefore be included in our sample.³

³ For a recent overview on the challenges posed by the assessment of the Portuguese and Brazilian slave trade, see (da Silva 2021)

Table 3. Representativity of our sample (Flag)

	Our sample			Whole TSTD	
	N (obs)	N (voyages)	%	N	%
Great Britain	215	239	56%	11,239	42%
Netherlands	101	101	24%	1,249	5%
France	48	84	20%	4,090	15%
Denmark	5	5	1%	311	1%
Portugal/Brazil				6,130	23%
Spain				1,660	6%
USA				1,799	7%
Other				92	0%
<i>Sum</i>	<i>371</i>	<i>429</i>	<i>100%</i>	<i>26570</i>	<i>100%</i>

Note: Pearson's $\chi^2 = 114$: our sample is not a random selection of the population

Source: our sample and TSTD

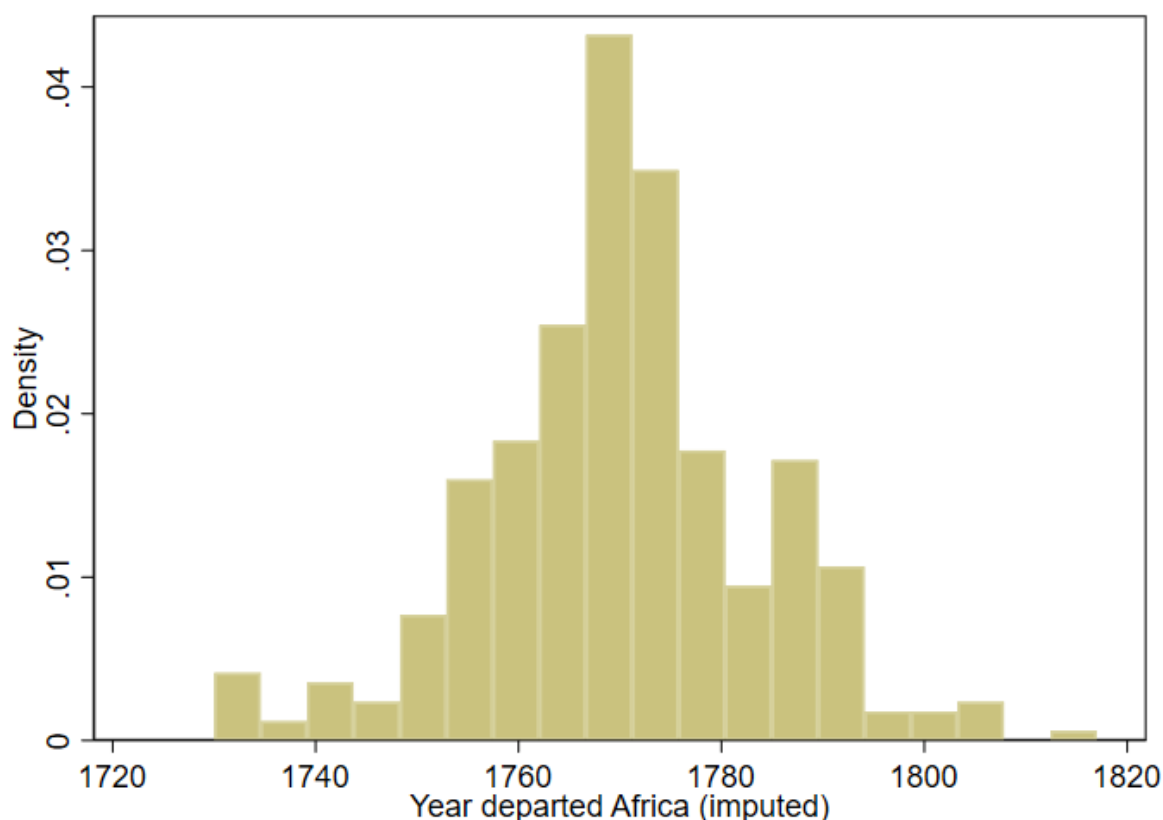
Table 4 Representativity of our sample (other variables)

t	Our sample		Whole TSTD		t-test of mean equality
	Mean	S.d.	Mean	S.d.	
Year	1770	14	1764	59	Rejected (0.036)
Middle Passage mortality	0.123	0.083	0.132	0.085	Rejected (0.031)
Ship tonnage	232	99	194	98	Rejected (0.000)
Number of slaves embarked	283	115	309	155	Rejected (0.001)
Slave crowding (slaves embarked per ship tonnage)	1.34	0.60	1.74	1.07	Rejected (0.000)

Source: our sample and TSTD

As Table 4, as well as Figure 1 and Figure 2, shows, there is also a chronological bias: our sample only covers the period from 1730 to 1817, and more than half of our observations furthermore are concentrated to the period from 1751 to 1775. We do not assume that the level of profitability remained stable over time, so it is not possible to generalize from our dataset about the level of profitability either before or after this period. Most importantly, our data is all from the period of private trade. Our dataset does not include any ventures from the chartered slave trading companies of the earlier era – such as the English Royal African Company or the Dutch West India Company – for a lack of surviving accounts on voyage level. Aside from nationality and date, the voyages in our sample are reasonably representative; the ships in our sample are somewhat larger, and the number of slaves somewhat lower, than the average ship in the whole TSTD. As a consequence, the crowding of the slaves (number of slaves embarked per tonnage of the ship) was lower on the ships in our sample than on the ships in the whole TSTD. These differences are, however, relatively minor compared to the large variance within each respective sample. The average mortality rate is on the other hand more or less on par with the average for the whole of the TSTD.

Figure 2. Sample size chronologically (number of observations of accounts)



Source: our sample

It is possible that there is a bias as to why certain sources have survived. We do in many cases not know why certain slave traders kept detailed accounts of the slave-trading voyages they were involved in, nor why these records have survived in archives until today. Thomas and Bean argued that there potentially was a positive bias in surviving historical accounts of the slave trade, as they believed that chances that records would survive would be higher for more successful traders (Thomas and Bean 1974). Guillaume Daudin has contested this claim, arguing that it is more likely that there is a negative bias; the chances that records would survive would be much higher in the case of traders experiencing economic difficulties, as records then could have survived in official archives, such as court records (Daudin 2002, 52). Indeed, there are a certain number of records underlying our dataset that have survived in the archives because the trader or investor in the trade experienced financial difficulties, and as a consequence became involved in court cases concerning their business. One important example are the accounts of James Rogers, one of the largest slave traders from Bristol, whose accounts have survived in the Chancery Masters Exhibits because he went bankrupt (Richardson 1996, xi; Morgan 2003, 212–14). It seems reasonable to assume, as Daudin, that the profitability of records from such a background might exhibit a negative selection bias, i.e. a lower level of profits than what the average merchants involved in the trade did. If anything, we would thus expect that this factor leads to a downward bias in the estimates from our sample of ventures.

As already mentioned, we have in our dataset many ventures with accounts so incomplete that it would require a whole host of assumptions to try to calculate the profitability of these ventures. One example is the accounts of the Danish-Guinean Trading Company, “the

Bargum-society” (Lauring 2010). In such cases, we have been forced to exclude the venture from the sample studied in the present paper. There are, however, a number of ventures in our sample where we believe it is reasonable to impute an estimate in cases of missing data for some particular variable. This is described in greater detail in appendix 3 of the paper. Our dataset is then linked to the Transatlantic Slave Trade database (henceforth TSTD), in order to use several of the variables from this database for an econometric analysis of our data on venture profitability. The variables in the TSTD of primary interest for this article are the variables on the chronology, the number of slaves purchased, the experience of the outfitter and the captain, and the mortality rate during the Middle Passage. More details on the usage of TSTD are given in appendix 2. We are able to link 357 of the observations (97%) in our dataset to the TSTD. For the remaining 12 observations we can find no voyage in the TSTD that seem to match our observation. We are unable to tell whether this is because these particular voyages might have been mistakenly omitted from the TSTD, or whether the voyages in question indeed are included in the TSTD, but that there are errors in either dataset that prohibit successful linking. Information on the explanatory variables to be tested in the analysis is furthermore not always complete in the TSTD. The sample size that we eventually are able to use in the econometric analyses does therefore vary depending on the model we test, but varies between 290 and 371 observations.

Profitability per venture

It is finally of importance to emphasize that we here study the profitability *per venture*. This is defined as net returns in Europe divided by net outlays in Europe before the venture minus one. This cannot be directly compared to returns on investment per year. The average voyage length (for all ships where this is known) of a full cycle of the transatlantic slave trade – from departing from, to returning to, a port in Europe – was around a whole year (between 400 and 500 days during the early eighteenth century, but decreasing to between 3-400 days on average one century later). For an investor to get money back on the investment in a slave voyage could, however, take longer time still, as for example bills of exchange could be due for payment after a certain number of months or years, and the credit terms seem to have lengthened over the eighteenth century, at least in the British trade (Morgan 2005; Radburn 2015b). The data from most voyage accounts are, however, too incomplete to allow for an in-depth study of the internal rate of return. It is also beyond the scope of the present article to attempt to include a discount rate on bills of exchange. The estimates of per venture profitability can thus with some caution (as business models seemingly differed between the traders of different nationalities) be compared to the research summarized in Table 1 above, but not directly with estimates from studies estimating the annual profitability of a business or trade. That could potentially be the object of future research on the topic.

Results

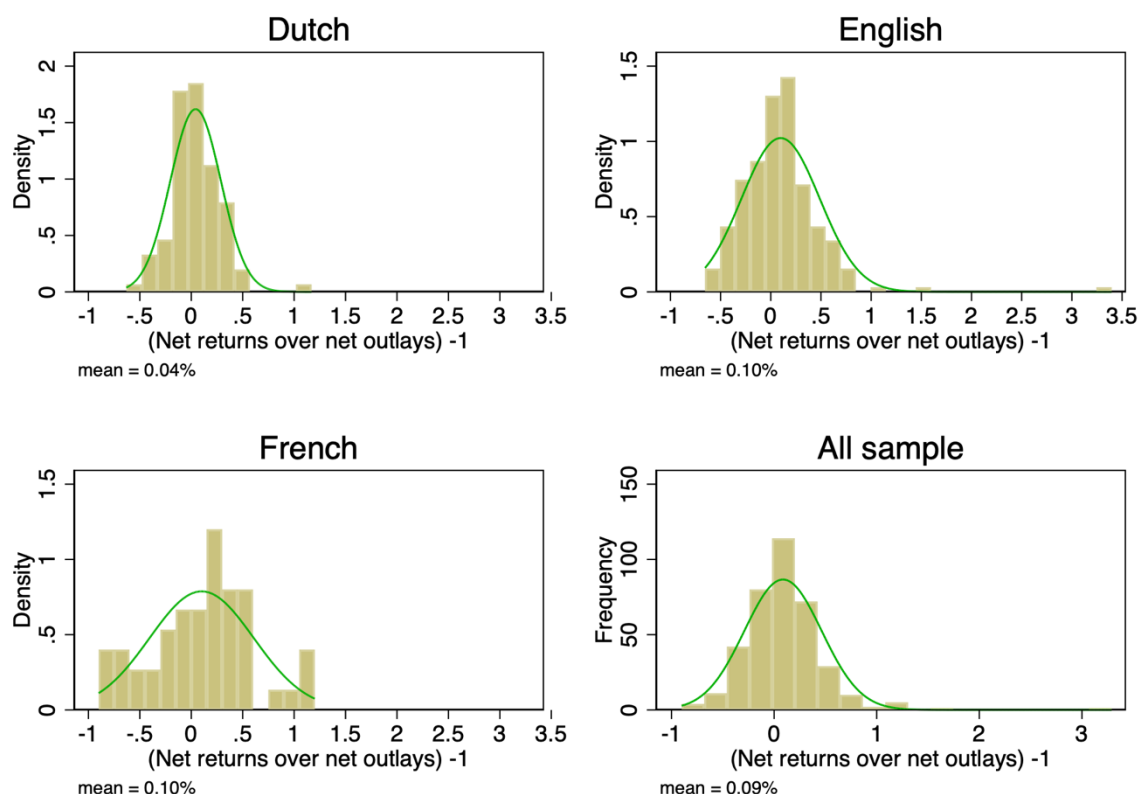
Table 5. Average profitability of the transatlantic slave trade, by nationality of trader, 1730-1817

Nationality	N	Mean	Median	S.d.	Min	Max
Danish	5	0.371*	0.211	0.389	0.142	1.062
Dutch	101	0.042	0.033	0.246	-0.631	1.15
English	215	0.098	0.087	0.390	-0.654	3.289
French	50	0.101	0.168	0.506	-0.9	1.15
Total	372	0.086	0.077	0.377	-0.9	3.289

Note :*, **, *** : Null hypothesis of mean equality with the baseline rejected at the 10, 5 and 1 per cent level (t-test). Source: our dataset

Table 5 shows the average profitability of the slave trade, by the nationality of the slave trader. The estimated average profit from a slave trading voyage was around 9 per cent per venture. The small number of Danish ships exhibit a substantially higher rate of profit, but these ships are most probably not very representative of the Danish trade. The Dutch voyages seem to exhibit a somewhat lower average profit. The profitability of the French ventures was more varied and, as show by Figure 3, did not follow a normal law. This might be linked to the smaller number of observations, or simply to the fact that wrecked and captured ventures are only present in the French part of the dataset.

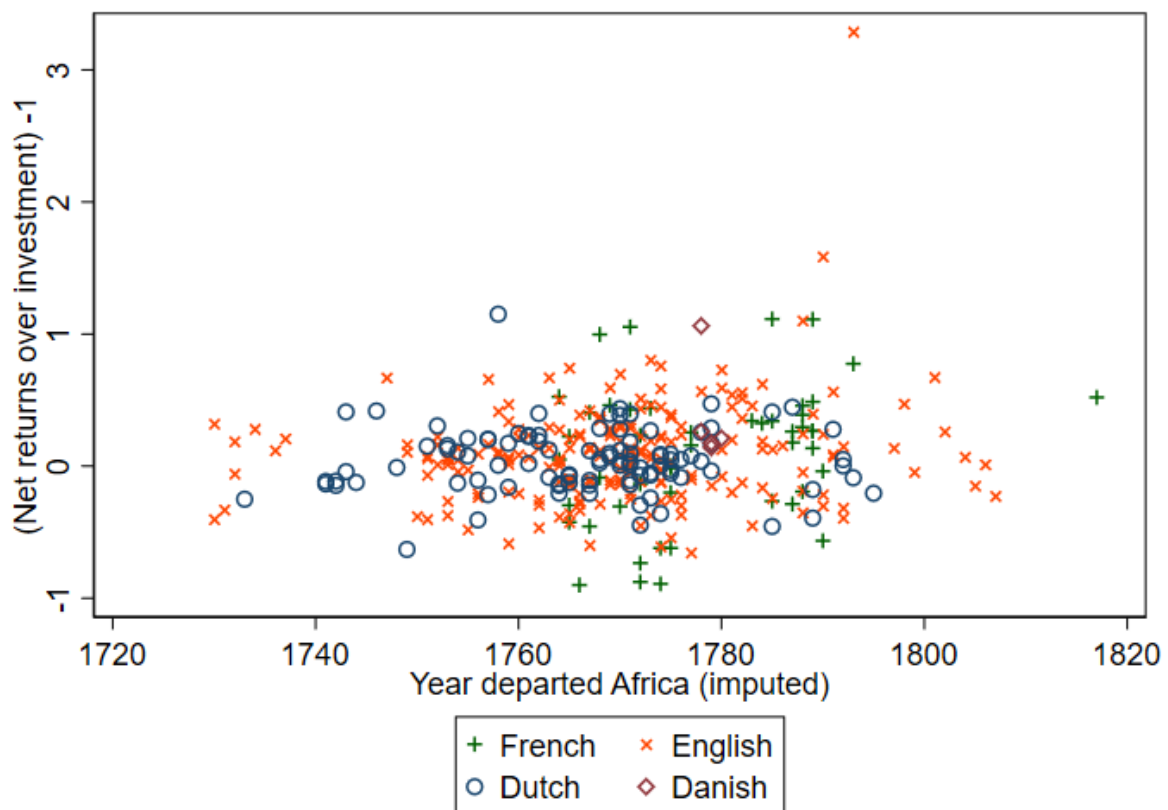
Figure 3. Dispersion of profit rates by nationality



Estimates such as these are – as Daudin (2002, 56) has noted previously – to some extent artificial, as there are problems with observations with incomplete information. The data are mostly complete for the Dutch voyages included in our sample. For the English and French ships, however, there is some incomplete data. In the English (and potentially also the Danish) data, information on insurance and the value of the hull is missing for a number of

voyages. In the French data, there are a number of observations with claims for outstanding debts, where it is unknown if these eventually were paid. Changing the assumptions for how we deal with such incomplete information naturally has an effect upon the estimated mean profitability of the trade, but the effect is comparatively modest. The robustness of our mean estimates is analyzed in greater depth in the appendix to this paper (see appendix tables A1–A2). All robustness estimates fall in the range of a mean profitability of 6–12 per cent per venture, so our baseline estimate is at the center of this range of estimates. The well-known risky nature of the business, from the perspective of the investor, is shown by the standard deviations of the estimates in Table 5, which are very high compared to the mean, but also by the great variance of the results shown in Figure 2.

Figure 4. Profits from the transatlantic slave trade, by individual trading venture, 1730-1817



Source: our sample

Figure 4 thus shows the profitability of the individual ventures in our dataset. This confirms the conclusion from Table 5 that this was a very risky business. While some of the slaving voyages were extraordinarily profitable – with profits exceeding 100 per cent – others could be great economic failures, with losses of up to the total capital invested in the voyage. For comparison, investing in British East India bonds could yield a return of around 3 per cent per year during the eighteenth century, and investing in consols could yield 2 per cent per year (Marco and Malle-Sabouret 2007, tbl. 1). Investing in plantations in the Americas was riskier, but could also yield substantially higher return, with estimates of an average profit of 10 per cent or more per year (Ward 1978; Koth and Serieux 2019). Investing on the early modern London stock market could also be risky. The average annual returns on these investments also fluctuated much over time: they could be as low as 4 per cent per year, as

during a sedate period on the market in the late 1720s and early 1730s, but could in contrast be as high as 27 per cent per year on average, as during the heydays of the stock market of the 1710s (Neal 1990, tbl. 3.1). Dutch investments returns would be lower and French investment returns would be lower.

As noted above, we are unable to calculate the internal rate of return for most of the voyages in our sample, so our estimates cannot be compared directly to the previous estimates of annual return on other types of investments, but as a full voyage could take more than a year, and it could take an investor even longer still to receive the total returns from the voyage, the average profitability of the slave trade must be considered as comparatively low compared to the annual return from many of these alternative investment opportunities.

An important question is whether slave voyages warranted a risk premium. If it is the case, when the risks involved are taken into consideration, gents must therefore either have been highly risk-prone to invest in the slave trade, or made additional profits from the trade in some other way. Yet, (Daudin 2004a) has claimed that, conditional on wealth, this risk could be diversified away and thus did not warrant a risk premium. If that is true, we expect returns between ventures not to be correlated. We check that by regressing returns of years as a categorical variable. Indeed, if we restrict the sample to years with four or five observations (40 and 34 years respectively), we cannot reject the hypothesis that the year variables are not jointly significant at the 5% threshold. If we restrict the sample to years with the sample to years with six or seven observations (23 and 21 years respectively), we cannot reject the hypothesis the year variables are not jointly significant at the 15% threshold. This suggests that diversification was indeed available to slave trade investors. This is all the more true as they could invest in other long-distance Atlantic trade ventures. In that case the investment would not warrant a risk premium.

What factors did then determine the profitability of the trade, and was there anything that the investors could do to influence the profitability? Table 6 shows the results of multivariate regressions analyzing the hypothesized determinants of the slave trade profitability. Model 1 estimates our baseline scenario for the full sample. Models 2 and 3 explore using alternative variables for estimating economies of scale. Model 4 excludes a particular outlier from the regression. Model 5 instead estimates the coefficient with robust standard errors. Further robustness tests, based on alternative assumptions for the estimates, are reported in the appendix to the paper. In summary, all of the results reported in Table 6 are robust to the changed assumptions used for the estimates reported in the appendix.

Table 6. Multivariate regressions on the profitability of the slave trade, 1730-1817

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Nationality = 1, Danish						0.17 (0.18)
Nationality = 2, Dutch	0.026 (0.070)	-0.051 (0.074)	-0.064 (0.083)	-0.024 (0.062)	0.026 (0.079)	0.037 (0.057)
Nationality = 4, French	0.0049 (0.084)	-0.065 (0.085)	-0.072 (0.085)	-0.055 (0.074)	0.0049 (0.12)	0.10 (0.064)
period = 1, pre-1750	-0.089 (0.082)	-0.076 (0.083)	-0.076 (0.083)	-0.062 (0.072)	-0.089 (0.076)	-0.085 (0.081)
period = 3, 1776-1800	0.19*** (0.056)	0.15*** (0.056)	0.15** (0.057)	0.11** (0.049)	0.19** (0.095)	0.22*** (0.049)
period = 4, post-1800	0.51*** (0.16)	0.40** (0.17)	0.39** (0.17)	0.39*** (0.14)	0.51*** (0.19)	0.37** (0.15)
War involving own nationality	0.046 (0.055)	0.029 (0.056)	0.027 (0.056)	-0.00016 (0.049)	0.046 (0.066)	0.052 (0.053)
Neutrality of own nation	-0.0037 (0.066)	-0.0044 (0.067)	-0.0039 (0.068)	0.022 (0.058)	-0.0037 (0.056)	0.032 (0.067)
Slave price markup between America and Africa	-0.010 (0.022)	-0.0016 (0.022)	-0.00051 (0.022)	-0.019 (0.019)	-0.010 (0.019)	
Total net expenditure in kg of silver per slave	-0.090*** (0.022)	-0.12*** (0.021)	-0.12*** (0.020)	-0.083*** (0.019)	-0.090* (0.049)	
Not the first voyage of the outfitter	-0.013 (0.066)	0.012 (0.067)	0.015 (0.067)	-0.027 (0.057)	-0.013 (0.052)	
Not the first voyage of the captain	0.12** (0.047)	0.097** (0.048)	0.095* (0.048)	0.10** (0.041)	0.12*** (0.040)	
Slave mortality rate	-1.16*** (0.26)	-1.20*** (0.26)	-1.21*** (0.26)	-1.12*** (0.23)	-1.16*** (0.21)	
Number of embarked slaves per ton	0.013 (0.048)	-0.033 (0.053)	-0.033 (0.047)	-0.0035 (0.042)	0.013 (0.060)	
Net expenditure on venture (ln(silver grams))	-0.16*** (0.053)			-0.078* (0.047)	-0.16 (0.11)	-0.23*** (0.044)
ln_SLAXIMP		-0.0062 (0.063)				
Tonnage standardized on British measured tons, 1773-1835			0.000069 (0.00033)			
Constant	2.49*** (0.67)	0.51 (0.36)	0.46*** (0.18)	1.45** (0.60)	2.49* (1.33)	3.11*** (0.57)
Observations	293	293	293	292	293	371
R-squared	0.234	0.208	0.208	0.207	0.234	0.111

Source: our sample. Models estimated:

Baseline estimate, using net expenditure on voyage as proxy for economies of scale.

Baseline estimate, using number of slaves embarked as proxy for economies of scale.

Baseline estimate, using ship tonnage as proxy for economies of scale.

Baseline estimate, excluding one British outlier.

Baseline estimate, using robust standard errors.

Baseline estimate not relying on STDT and maximizing sample size

The share of the variation explained by the variables in the regressions (R_2) is around 21-23 per cent. Considering the limited sample size of the study, this must be considered a quite high R_2 , but there are apparently a number of additional explanatory variables that we have been unable to control for.

As for what our estimates can show, and starting with the four context variables, few of them turn out to be statistically significant in our estimates. While the crude average profitability seemed to differ by nationality of the trader, as was shown in Table 5, this relationship does not hold once we include a number of other explanatory variables. There were certainly several differences in how the slave trade was organized in the different countries – something that would merit a study of its own. The different institutional settings and business models do, according to the estimates we show here, nonetheless not seem to differ enough to really have a measurable impact upon the profitability of the trade. Furthermore, neither the war, nor the neutrality, variables are statistically significant in any regressions. We are unable to distinguish whether this is due to the variables being too crude in reality, or whether the traders as a rule really experienced little impact by the wars and/or neutrality. The only context-variable where we find any statistically significant result is for the period during which the venture in question was undertaken. Ventures undertaken during the third and fourth sub-periods of our sample (1776-1800 and 1801 onwards, respectively) seem to exhibit a higher mean profitability than ventures undertaken at an earlier date. The estimated coefficients are furthermore substantial (around 10–20 percentage points higher profit during the third period, and even higher during the fourth), but must be interpreted with caution as the sample sizes for these periods are limited (especially for the fourth period studied). The estimates are furthermore robust to changed assumptions for observations with incomplete data, as reported in the appendix to the paper. The results are, however, to some extent driven by a particular outlier in the sample. If we control for this, the estimated coefficients are somewhat reduced but are still statistically significant. It is possible that these results are due to some omitted variable that we have been unable to control for, for example in the form of some technological improvements (such as copper sheathing studied in previous research). The conclusion we draw from these results is that the profitability of the trade at the very least was not decreasing over time.

We turn next to the four input-variables that a trader to some extent could wield any control over. Of these variables, we find statistically significant results for one variable: the skill of the captain. These results are robust to changed assumptions for observations with incomplete data, as reported in the appendix to the paper. The size of the coefficient is in addition substantial: the estimates suggest that choosing a captain that had previous experience of at least one slave trading venture could increase the profitability by some 9–11 percentage points, or more than double the profitability compared to the estimated mean in our sample. The total expenditure on the slave voyage is used in our baseline estimate as the proxy for potential economies of scale. The results of our estimates would, if anything, seem to suggest the direct opposite: diseconomies of scale, as the estimated coefficient is negative. The estimated coefficient in the baseline model is furthermore quite substantial: a one standard deviation increase in the total investment is estimated to lead to a reduction in profits by around 9 percentage points. The results are quite robust to changed assumptions for

observations with incomplete data, as is shown in the appendix to the paper, but are instead to a significant extent driven by an outlier in our sample. If we exclude these outliers from the regression (as in model 4 of table 6), the estimated coefficient is reduced substantially (and if we instead estimate the regression using robust standard errors, as in model 5, the results are no longer statistically significant). One may think this is because investment can be high because of high prices rather than high real investment. Yet, if we instead attempt to include alternative proxies for economies of scale, using either the number of slaves embarked or the tonnage of the ships as alternative measures (models 2–3 in table 6), these proxies do not exhibit any statistically significant relationship with venture profitability. Furthermore, neither the skill of the outfitter, nor slave crowding on board the ship, exhibit any significant relationship with venture profitability. It has been shown in previous research that crowding was positively associated with on-board slave mortality (Duquette 2014; Solar and Duquette 2017). In a univariate analysis, slave crowding appears to be positively associated with venture profitability, but once we include slave mortality as a variable in the regressions, the relationship between crowding and profitability ceases to be statistically significant.

We finally turn to the three outcome-variables of the voyage. One of these variables, the price markup of slaves between Africa and the Americas, exhibits no statistically significant relationship with venture profitability. The variable might simply be too crude, as assigning the average price for the year of the venture allows for no variation between ships departing Africa the same year. The two other outcome-variables both exhibit the expected statistically significant relationships with venture profitability. Slave mortality during the Middle Passage is, as expected, negatively associated with venture profitability and statistically significant throughout all of the different models tested in Table 6. These results are furthermore robust to changed assumptions for observations with incomplete data, as reported in the appendix to the paper. This confirms the hypothesis, based on previous research (Richardson 1987), that Middle Passage slave mortality indeed was a key driver of the profitability of the trade. The size of the estimated coefficient is high, around -1, in all specifications. This makes sense intuitively, as this means that if the mortality equalled 1 (i.e. 100 per cent mortality among the slaves), the profit of the voyage would be -100 per cent of the investment, i.e. a complete loss of all the capital invested. A decrease in slave mortality of one standard deviation would according to our estimates increase the profit rate by around 10 percentage points, i.e. it would more than double the profit compared to the estimated mean of our sample. Vice versa, an increase in mortality by one standard deviation would reduce the mean profitability to below zero. Finally, venture investment per slave purchased, which we include as a proxy for the price paid for purchasing slaves, is furthermore negatively associated with venture profitability, as expected. The result is also statistically significant, and robust to changed assumptions for observations with incomplete data, as reported in the appendix to the paper. The estimated coefficient is furthermore substantial: a decrease of the variable by one standard deviation would increase the profitability of the venture by around 12 percentage points, i.e. more than double the profit compared to the mean estimate for our sample. This lends support to the hypothesis in question, with a lower profitability the higher the price (in terms of trade goods) that the traders in effect had to pay for the slaves in Africa.

We also run a sample-maximising regression dropping all variables associated with slave numbers, price, human capital and tonnage. The coefficients associated with remaining variables do not change.

The strong relationship between some outcome variables and profit suggest that maybe we can infer profits based on outfitting costs and value of sold slaves in the West Indies. We do that for an additional 82 ventures not included in the sample, in appendix 4.

We can thereby summarize what our results mean for the hypotheses tested. This is shown in table 7.

Table 7. Results of tested hypotheses explaining the profitability of the slave trade

	Factor	Hypothesized relationship with venture profitability	Estimated relationship with venture profitability
<i>Context variables</i>			
H1	Nationality of trader	Significant, but undetermined.	Not significant.
H2	War (involving nation of trader)	Negative.	Not significant.
H3	Neutrality (during war involving others)	Positive.	Not significant.
H4	Time-period	Undetermined.	Significant, and higher profit during periods 3 and 4.
<i>Input variables</i>			
H5	Economies of scale	Positive.	Negative, but not robust to changes in the model.
H6	Ship crowding	Positive.	Not significant.
H7	Skill of outfitter	Positive.	Not significant.
H8	Skill of ship captain	Positive.	Positive; significant, and substantial.
<i>Outcome variables</i>			
H9	Middle Passage mortality	Negative.	Negative; significant and substantial.
H10	Price of slaves in Africa	Negative.	Negative; significant and substantial.
H11	Price markup of slaves between Africa and America	Positive.	Not significant.

In summary, we find no support for three of the four hypothesized context variables (H1–H3), and only support for one of them – the time-period of the venture (H4). We find no support for two of the input variables (H6 and H7), but we do find strong support for hypothesis H8, on the skill of the ship’s captain. The estimates point to the opposite result than hypothesized regarding economies of scale (H5), but these results are not robust to changes in the model. We finally find strong support for two of the outcome-variables (H9 and H10), on Middle Passage mortality and the price to be paid for slaves in Africa, but no support for the hypothesis on the price markup between Africa and the Americas (H11).

Discussion

A key finding of this paper is to confirm the conclusion from previous research on smaller samples of slave-trading voyages that the profitability of the slave trade on average was comparatively low. While some slave trading ventures could exhibit extraordinarily high profits – sometimes in excess of 100 per cent of the capital invested – there were also a number of ventures exhibiting great losses. The risks were thus high, and the average profit for the whole sample of ventures does not exhibit any extraordinarily high profit-levels in general. At the same time, it is important to note that the private trade in slaves actually was profitable, in contrast to the chartered company trade in slaves, which as a rule seem to have been unprofitable. It might seem paradoxical that the competitive private trade in slaves would have been profitable, while the chartered monopoly trade of the earlier era most often was not. Monopoly versus open trade is, however, far from the only factor that differs between the private and chartered slave trade. For one thing, the chartered companies were many times not just business entities, but also political agents of their respective home states. The political engagements required of these companies, for example in terms of military operations, might many times have been costly. For another thing, the chartered companies were operating on a very different scale, and with a very different organization of business, including bureaucratized company headquarters, and trading forts and factories to maintain in

Africa. One possibility is therefore that many of the chartered companies simply were inefficient organizations, with too large fixed costs in relation to their actual trading activities. Another possibility is that company managers might have appropriated much of the economic surplus of these companies. Evidence suggestive of this is for example that the Dutch West India Company exhibited substantial losses overall, even though its trading activities in both slaves and commodities operated with a consistent surplus (Heijer 2003a, tbl. 4.8; 2003b, tbl. 6.4).

As we only are able to calculate the return on investment per venture, rather than annual return on investment in the slave trade, we cannot compare our estimates directly to previous research on the returns from other types of economic activities. As the average slave trading venture could take a year or more to complete, and receiving the return from the voyage could take even longer, it seems safe to assume that the annual return on investment would be lower than the return per venture that we estimate in this paper. That would mean that the return from investing in slave trading would have been lower than the return from investing in an activity exploiting the labour of the slaves, such as plantations in the Americas, where returns could exceed 10 per cent year (see Rönnbäck 2023 for an overview of literature on this topic). But several merchants might also have profited indirectly from their involvement in the slave trade. Some of the merchants who invested in the slave trade for example also had other business interests, and could act as preferred suppliers of the slave trade (Richardson 1986, xxiii; de Kok 2019, 46–50; van der Blij 2022; Zahedieh 2021). Participating in the slave trade might thus have improved the performance of other business ventures that the slave traders were investing in. The ships' husbands of the slave trade would, in some cases, also receive an additional reimbursement in addition to the return from the capital invested in the venture as a compensation of the work of organizing the venture. David Richardson has argued that the practice existed but seems to have been uncommon in the British slave trade (Richardson 1991a, xviii; 2005, 40), but it in contrast seems to have been standard practice in both the Dutch and the French trade (Daudin 2005; de Kok 2019, 45–46). The investors were, finally, not the only agents profiting from the trade. The ships' captains could make substantial gains from their participation: estimates from a sample of voyages by the Royal African Company for example suggest that the captains of the ships could pocket around 6 per cent of the total return of these voyages (Eltis, Lewis, and McIntyre 2010, tbl. 4). Other merchants could also make substantial profits on commissions as factors in charge of the selling of the slaves in the Americas (Radburn 2015a). European states could gain from the sale of licenses (e.g. Newson and Minchin 2007). Many colonies in the Americas furthermore imposed import duties on slaves, so that the slave trade also contributed to the public finances of the colonies (King 1942; Deyle 1989, 110). In the French case, however, there were policies encouraging slave trade that cost the state (see Appendix 1).

Our findings of a comparatively low average profitability of the slave trade should not be interpreted as supportive of the claim that the slave trade was peripheral for the European economies, as has been argued in some previous research (most famously by O'Brien 1982). The profits accruing to the investors in the trade were but a fraction of the total value-added created for the European economies by the slave trade, and more broadly also by the whole slave plantation complex in the Americas, which the slave trade was a key supplier of labour for (Rönnbäck 2018; Brandon and Bosma 2021). The economic contributions that this plantation complex made to European development came not only in the form of capital accumulation from retained profits, but also in the form of cheaper inputs of goods produced by the slaves (Rönnbäck 2021), and privileged markets for output from European industries (Inikori 2002; Harley 2015). The large numbers of people employed in the trade, as well as in other industries related to the trade, also contributed to the growth of secondary and tertiary

sector employment in several European economies (Allen 2003), and was presumably one factor behind the development of a high-wage economy, particularly in Britain (Allen 2009). The growth of the Atlantic trade can, in turn, also have contributed to shaping the institutional development of these economies, so that they were able to better sustain economic growth over the long run (Acemoglu, Johnson, and Robinson 2005).

Conclusion

The transatlantic slave trade has been the subject of very much previous research. One of the hotly debated topics in the previous research has been the profitability of the trade. Some scholars have argued that the profits were very high, and that these profits made significant contributions to the capital accumulation crucial for investments in the Industrial Revolution in Europe. Empirical research on the topic has, however, led to highly divergent results. This is to a large extent due to very small samples of data, and different methodologies applied for estimating the mean profitability of the trade.

In this paper, we have attempted to contribute to this discussion by pooling all available data on the profitability of the slave trade. The resulting sample of slave-trading ventures is almost four times the size of the largest previous study in the field, and much of our data has never before been used in research on this topic. The sample is also large enough to allow us to analyze econometrically the drivers of the venture profitability.

Our results show that the mean profitability of the trade was around 9 per cent per venture on the capital invested. This might at first not seem very low, but the variance was very high in the sample, suggesting that there were great risks involved in the trade. The estimated return is furthermore per venture, and it could in some cases take the investors much longer than a year to receive all of these returns. While we are unable to calculate the annual return on investments, for lack of the timing of the cash flows for the vast majority of the observations in our sample, the annual return on investments – that can be compared to the annual return on other investments – would presumably have been substantially lower than the estimated 10 per cent return per venture. We can at least conclude that our estimates do not support any claims that the profitability of the trade was remarkably high on average.

We are able to identify several key drivers of the venture profitability. Two important ones were the mortality among the slaves during the Middle Passage, and the price that the captain had to pay for the slaves in Africa. The impact was substantial: a change by one standard deviation in either of these two variables could double – or reduce to zero – the estimated profitability of the trade compared to the estimated mean profit. These two factors were, however, largely beyond the control of the investors, so for them, the outcome of a slave trading venture must to a large extent have seemed like a gamble. The key determinant of venture profitability that the investors actually could control was the choice of slave ship captain. An experienced captain – as measured by having undertaken at least one previous slave trading voyage – could double the profitability of a venture compared to the estimated mean of our sample. We are, in contrast, unable to find support for several other hypotheses suggested in previous research, including economies of scale, the nationality of the traders, and the degree of slave crowding on board.

While the profits from the slave trade might not have been remarkably high, the contribution that the slave trade made to European economic development cannot be said to be peripheral. The contribution did, however, come via a number of mechanisms where capital accumulation from retained profits from the trade was but one part.

References

- Accioli, Gustavo. 2008. "O Negócio Da Costa Da Mina e o Comércio Atlântico: Tabaco, Açúcar, Ouro e Tráfico de Escravos: Pernambuco (1654–1760)." São Paulo: University of São Paulo.
- Acemoglu, Daron, Simon Johnson, and James Robinson. 2005. "The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth." *American Economic Review*, 546–79.
- Allen, Robert C. 2003. "Progress and Poverty in Early Modern Europe." *The Economic History Review* 56 (3): 403–43. <https://doi.org/10.1111/j.1468-0289.2003.00257.x>.
- . 2009. *The British Industrial Revolution in Global Perspective*. Cambridge: Cambridge University Press.
- Anstey, Roger. 1975a. *The Atlantic Slave Trade and British Abolition 1760-1810*. London: Macmillan.
- . 1975b. "The Volume and Profitability of the British Slave Trade, 1761-1807." In *Race and Slavery in the Western Hemisphere: Quantitative Studies*. Edited by Stanley Engerman and Eugene Genovese, 3–31. Princeton University Press.
- Beckert, Sven. 2014. *Empire of Cotton : A New History of Global Capitalism*. London: Penguin.
- Beckert, Sven, and Seth Rockman. 2016. *Slavery's Capitalism : A New History of American Economic Development*. Philadelphia: PENN, University of Pennsylvania Press.
- Behrendt, Stephen D. 1993. "The British Slave Trade, 1785-1807: Volume, Profitability, and Mortality." PhD Thesis, The University of Wisconsin-Madison.
- . 2001. "Markets, Transaction Cycles, and Profits: Merchant Decision Making in the British Slave Trade." *The William and Mary Quarterly*, 171–204.
- . 2007. "Human Capital in the British Slave Trade." In *Liverpool and Transatlantic Slavery*, Edited by David Richardson, Suzanne Schwarz and Anthony Tibbles, 66–97. Liverpool: University of Liverpool.
- . 2010. "The Transatlantic Slave Trade." In *The Oxford Handbook of Slavery in the Americas*. Edited by Robert L. Paquette and Mark M. Smith, 251–74. Oxford: Oxford University Press.
- Bergad, Laird W.. 1999. *Slavery and the Demographic and Economic History of Minas Gerais, Brazil, 1720–1888*. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511572708>.
- Blij, Koen van der. 2022. "Shareholders in the Dutch Eighteenth-Century Atlantic Trade." *TSEG-The Low Countries Journal of Social and Economic History* 19 (2): 69–94.
- Brandon, Pepijn, and Ulbe Bosma. 2021. "Slavery and the Dutch Economy, 1750–1800." *Slavery & Abolition* 42 (1): 43–76.
- Burnard, Trevor, and Giorgio Riello. 2020. "Slavery and the New History of Capitalism." *Journal of Global History* 15 (2): 225–44.
- Butel, Paul. 1973. *La Croissance commerciale bordelaise dans la seconde moitié du XVIIIe siècle...* 2 vols. Lille: Service de reproduction des thèses de l'université.
- Cavignac, Jean. June 97, 2. *Jean Pellet, Commerçant En Gros (1694-1772). Contribution à l'étude Du Négoce Bordelais Au XVIIIe Siècle*. Affaires et Gens d'affaires, 31. Paris: SEVPEN.
- Combrink, Tamira, and Matthias van Rossum. 2022. *Slavery and Europe: Exploring the Economic Impact of Atlantic Slavery*. Taylor & Francis.
- Da Silva, Daniel B. Domingues. 2017. *The Atlantic Slave Trade from West Central Africa, 1780–1867*. Cambridge University Press.
- Darity, William. 1985. "The Numbers Game and the Profitability of the British Trade in Slaves." *The Journal of Economic History* 45 (3): 693–703.
- Daudin, Guillaume. 2002. "Comment Calculer Les Profits de La Traite?" *Outre-Mers. Revue*

- d'histoire* 89 (336): 43–62.
- . 2004a. “Profitability of Slave and Long Distance Trading in Context: The Case of 18th Century France.” *Journal of Economic History* 64 (1): 144–71.
- . 2004b. “Profitability of Slave and Long-Distance Trading in Context: The Case of Eighteenth-Century France.” *Journal of Economic History*, 144–71.
- . 2005. *Commerce et Prospérité : La France Au XVIIIe Siècle*. Paris: Presses de l’Université Paris-Sorbonne.
- . 2021. “How Important Was the Slavery System to Europe?” *Slavery & Abolition* 42 (1): 151–57.
- Davies, Kenneth Gordon. 1975. *The Royal African Company*. New York: Octagon.
- Deyle, Steven. 1989. “‘By Farr the Most Profitable Trade’: Slave Trading in British Colonial North America.” *Slavery and Abolition* 10 (2): 107–25.
- Ducoin, Jacques. 1993. *Naufrages, conditions de navigation et assurances dans la marine de commerce du XVIIIe siècle : le cas de Nantes et de son commerce colonial avec les îles d’Amérique*. 2 vols. Paris: Librairie de l’Inde. <http://gallica.bnf.fr/ark:/12148/bpt6k3388684r>.
- Dumbell, Stanley. 1931. “The Profits of the Guinea Trade.” *Economic History* 2 (6): 254–57.
- Duquette, Nicolas J. 2014. “Revealing the Relationship Between Ship Crowding and Slave Mortality.” *The Journal of Economic History* 74 (2): 535–52. <https://doi.org/10.1017/S0022050714000357>.
- Eltis, David. 2000. *The Rise of African Slavery in the Americas*. Cambridge: Cambridge University Press.
- Eltis, David, Pieter C. Emmer, and Frank D. Lewis. 2016. “More than Profits? The Contribution of the Slave Trade to the Dutch Economy: Assessing Fatah-Black and Van Rossum.” *Slavery & Abolition* 37 (4): 724–35.
- Eltis, David, and Stanley L. Engerman. 2000. “The Importance of Slavery and the Slave Trade to Industrializing Britain.” *Journal of Economic History*, 123–44.
- , eds. 2011. *The Cambridge World History of Slavery: Volume 3: AD 1420–AD 1804*. Vol. 3. The Cambridge World History of Slavery. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CHOL9780521840682>.
- Eltis, David, Stanley L. Engerman, Seymour Drescher, and David Richardson, eds. 2017. *The Cambridge World History of Slavery: Volume 4: AD 1804–AD 2016*. Vol. 4. The Cambridge World History of Slavery. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781139046176>.
- Eltis, David, Frank D. Lewis, and Kimberly McIntyre. 2010. “Accounting for the Traffic in Africans: Transport Costs on Slaving Voyages.” *The Journal of Economic History* 70 (4): 940–63.
- Eltis, David, Frank D. Lewis, and David Richardson. 2005. “Slave Prices, the African Slave Trade, and Productivity in the Caribbean, 1674–1807.” *The Economic History Review* 58 (4): 673–700.
- Eltis, David, and David Richardson. 2008. “A New Assessment of the Transatlantic Slave Trade.” In *Extending the Frontiers: Essays on the New Transatlantic Slave Trade Database*. Edited by David Eltis and David Richardson, 1–60. New Haven: Yale University Press.
- Engerman, Stanley L. 1972. “The Slave Trade and British Capital Formation in the Eighteenth Century: A Comment on the Williams Thesis.” *Business History Review* 46 (4): 430–43.
- Florentino, Manolo Garcia. 1997. “Em Costas Negras: Um Estudo Sobre o Tráfico Atlântico de Escravos Para o Porto Do Rio de Janeiro, c. 1790-c. 1830.” *São Paulo: Companhia Das Letras*.
- Galenson, David W. 1986. *Traders, Planters, and Slaves : Market Behavior in Early English America*. Cambridge: Cambridge Univ. Press.

- Gemery, Henry A., and Jan S. Hogendorn. 1974. "The Atlantic Slave Trade: A Tentative Economic Model." *The Journal of African History* 15 (02): 223–46.
- Hancock, David. 1995. *Citizens of the World: London Merchants and the Integration of the British Atlantic Community, 1735-1785*. Cambridge: Cambridge University Press.
- Harley, C. Knick. 2015. "Slavery, the British Atlantic Economy, and the Industrial Revolution." In *The Caribbean and the Atlantic World Economy: Circuits of Trade, Money and Knowledge 1650-1914*. Edited by Adrian Leonard and David Pretel, 161–83. Basingstoke: Palgrave Macmillan.
- Heblich, Stephan, Stephen J. Redding, and Hans-Joachim Voth. 2022. "Slavery and the British Industrial Revolution." Working Paper 30451. National Bureau of Economic Research.
- Heijer, Henk den. 2003a. "The Dutch West India Company, 1621-1791." In *Riches from Atlantic Commerce: Dutch Transatlantic Trade and Shipping, 1585-1817*. Edited by Johannes Postma and Victor Enthoven, 77–112. Leiden: Brill.
- . 2003b. "The West African Trade of the Dutch West India Company, 1674-1740." In *Riches from Atlantic Commerce: Dutch Transatlantic Trade and Shipping, 1585-1817*. Edited by Johannes Postma and Victor Enthoven, 139–69. Leiden: Brill.
- Hilt, Eric. 2017. "Economic History, Historical Analysis, and the 'New History of Capitalism.'" *The Journal of Economic History* 77 (2): 511–36.
- Hyde, Francis E., Bradbury B. Parkinson, and Sheila Marriner. 1953. "The Nature and Profitability of the Liverpool Slave Trade." *The Economic History Review* 5 (3): 368–77.
- Inikori, Joseph E. 1973. "English Trade to Guinea." Ibadan: University of Ibadan.
- . 1981. "Market Structure and the Profits of the British African Trade in the Late Eighteenth Century." *Journal of Economic History*, 745–76.
- . 2002. *Africans and the Industrial Revolution in England: A Study in International Trade and Economic Development*. New York: Cambridge University Press.
- King, James Ferguson. 1942. "Evolution of the Free Slave Trade Principle in Spanish Colonial Administration." *The Hispanic American Historical Review* 22 (1): 34–56.
- Klein, Herbert S. 1972. "The Portuguese Slave Trade from Angola in the Eighteenth Century." *The Journal of Economic History* 32 (4): 894–918.
- Kok, Gerhard de. 2016. "Cursed Capital: The Economic Impact of the Transatlantic Slave Trade on Walcheren around 1770." *Tijdschrift Voor Sociale En Economische Geschiedenis/The Low Countries Journal of Social and Economic History* 13 (3).
- . 2019. "Walcherse Ketens: De Trans-Atlantische Slavenhandel En de Economie van Walcheren, 1755-1780." Leiden: University of Leiden.
- Koth, Karl B., and John E. Serieux. 2019. "Sugar, Slavery and Wealth: Jamaica Planter Nathaniel Phillips and the Williams Hypothesis (1761–1813)." *Capitalism: A Journal of History and Economics* 1 (1): 59–91.
- Lauring, Kåre. 2010. "Dansk Slavehandel – En Underskudsforretning?" *M/S Museet for Søfarts Årbog* 69: 101–38.
- . 2011. "Fra Underskud Til Forbud–Den Danske Slavehandel 1781-1807." *M/S Museet for Søfarts Årbog* 70: 61–113.
- Lemarchand, Yannick. 1995. "Les Comptes d'armement Revisités. Les Particularités Comptables Des Sociétés Quirataires à Nantes Au XVIIIe Siècle." *Revue d'histoire Moderne et Contemporaine (1954-)* 42 (3): 435–53.
- Lopes, Gustavo Acioli. 2008. "Negócio Da Costa Da Mina e Comércio Atlântico: Tabaco, Açúcar, Ouro e Tráfico de Escravos, Pernambuco (1654-1760)." PhD Thesis, Universidade de São Paulo.
- Lurvink, Karin. 2019. "Underwriting Slavery: Insurance and Slavery in the Dutch Republic (1718–1778)." *Slavery & Abolition* 40 (3): 472–93.

- Marco, Pilar Nogués, and Camila Vam Malle-Sabouret. 2007. "East India Bonds, 1718–1763: Early Exotic Derivatives and London Market Efficiency." *European Review of Economic History* 11 (3): 367–94.
- Marzagalli, Silvia. 2017. "Le Prix d'un Homme. Les Expéditions de François Castaing, Armateur Négrier Bordelais." In *Pour Une Histoire Globale Des Réseaux de Pouvoir. Mélanges En l'honneur d'Hubert Bonin*, by Bernard Blancheton, François-Charles Mougel, and Françoise Talliano des Garets, Peter Lang, 259–67. Bruxelles.
- McDade, Katie. 2011. "Liverpool Slave Merchant Entrepreneurial Networks, 1725–1807." *Business History* 53 (7): 1092–1109.
- McWatters, Cheryl S. 2008. "Investment Returns and La Traite Négrière: Evidence from Eighteenth-Century France." *Accounting, Business & Financial History* 18 (2): 161–85.
- McWatters, Cheryl S., and Yannick Lemarchand. 2009. "Accounting for Triangular Trade." *Accounting, Business & Financial History* 19 (2): 189–212.
- Menz, Maximiliano. 2013. "A Companhia de Pernambuco e Paraíba e o Funcionamento Do Tráfico de Escravos Em Angola (1759-1775/80)." *Afro-Ásia*, 45–76.
- . 2019. "Uma Comunidade Em Movimento: Os Traficantes de Escravos de Lisboa e Seus Agentes No Atlântico, c. 1740-1771." *CLIO: Revista Pesquisa Histórica* 37 (2): 39–57.
- Merritt, J. E. 1959. "The Liverpool Slave Trade from 1789 to 1791." M.A. Thesis, Nottingham: University of Nottingham.
- Meyer, Jean. 1969a. *L'armement Nantais Dans La Deuxième Moitié Du XVIIIe Siècle*. Paris: SEVPEN.
- . 1969b. *L'Armement Nantais Dans La Deuxième Moitié Du XVIIIe Siècle*. Ports-Routes-Trafics. Paris: Sixième section de l'Ecole Pratique des Hautes Études/Centre de recherches historiques et SEVPEN.
- Miller, Joseph C. 1986. "Slave Prices in the Portuguese Southern Atlantic, 1600-1830." *Africans in Bondage: Studies in Slavery and the Slave Trade*, 43–77.
- Morgan, Kenneth. 2003. "James Rogers and the Bristol Slave Trade." *Historical Research* 76 (192): 189–216.
- . 2005. "Remittance Procedures in the Eighteenth-Century British Slave Trade." *Business History Review* 79 (4): 715–49.
- Neal, Larry. 1990. *The Rise of Financial Capitalism : International Capital Markets in the Age of Reason*. Studies in Monetary and Financial History, 99-1334409-3. Cambridge: Cambridge University Press.
- Newson, Linda A. 2013. "The Slave-Trading Accounts of Manoel Batista Peres, 1613–1619: Double-Entry Bookkeeping in Cloth Money." *Accounting History* 18 (3): 343–65.
- Newson, Linda A., and Susie Minchin. 2007. *From Capture to Sale: The Portuguese Slave Trade to Spanish South America in the Early Seventeenth Century*. Brill. <https://doi.org/10.1163/ej.9789004156791.i-373>.
- Nunn, Nathan. 2008. "The Long-Term Effects of Africa's Slave Trades." *Quarterly Journal of Economics* 123 (1): 139–76.
- O'Brien, Patrick. 1982. "European Economic Development: The Contribution of the Periphery." *The Economic History Review* 35 (1): 1–18.
- Olmstead, Alan, and Paul Rhode. 2018. "Cotton, Slavery, and the New History of Capitalism." *Explorations in Economic History* 67: 1–17.
- Pearson, Robin, and David Richardson. 2019. "Insuring the Transatlantic Slave Trade." *The Journal of Economic History* 79 (2): 417–46.
- Pérez García, Rafael M. 2021. "El Mercado de Esclavos de Puerto Rico y Los Comienzos Del Tráfico Negrero Transatlántico, 1509-1523." *Fernández Chaves, Manuel F. y Pérez García, Rafael M. (Coords.), Tratas Atlánticas y Esclavitudes En América. Siglos XVI-XIX, Sevilla, Editorial Universidad de Sevilla, 2021a*, 143–83.

- Postma, Johannes Menne. 1990. *The Dutch in the Atlantic Slave Trade 1600-1815*. Cambridge: Cambridge Univ. Press.
- Radburn, Nicholas. 2009. "William Davenport, the Slave Trade, and Merchant Enterprise in Eighteenth-Century Liverpool." Wellington: University of Wellington.
- . 2015a. "Guinea Factors, Slave Sales, and the Profits of the Transatlantic Slave Trade in Late Eighteenth-Century Jamaica: The Case of John Tailyour." *William & Mary Quarterly* 72 (2): 243–86.
- . 2015b. "Keeping 'the Wheel in Motion': Trans-Atlantic Credit Terms, Slave Prices, and the Geography of Slavery in the British Americas, 1755–1807." *The Journal of Economic History* 75 (3): 660–89.
- Richardson, David. 1975. "Profitability in the Bristol-Liverpool Slave Trade." *Outre-Mers. Revue d'histoire* 62 (226): 301–8.
- . 1976. "Profits in the Liverpool Slave Trade: The Accounts of William Davenport, 1757-1784." In *Liverpool, the African Slave Trade, and Abolition*. Edited by Roger Anstey and P.E.H. Hair, 60–90. Historical Society of Lancashire and Cheshire.
- . 1986. *Bristol, Africa and the Eighteenth-Century Slave Trade to America. Volume 1: The Years of Expansion 1698-1729*. Bristol: Bristol Record Society.
- . 1987. "The Costs of Survival: The Transport of Slaves in the Middle Passage and the Profitability of the 18th-Century British Slave Trade." *Explorations in Economic History* 24 (2): 178–96.
- . 1991a. *Bristol, Africa and the Eighteenth-Century Slave Trade to America. Volume 3: The Years of Decline 1746-1769*. Bristol: Bristol Record Society.
- . 1991b. "Prices of Slaves in West and West-Central Africa: Toward an Annual Series, 1698–1807." *Bulletin of Economic Research* 43 (1): 21–56.
- . 1996. *Bristol, Africa and the Eighteenth-Century Slave Trade to America. Volume 4: The Final Years, 1770-1807*. Bristol: Bristol Record Society.
- . 2005. "Slavery and Bristol's 'Golden Age.'" *Slavery & Abolition* 26 (1): 35–54.
- . 2022. *Principles and Agents : The British Slave Trade and Its Abolition*. New Haven: Yale University Press.
- Rinchon, Dieudonné. 1956. *Les Armements négriers au XVIIIe siècle d'après la correspondance et la comptabilité des armateurs et des capitaines nantais, par le P. Dieudonné Rinchon,...* Bruxelles, Avenue Marnix. 25.
- Rinchon, P. Dieudonné. 1964. *Pierre-Ignace-Liévin Van Alstein, capitaine négrier, Gand 1733-Nantes 1793*. Mémoires de l'Institut Français d'Afrique Noire 71. Dakar: IFAN.
- Roman, Alain. 2001. *Saint-Malo au temps des négriers*. Hommes et sociétés. Paris: Éd. Karthala.
- Rönnbäck, Klas. 2014. "Sweet Business: Quantifying the Value Added in the British Colonial Sugar Trade in the 18th Century." *Revista de Historia Económica* 32 (2): 223–45.
- . 2018. "On the Economic Importance of the Slave Plantation Complex to the British Economy during the Eighteenth Century: A Value-Added Approach." *Journal of Global History* 13 (3): 309–27. <https://doi.org/10.1017/S1740022818000177>.
- . 2021. "Were Slaves Cheap Laborers? A Comparative Study of Labor Costs in the Antebellum U.S. South." *Labor History* 62 (5–6): 721–41.
- . 2023. "Revisiting the Profitability of Slavery: Slave Hiring Rates and the Return on Investments in Slaves in the Antebellum U.S. South." *Journal of Global Slavery* 8 (1): 83–118.
- Rönnbäck, Klas, and Dimitrios Theodoridis. 2018. "African Agricultural Productivity and the Transatlantic Slave Trade: Evidence from Senegambia in the Nineteenth Century." *The Economic History Review*.
- Saugera, Éric. 1989. "Une expédition négrière nantaise sous la Restauration : Les comptes du

‘Cultivateur’ (1814-1819).” In *Nantes-Afrique-Amérique*, 4, by Centre de recherches en histoire internationale et atlantique (Nantes), 7–55. Enquêtes et documents 16. Nantes: Centre de recherches sur l’histoire du monde atlantique.

Scanlan, Padraic X. 2020. *Slave Empire : How Slavery Built Modern Britain*. London: Robinson.

Scott, William Robert. 1903. “The Constitution and Finance of the Royal African Company of England from Its Foundation till 1720.” *The American Historical Review* 8 (2): 241–59.

Sell, Zach. 2021. *Trouble of the World: Slavery and Empire in the Age of Capital*. Chapel Hill: University of North Carolina Press.

Silva, Filipa Ribeiro da. 2021. “The Profits of the Portuguese–Brazilian Transatlantic Slave Trade: Challenges and Possibilities.” *Slavery & Abolition* 42 (1): 77–104.

Solar, Peter M., and Nicolas J. Duquette. 2017. “Ship Crowding and Slave Mortality: Missing Observations or Incorrect Measurement?” *The Journal of Economic History* 77 (4): 1177–1202. <https://doi.org/10.1017/S0022050717001073>.

Solar, Peter M., and Klas Rönnbäck. 2015. “Copper Sheathing and the British Slave Trade.” *The Economic History Review* 68 (3): 806–29.

Solow, Barbara Lewis. 1985. “Caribbean Slavery and British Growth: The Eric Williams Hypothesis.” *Journal of Development Economics* 17 (1–2): 99–115.

———. 1987. “Capitalism and Slavery in the Exceedingly Long Run.” *The Journal of Interdisciplinary History* 17 (4): 711–37.

———. 1991. *Slavery and the Rise of the Atlantic System*. Cambridge: Cambridge University Press.

Solow, Barbara Lewis, and Stanley L. Engerman. 1987. *British Capitalism and Caribbean Slavery : The Legacy of Eric Williams*. Studies in Interdisciplinary History, 99-0535071-3. Cambridge: Cambridge University Press.

Stein, Robert. 1975. “The Profitability of the Nantes Slave Trade, 1783-1792.” *Journal of Economic History*, 779–93.

Stein, Robert Louis. 1979. *The French Slave Trade in the Eighteenth Century : An Old Regime Business*. Madison: Univ. of Wis. P.

Stelzner, Mark. 2020. “Slavery and Capitalism.” *Labor History* 61 (3–4): 335–47. <https://doi.org/10.1080/0023656X.2020.1761309>.

Stevenson-Clarke, Peta, and Bradley Bowden. 2023. “Accounting, Slavery and the Slave Trade: A Multi-Continental Perspective.” *Accounting History*, 10323732231156200.

Tarrade, Jean. 1972. *Le Commerce Colonial de La France à La Fin de l’Ancien Régime. L’évolution Du Système de l’Exclusif de 1763 à 1789*. Paris.

“The Slave Voyages Database SPSS Codebook.” 2022. Slave Voyages. <https://www.slavevoyages.org/>.

Thomas, Robert Paul, and Richard Nelson Bean. 1974. “The Fishers of Men: The Profits of the Slave Trade.” *The Journal of Economic History* 34 (4): 885–914.

Torrão, Maria Manuel Ferraz. 1995. “Rotas Comerciais, Agentes Económicos, Meios de Pagamento.” *História Geral de Cabo Verde* 2: 17–123.

Walvin, James. 2022. *A World Transformed : Slavery in the Americas and the Origins of Global Power*. Oakland, California: University of California Press.

Ward, John R. 1978. “The Profitability of Sugar Planting in the British West Indies, 1650-1834.” *The Economic History Review* 31 (2): 197–213.

Whatley, Warren. 2018. “The Gun-Slave Hypothesis and the 18th Century British Slave Trade.” *Explorations in Economic History* 67 (January): 80–104. <https://doi.org/10.1016/j.eeh.2017.07.001>.

———. 2022. “How the International Slave Trades Underdeveloped Africa.” *The Journal of Economic History* 82 (2): 403–41.

- Whatley, Warren, and Rob Gillezeau. 2011. "The Impact of the Transatlantic Slave Trade on Ethnic Stratification in Africa." *The American Economic Review* 101 (3): 571–76.
- Williams, Eric. 2014. *Capitalism and Slavery*. Chapel Hill: University of North Carolina Press.
- Wright, Gavin. 2020. "Slavery and Anglo-American Capitalism Revisited." *The Economic History Review* 73 (2): 353–83. <https://doi.org/10.1111/ehr.12962>.
- Zahedieh, Nuala. 2021. "Eric Williams and William Forbes: Copper, Colonial Markets, and Commercial Capitalism." *The Economic History Review* 74 (3): 784–808.

Appendix 1: Source description

English data

Sources

The British data come from a number of different sources. All of the sources are from the accounts of private traders. The most important traders in the dataset are William Davenport (94 ventures), John Tomlinson and John Knight (30 ventures), Joan Goad (Hassell papers, 19 ventures), James Rogers (14 ventures), Nicholas Torre (14 ventures), David Tuohy (12 ventures), James Day (11 ventures), Thomas Lumley (8 ventures) and Thomas Leyland (6 ventures). Some, but far from all, of these sources have been used in previous research (Inikori 1973; 1981; Richardson 1975; 1976; Radburn 2009). The accounts from the Davenport records were digitized by Nick Radburn, who generously shared his dataset. The vast majority of the other records were for this project collected by David Richardson from primary and secondary sources, with assistance in digitizing the data by Klas Rönnbäck. The accounts from the sources differ in terms of how complete they are, and how well-ordered they are. Some of the accounts are in a state of disarray. The categories of expenditures and returns that the accounts are reporting differ between the accounts. For many of the traders, it is known that they invested in more slave trading ventures than the ones above, but accounts for these other voyages have not survived (if they ever were recorded). As a rule, ventures were undertaken by a group of trader, with one of them acting as the ship's husband. The accounts are as a rule made up to settle the affairs between the investors in the venture. In some cases (e.g. James Rogers' or Thomas Lumley's accounts), the records have survived because the trader got involved in legal disputes, and the records were used as evidence. Most of the accounts are per voyage of a single ship, but the sources occasionally report data for two (or, in one single case, three) ships that presumably sailed together. The accounts are reported by full voyage. Only occasionally is the date of individual transactions recorded, but there is no single venture with complete dating of all transactions related to the venture.

Insurance

Insurance was as a rule not taken out by a joint venture, but by the individual traders. Insurance costs are therefore not always to be found in the accounts of the voyages, but were at best reported separately. Such separate accounting of insurance is in many cases missing in our dataset. It is not possible to tell for certain if this is due to a) the trader not purchasing any insurance, b) the trader purchasing insurance but the accounts of this never were recorded or have since gone missing in the archival materials, or c) insurance was purchased, but accounts of this have not been found by the researchers, for example if the accounts are in some disarray. Insurance was as a rule taken out before the voyage, but additional policies could also be added during a voyage (Pearson & Richardson 2019, p. 19).

Value of ship

For many of the ventures, the value of the ship is known, either when purchased in the first place, or when sold after the completion of a voyage, or for both of these. If the same ship was used for several voyages, the traders do as a rule not seem to have included the value of the ship in the accounts of the successive voyages (except for it the ship eventually was sold). The value of the ship is (at best) therefore recorded only on its first voyage, and on its last voyage.

Taxes and commissions

When the Royal African Company lost its monopoly in 1697, private merchants had to pay a levy (10%) on goods exported from Africa to the RAC, but seems to have expired in 1712

(Davies 1975, p. 151). The trade was after this subject to normal duties on imports etc. What taxes/customs there are seem to be included in the accounts, as far as it is possible to tell.

Timing of returns

The returns are often in the form of bills of exchange. In some cases, the sources report the length of payment, which often seem to be in separate tranches, but this is not reported systematically for all ventures. Other returns are in the form of the sales of various commodities, and it is not always reported when these were sold. Nick Radburn has shown that the length of credit for slave sales increased during the late 18th century from less than 5 months on average in the 1750s, to 15-20 months by the 1780s (Radburn 2015, figure 1). In a few cases, there is also debt reported to be outstanding in the Caribbean.

French data

Sources

There are 46 venture or ship profit sources in the French data. All of them come, directly or indirectly, from outfitting accounts (*comptes d'armement*) or return accounts (*comptes de désarmement*) that were made by outfitter for the benefit of their investors. We do not know of any surviving document that would recapitulate cost and benefit of a particular slave expedition for the outfitter, though some recapitulation must be present in their own account books.

The main source is the archives from the Bertrand de Cœuvre's estate, assembled by Meyer (Meyer 1969a). Bertrand de Cœuvre was an investor in many slave voyages. For 35 of them, we have the full cash flows as compiled by the estate's executors. They give the amount paid for the outfitting (one figure, no date) and between the outfitting and the departure (one figure, no date). They also provide the return cash flows day by day. Sometimes they mention that some funds were still to be collected with the date of the account giving that information. These accounts are given by ship or group of ships that sailed together. The returns cash flows are not associated to a specific voyage.

Additional data has been assembled from some other traders, from previous research (D. Rinchon 1956; P. D. Rinchon 1964; Saugera 1989; Roman 2001; McWatters 2008). Thanks to Silvia Marzagalli, we have also retranscribed the outfitting and return account book (*Livre des compte d'armement et de désarmement*) of François Castaing which is in the Municipal archives of Bordeaux (1 S 3) (Marzagalli 2017).

Insurance

The information on insurance is contradictory in the French data. Sometimes, insurance is paid by the outfitter (usually without commission), and so will be included in the accounts. Sometimes it is paid by the capitalists and might be missed. Meyer argues that it should be integrated as a cost at outfitting of the ship. Butel argues (based on an early 1750s memoir) that there were huge delays for the payment of premium (Butel 1973, 717). Other scholars have instead argued that the practice was to pay the insurance cost upon the return of the ship (Cavignac June 97, 2, 78; Ducoin 1993, 166). Insurance is given in six of the 28 outfitting accounts for slave ships reported by Meyer (Meyer 1969a, 304–5). This suggests it might have been paid at departure only in these cases. In the five Castaing's accounts, insurance on the first leg of the voyages is mentioned in the outfitting accounts, but paid in the return accounts.

Value of ship

The ship value at outfitting seems to be systematically included in the outfitting accounts (Meyer 1969a, 304). At return, the value of the ship (or of one of the ships) is mentioned in two on the nine return accounts given by Meyer (Meyer 1969a, 287–90). This is not

surprising, as the investing concern was continuing (Lemarchand 1995). The value of the ship was only mentioned when there was a change of partnership, or in the outfitting accounts to justify the share value.

Taxes and commissions

The letters patent of April 1717 define the tax regime for colonial trade (Tarrade 1972, 85 and passim). Colonial goods pay a 3% tax ("Domaine d'Occident") upon arriving in France and further import taxes for those that were not reexported. These taxes are mentioned in the return accounts.

Two different tax regimes applied successively to French slave trade. The letters patent of January 1716 (Tarrade 1972, 90) defined the first one. Outfitters had to pay the French Compagnie des Indes a small sum (20 lt, and 10 lt from 1720) per slave introduced in the colonies. More importantly, goods from Africa or bought in the West Indies in exchange for slaves benefited from a 50% reduction in import taxes in France. As the return cargo of a slaving voyage was of much smaller value than the total value in the West Indies of a cargo of enslaved persons, this benefit was materialized by an official document named the "acquis de Guinée" that could be used over a considerable number of years. We found no systematic trace of these acquis in the accounts.

In 1784, October 24th, these "acquis de Guinée" were replaced by a pre-departure subsidy by ton of slaving ship (Tarrade 1972, 552). This new system applied from 1785, November 10th (Meyer 1969b, 140) This was sometime converted into (or confused with) a gratification per slave (Tarrade 1972, 628). The subsidy was between 40 lt and 100 lt per ton, depending on the destination in the French colonies. These are often mentioned in accounts.

The outfitter received a 2% commission on all cash flows.

Timing of returns

The timing of the returns is detailed in most of the French data. The evidence shows that getting the returns took a lot of time, partly because they were only accounted when the outfitter sent them to investors. At that point, they would presumably be in quite liquid and short-term bills of exchange. The outfitter was tasked with recovering all the West Indies and European debts linked to the expedition.

Dutch data

All Dutch data come from the same company, the Middelburg Company (MCC). This was a joint-stock company trading in slaves. One of the voyages (the 1768 one by the Zanggodin, captain Jan van Sprang, STDT 11178) is exceptional in that the captain opted to purchase only 67 slaves (of which he managed to sell 45 survivors), which accounted for just 19 percent of the total value of his trade cargo. The remaining 81 percent of the cargo's value was allocated towards the acquisition of African commodities, mainly ivory. Across all of the MCC-voyages, captains usually used about 94 percent of the value of the cargo to buy slaves and the remaining 8 percent to buy commodities (not taking into account unsold cargo).

Insurance

In the MCC data as provided for the database, insurance premiums are always separately mentioned. The MCC usually insured all ships and cargoes, although not for the full amount. As a joint-stock company with a sufficient capital base, it could afford to insure only 40 percent of the value of ships and cargoes. Only in the run up to the fourth Anglo-Dutch war (1780-1784), the directors chose to insure up to 100 percent of the outgoing values.

Insurance policies were obtained through brokers in Middelburg, Rotterdam and Amsterdam.

Value of ship

The value of the ships is systematically reported in the accounts for all ventures. Initial ship value was determined based on purchase or building costs. After that, the MCC employed a

linear depreciation scheme per voyage based on the expected number of voyages. Sometimes extensive outfitting led to a (higher) revaluation. In practice, we find rare very low or even negative valuations.

Taxes and commissions

The Dutch West India Company (WIC) charged a fee for the right to access its charter area. This fee was called *lastgeld* and was based on the size of the ship. Ships were divided in classes, which affected ship building. The fee was systematically included in MCC:s accounts. The fee was between f3,000 and f9,000. The MCC usually paid between f3,500 and f4,500 per voyage.

The MCC-directors received a fixed portion of dividends: there was no other sign of commissions being paid.

Timing of returns

In some colonies, the MCC was forced to grant buyers of slaves the ability to pay in up to three installments. Colonists usually paid with bills of exchange (although during times of financial crises, payment in produce was preferred). A big disadvantage for Dutch slave traders was the lack of financial innovation on remittances from the colonies. Dutch bills were not guaranteed and fairly often protested. In addition, slavers paying in installments would send several separate batches of bills.

Danish data

All Danish data come from the same company, the Baltic-Guinean Company. The data has been assembled by Kåre Lauring (Lauring 2011), and generously shared with us. The accounts are seemingly reporting total costs and revenues. It is unclear if the accounts include the value of the ship and insurance costs.

Appendix 2: Linking to TSTD and other datasets

As the data on several of the observed variables in the TSTD is incomplete, we have resorted to using the imputed variables on main region of slave purchase in Africa, main region of slave landing in the Americas, year of departure from Africa, and on the numbers of slaves embarked and disembarked.⁴ If the primary sources we have consulted have reported data on any of these variables when this data was missing for this voyage in the TSTD, we have complemented the data for this observation with the data from our primary sources. In order to link the datasets, the Voyage-ID variable in the TSTD was entered in our database for each observation, so as to enable a linking based on this unique identifier. For the ventures in our dataset encompassing multiple voyages, we have calculated the corresponding variables of interest using the relevant data in TSTD.⁵

⁴ The specific variables used for the econometric analysis are thus: YEARAF (imputed year of departure from Africa), MAJBYIMP (imputed principal region of slave purchase), MJSELIMP (imputed principal region of slave disembarkation), SLAXIMP (imputed total slaves embarked) and SLAMIMP (imputed total slaves disembarked). The variable on Middle Passage mortality, VYMRTRAT, has in addition been used as a complement to a calculation based on the two variables on slave embarkation/disembarkation. See ("The SlaveVoyages Database SPSS Codebook" 2022) for further information on the variables in the TSTD dataset.

⁵ The year of departure from Africa has then been calculated as the earliest year of all voyages reported collectively as a venture in our sources. The difference between multiple voyages accounted for as a collective venture in our dataset was at most one year, so should have comparatively little impact upon our estimates. Middle Passage mortality (VYMRTRAT) was calculated as the mortality rate of the total number of slaves embarked on all voyages. Slaves embarked (SLAXIMP) and disembarked (SLAMIMP) have been calculated as crude average of the voyages encompassed in one such venture. The regions of trade (MAJBYIMP and

To test the different hypotheses, we use the following variables from our dataset and from the TSTD.

- *H1 and H3. Nationality of the trader:* we use the data on nationality of the ships' husbands from our own dataset. Most commonly, business partners in a venture were of the same nationality as the ship's husband. We interact the nationality with the dummy variable for war in order to also get a variable for traders from neutral nations during wars involving any of the other Atlantic nations in Europe.
- *H4. Time:* we here use the year of departure from Africa (YEARAF) from TSTD as a proxy variable for the timing of the voyage. Dummy variables for years when the nations in the dataset were involved in wars in the Atlantic have then been linked to this proxy variable. It is possible that a voyage might have been outfitted and left a European port at the end of one year, but only departed from Africa the following year. This could create a certain measurement error in these variables, but we believe that this is of minor importance.
- *H5. Economies of scale:* we here use a couple of different variables as a proxy for the size of a slave venture; the modified tonnage-variable (TONMOD) and the number of slaves embarked (SLAXIMP) from the TSTD; and from our own dataset the total investment in the venture (in silver-content equivalents to account for different currencies).
- *H6. Ship crowding:* we calculate as the ratio of the number of slaves embarked and the modified tonnage-variables (both from the TSTD).
- *H7-H8. Human capital*
 - Captain identification is easy in TSTD, but identifying outfitters is more complicated, as TSTD identifies all the owners but does not report the name of the outfitter. We have assumed that the person reported in the TSTD as the first owner of the venture also was the outfitter.⁶
 - We use the total number of slave trading voyages reported in the TSTD for the outfitter and the captain as a proxy for skills. The justification is that an actor that stayed for a long time in that line of business must have been skillful.
 - We use the participation in past ventures as an outfitter or an captain as a proxy for experience
 - Constructing these variables has implied reconciling different denominations for the same individual in TSTD. This is mostly about first name: "Romanet, Adrien", outfitting from Nantes in 1767 is presumably the same as "Romanet" outfitting from Nantes in 1769 in TSTD (the only two "Romanet" in the TSTD), or "A. Romanet" in our dataset. Idem for the captain "Pacaud, P" and "Pacaud, Pierre" both operating from Nantes in 1786 and 1788. We have also assumed that the same-named individuals were homonymes if their activity had at least a twenty year gap, for example outfitters named

MJSELIMP) have only been entered if they were identical for all voyages in the same venture, otherwise they have been left empty.

⁶ In 76% of the cases (n=156) where William Davenport invested in a voyage, the outfitter was also reported as the first owner in the TSTD.

“Arnou” active respectively in 1754 and 1776-1790 are probably not the same person. “Surcouf” are active as outfitters in 1749-1756, 1777 and 1820: we hypothesized there are three different persons.

- *H9. Middle Passage mortality:* this is estimated as the crude mortality rate using the data in TSTD: $(\text{slaves embarked (SLAXIMP)} - \text{slaves disembarked (SLAMIMP)}) / (\text{slaves embarked})$.
- *H10-H11. Slave prices:* Ideally, we would have wanted to use only the amount of investment in trade goods per slave purchased as a proxy for this, but the composition of the outlays is not known for a large number of the observations in the sample. For that reason, we use the total investment in the venture per slave purchased as a proxy for the purchase price of the individual slaves. In addition, we will also use data-series produced in previous research on the annual average prices of slaves in Africa (Richardson 1991b; Eltis 2000, tables 6-1 & B-1) and the Americas (Galenson 1986, tables 3.1, 3.3 & 3.6; Eltis, Lewis, and Richardson 2005), respectively, as a proxy for the price paid/received for a particular venture. This is a crude variable as we here have no data for the individual venture. All ships departing Africa a particular year are thus assigned the average prices (and consequently the markup of prices between the two markets) prevalent that year, as a crude proxy of the market conditions they presumably would have faced.

Table 8. Descriptive statistics

Baseline

	Nationality				
	Danish	Dutch	English	French	Total
profit					
Mean	0.371	0.042	0.098	0.101	0.087
Median	0.211	0.033	0.087	0.168	0.077
Standard deviation	0.389	0.246	0.390	0.506	0.377
Minimum value	0.142	-0.631	-0.654	-0.900	-0.900
Maximum value	1.062	1.150	3.289	1.150	3.289
Number of nonmissing values	5	101	215	50	371
Imputed total slaves embarked					
Mean	420	272	271	361	283
Median	429	261	270	349	271
Standard deviation	69	73	121	139	114
Minimum value	304	46	60	107	46
Maximum value	475	479	980	691	980
Number of nonmissing values	5	101	180	35	321
Year departed Africa (imputed)					
Mean	1779	1767	1770	1778	1770
Median	1779	1769	1770	1775	1770
Standard deviation	1	13	14	11	14
Minimum value	1778	1733	1730	1763	1730
Maximum value	1780	1795	1807	1817	1817
Number of nonmissing values	5	101	215	50	371
Total net expenditure in grams of silver for the whole ship					
Mean	761,358	751,925	650,247	1,084,555	737,957
Median	677,291	681,070	548,572	1,095,225	629,263
Standard deviation	192,373	223,561	456,500	478,752	430,762
Minimum value	556,265	454,928	111,329	223,608	111,329
Maximum value	966,599	1,383,340	3,492,068	2,305,632	3,492,068
Number of nonmissing values	5	101	215	50	371
Total net expenditure in g. of silver per slave					
Mean	1,836	3,011	2,514	2,993	2,712
Median	2,035	2,707	2,274	2,664	2,461
Standard deviation	439	1,507	1,190	1,792	1,384
Minimum value	1,179	1,381	456	994	456
Maximum value	2,253	13,725	9,132	12,368	13,725
Number of nonmissing values	5	101	180	35	321
Tonnage standardized on British measured tons, 1773-1835					
Mean	.	326	182	244	233
Median	.	316	182	254	218
Standard deviation	.	80	72	64	99
Minimum value	.	192	44	146	44
Maximum value	.	497	501	365	501
Number of nonmissing values	0	95	180	24	299
Total net expenditure in grams of silver for the whole ship					
Mean	761,358	751,925	650,247	1,084,555	737,957
Median	677,291	681,070	548,572	1,095,225	629,263
Standard deviation	192,373	223,561	456,500	478,752	430,762
Minimum value	556,265	454,928	111,329	223,608	111,329
Maximum value	966,599	1,383,340	3,492,068	2,305,632	3,492,068
Number of nonmissing values	5	101	215	50	371

	Nationality				
	Danish	Dutch	English	French	Total
Slave mortality rate					
Mean	0.16	0.08	0.14	0.15	0.12
Median	0.14	0.05	0.13	0.14	0.11
Standard deviation	0.13	0.09	0.06	0.10	0.08
Minimum value	0.00	0.00	-0.12	0.00	-0.12
Maximum value	0.34	0.57	0.44	0.50	0.57
Number of nonmissing values	5	101	180	34	320
Number of embarked slaves per ton					
Mean	.	0.88	1.56	1.54	1.34
Median	.	0.82	1.51	1.44	1.24
Standard deviation	.	0.31	0.57	0.58	0.60
Minimum value	.	0.17	0.42	0.73	0.17
Maximum value	.	1.66	3.19	3.19	3.19
Number of nonmissing values	0	95	177	24	296
War involving own nationality					
Mean	0.00	0.01	0.33	0.06	0.20
Median	0.00	0.00	0.00	0.00	0.00
Standard deviation	0.00	0.10	0.47	0.24	0.40
Number of nonmissing values	5	101	215	50	371
Neutrality of own nation					
Mean	1.00	0.43	0.00	0.12	0.15
Median	1.00	0.00	0.00	0.00	0.00
Standard deviation	0.00	0.50	0.00	0.33	0.35
Number of nonmissing values	5	101	215	50	371
Slave price markup between America and Africa					
Mean	4.31	3.86	3.57	3.20	3.61
Median	3.96	3.59	3.43	3.08	3.41
Standard deviation	2.52	1.27	0.98	0.58	1.08
Number of nonmissing values	5	101	215	49	370
Not the first voyage of the outfitter					
Mean	.	0.97	0.86	0.79	0.88
Median	.	1.00	1.00	1.00	1.00
Standard deviation	.	0.17	0.35	0.41	0.32
Number of nonmissing values	0	101	200	48	349
Not the first voyage of the captain					
Mean	1.00	0.73	0.78	0.48	0.72
Median	1.00	1.00	1.00	0.00	1.00
Standard deviation	.	0.44	0.42	0.50	0.45
Number of nonmissing values	1	101	183	48	333

The information in the TSTD is not complete for all of these variables. When including them in our analysis, we are therefore unable to use all the observations in our sample. In appendix table A1 below, we report data on the mean profitability for the different samples possible to use when including the different explanatory variables.

Appendix 3: Missing information and robustness tests

Missing information

There are a number of ventures in our sample where we believe it is reasonable to impute an estimate in cases of missing data. This is the case if the lacunae concern four variables: insurance costs, value of the ship (departing or returning) and claims outstanding.

For a large number of British observations, information is missing on the cost of insurance. Some of the merchants might certainly have abstained from purchasing insurance, and carried the risk themselves or together with the other investors. A more common issue is that accounts were made up and have survived for joint ventures, but insurance was not taken out on the joint venture but by the individual merchants, and the insurance premia paid are therefore not necessarily visible from the surviving records (Daudin 2002, 54). We have here assumed as our baseline estimate that all voyages where this information is missing were fully insured for the whole voyage cycle, for a premium equivalent to the going rates the year that the voyage took place (Pearson and Richardson 2019, table 3).

The data is also incomplete for a number of ventures when it comes to the value of the ship (Daudin 2002, 55). This differs between the different types of records used. The Dutch records from the MCC, on the one hand, keep a meticulous account of the accounting value of the ship both outgoing and returning on each voyage, using a fixed rate of depreciation when accounting for the value of a returning ship. In contrast, the value of the ship was included in many English voyage accounts only when a ship first was purchased, and when it was sold. If a ship had been, or would come to be, used for other voyages by the same group of partners, the value was not included. In cases where we know the value of the ship only when leaving a European port, we therefore have to impute the value of the value upon return. Estimates from the observations where we have positive information on the value of both the outgoing and incoming ship suggest a depreciation of 25 per cent on average ($n=87$; excluding outliers where the ship upon return is reported to be worth more than when departing). We imputed values for observations where this information is missing, assuming this rate of depreciation as our baseline estimate. Below, we report robustness tests, making alternative assumptions for the imputed variables. In a few cases, the value of a departing ship is not known, but the value upon return is revealed in the sources. We then assume the same rate of depreciation as above as our baseline estimate, in order to impute the value of the departing ship.

In some cases, the value of both the departing and the returning ship is unknown in the sources. In such cases we have imputed the value of the outgoing ship based on the total (non-ship) outlays of the voyage. Estimates from the observations where we have full information on total outlays and the value of the ship suggest that the value of the ship was equivalent to 17 per cent of the value of all other outlays ($n=205$). We have for observations missing both of these variables imputed the value of the departing ship assuming this ratio as our baseline estimate. The value of the returning ship is then estimated using the same rate of depreciation as above.

There are, finally, some voyages where the accounts report that the investors were owed outstanding debts in the Caribbean. It is not known from the accounts if these debts ever were repaid to the investors. We have as a baseline estimate assumed that 50 per cent of these debts eventually were paid. This is the discount used by the outfitter Daniel Garesché to convert in cash for the captain van Alstein the value of outstanding debts in 1775 (P. D. Rinchon 1964, 324)

Robustness tests

Table A1. Robustness of mean estimates in core sample when including explanatory variables

	N	Mean	S.d.	Min	Max	t-test of equality of mean with baseline sample
Full sample	369	0.086	0.377	-0.900	3.289	
Slaves embarked (SLAXIMP)	319	0.074	0.370	-0.900	3.289	Cannot reject equality (Pr = 0.7)
Outfitter's experience	354	0.081	0.374	-0.900	3.289	Cannot reject equality (Pr = 0.9)
Captain's experience	335	0.082	0.372	-0.900	3.289	Cannot reject equality (Pr = 0.9)
Ship tonnage (TONMOD)	297	0.060	0.369	-0.900	3.289	Cannot reject equality (Pr = 0.4)
Slave mortality	318	0.077	0.367	-0.891	3.289	Cannot reject equality (Pr = 0.8)
Slave crowding	294	0.062	0.371	-0.900	3.289	Cannot reject equality (Pr = 0.4)

Table A1 shows how representative the sample is when we only include ventures for which we have information on specific explanatory variables. As can be seen in the table, there are some changes in the estimated mean profitability, with the mean profitability lower in all estimates requiring information on some explanatory variables, than in our full sample. Our conclusion is that the sample of ventures that we are able to use for our regression analyses exhibit a small downward bias in terms of estimated profitability. We do thus, at least, thereby not end up with a positive selection bias when including explanatory variables in our regression estimates.

Table A2. Robustness of mean estimates depending on assumptions for observations with missing information

	Danish	Dutch	English	French	Total sample
Baseline estimate (half of all debts outstanding eventually paid; depreciation rate of hull of 25% per voyage; value of hull equals 17% of other outlays; insurance costs added for ventures where this is missing except if accounts report total outlays)	0.371 N=5	0.042 N=101	0.098 N=215	0.101 N=50	0.087 N=371
Observations with outstanding claims excluded from analysis	0.371 N=5	0.040 N=86	0.096 N=213	-0.051*	0.074 N=330
Claims outstanding assumed to not have been paid at all	0.371	0.033	0.097	-0.055**	0.063
Claims outstanding assumed to have been paid in full	0.371	0.052	0.099	0.257*	0.111
Higher cost of hull relative to other outlays (25% instead of 17% in baseline)	0.371	0.042	0.096	0.101	0.086
Lower rate of depreciation (10% instead of baseline 25%)	0.371	0.042	0.102	0.101	0.089
Cost of insurance not added to any voyages.	0.371	0.042	0.156***	0.101	0.121
Cost of insurance added to outlays, even in cases where accounts seem to suggest total outlays.	0.096	0.042	0.079***	0.101	0.072
Value of hull (outgoing/incoming) added to outlays/returns, even in cases where accounts seem to suggest total outlays/returns	0.280	0.042	0.079***	0.101	0.072
Both value of hull and cost of insurance added, in cases where accounts seem to suggest total outlays/returns	0.055	0.042	0.059***	0.101	0.060
<i>Minimum</i>	<i>0.055</i>	<i>0.033</i>	<i>0.059</i>	<i>-0.057</i>	<i>0.060</i>
<i>Maximum</i>	<i>0.371</i>	<i>0.052</i>	<i>0.156</i>	<i>0.248</i>	<i>0.121</i>

Note :*, **, *** : Null hypothesis of mean equality with the baseline rejected at the 10, 5 and 1 per cent level (t-test)

Table A2 reports estimates for the mean profitability of English and French ventures (and the whole sample), if we change the assumptions used for observations where information is incomplete. English results are sensitive to the treatment of insurance, and French profits are sensitive to the treatment of outstanding claims. This never leads to a significant difference for the whole sample.

Table A3 reports whether the regression results change if we change the underlying assumptions of the sample. The results are remarkably robust to changing assumptions, with virtually no estimated coefficient changing to any significant degree.

Table A3. Robustness of regression results

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Nationality = 2, Dutch	0.026 (0.070)	0.032 (0.075)	0.037 (0.072)	0.015 (0.070)	0.013 (0.074)	0.025 (0.070)	0.023 (0.071)	0.047 (0.071)	-0.010 (0.063)	0.0063 (0.063)
Nationality = 4, French	0.0049 (0.084)	-0.12 (0.094)	0.030 (0.085)	-0.021 (0.083)	-0.011 (0.088)	0.0039 (0.084)	0.00058 (0.084)	0.024 (0.084)	-0.033 (0.075)	-0.017 (0.075)
period = 1, pre-1750	-0.089 (0.082)	-0.11 (0.088)	-0.082 (0.083)	-0.096 (0.081)	-0.051 (0.086)	-0.088 (0.082)	-0.089 (0.082)	-0.082 (0.083)	-0.084 (0.074)	-0.078 (0.074)
period = 3, 1776-1800	0.19*** (0.056)	0.21*** (0.056)	0.19*** (0.056)	0.20*** (0.055)	0.24*** (0.057)	0.19*** (0.055)	0.20*** (0.056)	0.21*** (0.056)	0.15*** (0.050)	0.16*** (0.050)
period = 4, post-1800	0.51*** (0.16)	0.53*** (0.17)	0.51*** (0.17)	0.52*** (0.16)	0.65*** (0.17)	0.51*** (0.17)	0.52*** (0.17)	0.54*** (0.17)	0.45*** (0.15)	0.47*** (0.15)
War involving own nationality	0.046 (0.055)	0.039 (0.057)	0.049 (0.056)	0.043 (0.055)	0.068 (0.058)	0.044 (0.055)	0.049 (0.055)	0.059 (0.056)	0.029 (0.050)	0.038 (0.050)
Neutrality of own nation	-0.0037 (0.066)	0.040 (0.072)	-0.018 (0.067)	0.010 (0.066)	-0.023 (0.069)	-0.0033 (0.066)	-0.0041 (0.066)	-0.0083 (0.067)	0.012 (0.060)	0.0079 (0.060)
Slave price markup between America and Africa	-0.010 (0.022)	-0.013 (0.023)	-0.010 (0.022)	-0.011 (0.021)	-0.011 (0.023)	-0.010 (0.022)	-0.010 (0.022)	-0.010 (0.022)	-0.011 (0.019)	-0.011 (0.020)
Total net expenditure in kg of silver per slave	-0.090*** (0.0022)	-0.082*** (0.0022)	-0.092*** (0.0022)	-0.089*** (0.0021)	-0.10*** (0.0023)	-0.090*** (0.0022)	-0.091*** (0.0022)	-0.094*** (0.0022)	-0.085*** (0.0019)	-0.089*** (0.0019)
Not the first voyage of the outfitter	-0.013 (0.066)	-0.026 (0.067)	-0.011 (0.067)	-0.015 (0.065)	-0.025 (0.069)	-0.013 (0.066)	-0.012 (0.066)	-0.019 (0.066)	-0.018 (0.059)	-0.023 (0.060)
Not the first voyage of the captain	0.12** (0.047)	0.086* (0.049)	0.12** (0.048)	0.11** (0.046)	0.12** (0.049)	0.11** (0.047)	0.12** (0.047)	0.12** (0.047)	0.11** (0.042)	0.11** (0.043)
Slave mortality rate	-1.16*** (0.26)	-1.03*** (0.27)	-1.17*** (0.26)	-1.16*** (0.26)	-1.22*** (0.27)	-1.16*** (0.26)	-1.15*** (0.26)	-1.15*** (0.26)	-1.13*** (0.23)	-1.12*** (0.23)
Number of embarked slaves per ton	0.013	0.045	0.0071	0.019	0.017	0.012	0.013	0.012	-0.00077	-0.0024

	(0.048)	(0.048)	(0.048)	(0.047)	(0.049)	(0.047)	(0.048)	(0.048)	(0.043)	(0.043)
Net expenditure on venture (ln(silver grams))	-0.16***	-0.17***	-0.16***	-0.16***	-0.16***	-0.16***	-0.16***	-0.17***	-0.11**	-0.11**
	(0.053)	(0.053)	(0.053)	(0.052)	(0.055)	(0.052)	(0.053)	(0.054)	(0.048)	(0.049)
Nationality = 1, Danish										
Constant	2.49***	2.52***	2.48***	2.49***	2.52***	2.48***	2.46***	2.53***	1.81***	1.83***
	(0.67)	(0.68)	(0.68)	(0.66)	(0.71)	(0.67)	(0.67)	(0.69)	(0.61)	(0.63)
Observations	293	271	293	293	293	293	293	293	293	293
R-squared	0.234	0.244	0.227	0.241	0.268	0.233	0.235	0.236	0.233	0.237

Models estimated in table A3:

1. Baseline model
2. Baseline model, but observations with outstanding claims excluded from analysis.
3. Baseline model, but claims outstanding assumed to have been paid in full.
4. Baseline model, but claims outstanding assumed to not have been paid at all.
5. Baseline model, but cost of insurance not added to any voyages.
6. Baseline model, but higher cost of hull relative to other outlays (25% instead of 17% in baseline).
7. Baseline model, but lower rate of depreciation (10% instead of baseline 25%).
8. Baseline model, but cost of insurance added to outlays, even in cases where accounts seem to suggest total outlays.
9. Baseline model, but value of hull (outgoing/incoming) added to outlays/returns, even in cases where accounts seem to suggest total outlays/returns.
10. Baseline model, but both value of hull and cost of insurance added, in cases where accounts seem to suggest total outlays/returns

Appendix 4: Out-of-sample predictions

As noted above, our baseline estimates include 371 observations, for which we either have complete information or where we only lack information on some particular variable that we believe it is reasonable to impute, as discussed in appendix 3. There is, in addition, a further 82 ventures for which we have information on the outlays, but not on the returns. As we lack data on returns, these have been excluded from our core sample. We can, however, attempt to estimate the profit for these ventures, too, based on association between the gross returns from slave sales in the Americas, and the net returns from a voyage. For that purpose, we estimate the gross returns per slave sold in Europe in the sample from the number of slaves disembarked in the Americas by the venture in question (using the variable SLAMIMP in TSTD), and the average price of slaves sold in the Americas during the year of the venture, based on the previous research by David Eltis and co-authors (Eltis, Lewis, and Richardson 2005), converted into silver equivalent price (see Table A4). This relationship is then used to predict the net returns per slave on the 82 ventures for which we lack this information. We then compute the aggregate net returns and the profits for these ventures.

Table A4. Explaining the net return per slaves in Europe in silver grams

Explained variable: Net return In Europe per slave sold in the Americas				
VARIABLES	(1) English	(2) French	(3) Dutch	(4) Danish
Slave price in the Americas (in silver grams)	0.59*** (0.052)	0.33* (0.19)	0.76*** (0.14)	0.25 (0.12)
Constant	471** (237)	1,645 (976)	217 (590)	1,826** (518)
Observations	181	34	10 1	5
R-squared	0.416	0.086	0.232	0.577

Source: our dataset and TSDT.

Table notes: Standard errors in Parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A5 suggests that there is no statistically significant difference in profits between our baseline sample and the out-of-sample imputations. This is reassuring for the representativeness of our sample, even if, nation by nation, this does not hold in the Dutch and English case.

Table A5. Using imputed profits

Profits imputed or not					
	Nationality				
	Danish	Dutch	English	French	Total
Hypothesis					
Baseline					
Mean	0.371	0.042	0.098	0.101	0.087
Median	0.211	0.033	0.087	0.168	0.077
Standard deviation	0.389	0.246	0.390	0.506	0.377
Maximum value	1.062	1.150	3.289	1.150	3.289
Minimum value	0.142	-0.631	-0.654	-0.900	-0.900
Number of nonmissing values	5	101	215	50	371
Baseline including only imputed profits					
Mean		0.338**	-0.076**	0.332	0.027
Median		0.302	-0.258	0.275	-0.172
Standard deviation		0.116	0.783	0.451	0.728
Maximum value		0.468	4.289	1.238	4.289
Minimum value		0.243	-0.597	-0.337	-0.597
Number of nonmissing values		3	54	15	72
Baseline including imputed profits					
Mean	0.371	0.051	0.063	0.155	0.077
Median	0.211	0.036	0.038	0.224	0.050
Standard deviation	0.389	0.248	0.498	0.500	0.452
Maximum value	1.062	1.150	4.289	1.238	4.289
Minimum value	0.142	-0.631	-0.654	-0.900	-0.900
Number of nonmissing values	5	104	269	65	443

Note :*, **, *** : Null hypothesis of mean equality with the baseline rejected at the 10, 5 and 1 per cent level (t-test)

Using the sample including the imputed does not change the regression results either.

Table A6. Explaining profits in the baseline or baseline+imputed sample

VARIABLES	(1) Baseline	(3) Baseline and imputed
Nationality = 2, Dutch	0.026 (0.070)	0.19** (0.074)
Nationality = 4, French	0.0049 (0.084)	0.17** (0.084)
period = 1, pre-1750	-0.089 (0.082)	-0.094 (0.074)
period = 3, 1776-1800	0.19*** (0.056)	0.34*** (0.059)
period = 4, post-1800	0.51*** (0.16)	0.78*** (0.19)
War involving own nationality	0.046 (0.055)	0.071 (0.061)
Neutrality of own nation	-0.0037 (0.066)	-0.040 (0.074)
Slave price markup between America and Africa	-0.010 (0.022)	-0.026 (0.023)
Total net expenditure in kg of silver per slave	-0.090*** (0.0022)	-0.084*** (0.0024)
Not the first voyage of the outfitter	-0.013 (0.066)	-0.096 (0.070)
Not the first voyage of the captain	0.12** (0.047)	0.093* (0.050)
Slave mortality rate	-1.16*** (0.26)	-1.10*** (0.27)
Number of embarked slaves per ton	0.013 (0.048)	0.14*** (0.049)
Net expenditure on venture (ln(silver grams))	-0.16*** (0.053)	-0.34*** (0.052)
Constant	2.49*** (0.67)	4.70*** (0.67)
Observations	293	331
R-squared	0.234	0.332