'There can be no partnership with the king': political instability and the English East India Company*

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Abstract

The English East India Company and the English government formed a historic partnership to invest and share in the gains from Asian-European trade. While the partnership was successful for the Company in the long-run, its charter was unfavorably renegotiated on many occasions during the first 150 years. This paper argues that political instability weakened the government's commitment to honor the partnership, and as a result the EIC invested less. The empirical analysis focuses on the Company's shipping capacity over a 100 year period. The results show that new monarchs, parliamentary elections, and larger deficits were negatively associated with investments in capacity. The magnitudes are equivalent to an exceptionally large negative shock to sales growth. The paper gives new evidence on the effects of instability, especially concerning investments in public private partnerships. It also has implications for the link between investment and the security of corporate rights in Britain during the century before the Industrial Revolution.

Keywords: Political Instability, Policy Uncertainty, Credible commitment, East India Company.

JEL Codes: N43, P16, D72

1 Introduction

Political instability is one of the major sources of poor governance and slow economic growth. The fragility of regimes and social unrest which follow from political instability are especially problematic for firms that partner with the government on developmental projects. Partnership often involves government subsidies to compensate firms for making investments. In times of political instability, these might be canceled or altered in ways that are difficult to predict. Partnering firms have an incentive to invest less or at least delay investments until they better understand the future. This paper gives new estimates of political instability's effects by studying the English East India Company. Its history offers a useful perspective because England experienced several contentious changes in power and fiscal crises during the Company's first 150 years of operation.

The English East India Company (or EIC) was founded in 1600 through a charter from the English monarchy. It was granted a monopoly over all trade between England and Asia. In return, it paid special import duties and served the monarch's interests by checking the influence of European rivals in Asia. The partnership worked well for both in the long-run, but it was on shaky ground for much of its early history. The lack of strong legal protections meant that the monarch could easily renegotiate the EIC's charter and extract its profits. On several occasions between 1600 and 1750 the EIC was forced to lend to the monarch or to pay bribes to retain its privileges. The English monarch also violated the monopoly by authorizing private traders to enter the EIC's market. One of these events even prompted the EIC's legal counsel to warn 'there can be no partnership with the King.'[1] The other major governmental actor, Parliament, also proved to be an unreliable partner. It helped

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[1] In 1624, the EIC suffered a military defeat by the Dutch East India Company. EIC directors expressed hope that King James I would seek reparations but they soon realized that the King would not assist them. Shortly thereafter King James I offered to become an investor and sail ships under the royal flag of England. The EIC's directors refused the offer. Their legal councilors advised 'the whole undertaking would revert to the Crown, since there can be no partnership with the King' (quoted in Scott 1912, p. 108).

to renegotiate the EIC's charter several times between 1694 and 1744.

This paper argues that political instability weakened the government's commitment to honor the partnership, and as a result the EIC invested less in shipping capital. Several renegotiation events and extractions followed changes in the monarchy, parliamentary elections, and moments of fiscal crisis. As I argue below fiscal crises weakened commitment by raising the monarch's utility from extraction. New monarchs and elections had similar effects because new governments suffered little loss in reputation by renegotiating a controversial charter granted by a previous government.

In order to study the effects on investment, I use a new annual series on EIC shipping capacity measured in tons. Shipping was the main activity of the EIC and its capacity was closely related to sales revenues and profits. An inspection of the series shows that capacity was lower during periods of known political instability. As a preview, figure 1 shows the EIC's shipping capacity (in log tons) from 1610 to 1760. Capacity is lower between 1630 and 1660 following a turn to greater absolutism under Charles I, the English Civil Wars, and the brief republican government. Capacity falls again between 1685 and 1715 when there was renewed controversy over the monarchy, the Glorious Revolution, and the 'Rage of Political Parties.'

The effects of political instability are more closely examined in the period from 1660 to 1760 where there is rich data to control for other factors affecting EIC capacity. I augment a standard reduced form investment model with variables for the government's deficit ratio, indicators for years with new monarchs, and years with elections to the House of Commons. They capture moments when political instability discontinuously rises either through fiscal crises or regime changes. Additional variables include EIC sales revenue, shipping costs, war, and the capacity of the EIC relative to its main rival, the Dutch East India Company. The main results point to negative effects of deficits, new monarchs, and elections on the growth of shipping capacity. The magnitudes are equivalent to an exceptionally large negative shock

Figure 1: Capacity and Periods of Political Instability in England, 1610-1760
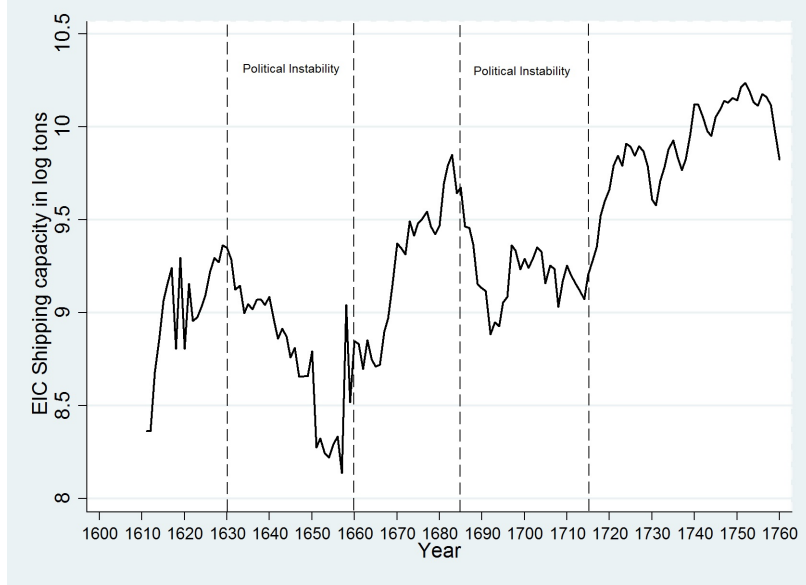
Source: see text.

to EIC sales growth.

Extensions to the baseline model further explore the mechanisms. One possibility is that the EIC invested less because of increased policy uncertainty, perhaps linked with regime changes and fiscal crises. Following the work of Baker et. al. (2013), I use the share of all books published in English which contain the words "East India" and "Company" in the title as an indicator of policy uncertainty. The idea is that publications about the EIC reflect increased discussion about its partnership and the value to the government and the economy. Consistent with an uncertainty effect, I find that a higher share of EIC titles lowered investment. However, I show that the estimated effects of deficits, new monarchs, and elections change relatively little when the share of EIC titles are added. This along with other findings suggest that regime changes and fiscal crises most likely raised the risks of extraction causing the EIC to invest less.

This paper contributes to several literatures. The first relates to the history of capitalism, where one prominent theme concerns politics and its relationship to early corporations.[2]

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[2]see North, Wallis, and Weingast (2009) for a general study.

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This paper builds on a number of studies which argue for a connection between instability and weak corporate performance.[3] It is one of the few in the historical literature to model and identify the effects of instability on investment.[4]

This paper also contributes to the literature analyzing British institutions in the 1600s and early 1700s. Much of the literature focuses on whether there was a commitment to protect property rights in land and government debt, but less has been said about rights granted to corporations.[5] The narrative and econometric evidence in this paper shows that the British government, including parliament, could not always make credible commitments during the seventeenth and early centuries. Political instability, emanating from contentious regime changes and fiscal crises, was the key problem.

Finally, this paper contributes to the broader literature dealing with political instability and uncertainty. One key issue is whether firm's investments are significantly affected.[6] This paper is novel because it offers evidence on one of the most important firms in history, and it analyzes the effects of different shocks on the same investment activity over a 100-year time span. Another closely related literature examines the effects of instability on public private partnerships or PPPs.[7] While the context was different, the EIC's partnership with the government shares many similarities with modern PPPs. Its history suggests that political instability is an important impediment to PPP investment, especially when there is an absence of formal institutions constraining the government.

The paper is organized as follows. Section 2 provides more background on the EIC and

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[3]See Scott (1912), Chaudhuri (1965, 1978), Horwitz (1978), Desai (1984), Stern (2011), Lawson (2014), and Bogart (2015) for works specifically on the EIC.

[4]see Haber et. al. (2003) for another example.

[5]See North and Weingast (1989) and Acemoglu, Johnson, and Robinson (2005) for discussions of commitments to protect property rights. Protections of corporate rights are discussed by Carruthers (1999), Broz and Grossman (2004), Bogart (2011), Cox (2012), and Jha (2015).

[6]There are a number of papers that focus on the aggregate effects of uncertainty, including Rodrick (1991), Alesina and Perotti (1996), Svensson (1998), Feng (2001), Henisz (2002), Bloom et. al. (2007), and Bloom (2009). For firm-level evidence see Leahy and Whited (1996), Julio and Yook (2012), Stein and Stone (2013), and Gulen and Ion (2015).

[7]See Newberry (2002), Guasch (2004), Laffont (2005) for overviews on PPPs, and see Guasch, Laffont, and Straub (2007) for an econometric analysis of instability and weak rule of law.

its partnership with the government. Sections 3 and 4 develop the theoretical and empirical frameworks for studying investment. Section 5 describes the data. Section 6 shows the results. Section 7 concludes.

2   Background

The English East India Company or EIC was founded to create trade with Asia.[8] Its business was based on meeting Asian demand for New World silver and Europe's demand for Asian spices and manufactured goods. EIC ships were loaded with silver and sailed east arriving in diverse locations across the Pacific, but mainly in India and China. After a period of time the ships would carry pepper, tea, and textiles to England and would arrive approximately one to two years after they originally left. EIC ships also operated in what was known as the 'country trade,' or trade within Asia. The country trade provided an alternative when the European trade was depressed and it served to enrich some of the EIC's employees in Asia.

Several European countries were competing for the Asian trade because it was profitable to merchants and it provided European monarchs with new tax revenues. The usual practice was to grant a company monopoly rights over all trade with Asia. The Portuguese monarch was the first to establish an East India Company in the 1500s. In 1600, Queen Elizabeth granted the EIC a monopoly over all trade between England and Asia. The Dutch Republic followed in 1602, founding the Dutch East India Company or VOC. Te French and Danish monarchs did the same.

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[8]For background on the EIC and its trade see Chaudhuri (1965, 1978), Carlos and Nicholas (1988), de Vries (2003, 2010), Bowen (2005), Stern (2011), Gelderblom, de Jong, and Jonker (2013), Lawson (2014), and Erickson (2014).

Table 1: East Asian bound Shipping Tonnage Among European Powers

Period	English	Dutch	Portuguese	French	Danish	Swedish	England % of Total
1581-90	0	0	55,419	0	0	0	0
1631-40	31,179	63,970	20,020	3000	4000	0	25.5
1681-90	47,879	130,849	11,650	17,500	4000	0	22.6
1731-40	67,880	280,035	13,200	53,891	12,267	7,368	15.6
1781-90	228,315	243,424	8,250	130,490	63,461	0	33.9
1820-29	859,090	178,000		168,180	22,770	6730	60.0

Source: De Vries (2003, pp. 46-49), Solar (2013, p. 649).

Table 1 reports the total shipping tonnages bound for Asia across European nations to show the relative positions. English shipping tonnage fell behind the Dutch in the seventeenth century and continued through the mid eighteenth century. The English take leadership after the 1780s, and continue to grow in market share over the following decades. After the mid eighteenth century the EIC gained territory in India, and part of its activity was devoted to the extraction of territorial revenues. This paper focuses on the pre-1760 period because the effects of political instability can be analyzed without the complexities of the structural change in its business model.

Readers may wonder why European monarchs favored monopoly over a competitive trade. While not the focus of this paper, it is useful to briefly state the reasons. First, monopoly entailed a valuable privilege which the monarchy could exchange for tax revenues or support. Early modern regimes were often weak and required the support of vested interests and extraordinary taxes. Second, monopoly privileges could be leveraged in times of crisis. European monarchs had difficulties borrowing and a privileged company could be held up for loans (Ashton 1960). Third, the Asian trade required investments in protection, like large ships and forts, because of the violence between Europeans and between Europeans and Asian rulers (Chaudhuri 1978, pp. 112-116). A monopolistic firm would internalize protection benefits more than competitive firms.

It is worth emphasizing that many contemporaries did not share the view that monopoly trading privileges in Asia had efficiency advantages. In *the Wealth of Nations*, Adam Smith

argued that the EIC monopoly mainly served to enrich its directors and employees. Smith was not alone as numerous writers and commentators argued for opening the trade. Historians have also questioned the value of the EIC monopoly for British and European economic growth more generally (De Vries 2010). I return to this issue in the conclusion.

2.1 England's political and fiscal institutions

It is useful to briefly review the state of institutions as they are linked with political instability. The Stuart monarchy started in 1603 after Queen Elizabeth died without an heir. The Stuart Kings, James I and Charles I, regularly disagreed with parliament over religious and fiscal issues. Their conflict culminated in the Civil Wars of the 1640s and the end of the monarchy. A republic was founded in 1653 under the protection of Oliver Cromwell. Cromwell's rule was contentious as he pursued many reforms in the church and government. When Cromwell died in 1658 there was a movement to restore the key features of Britain's monarchy. The Restoration of 1660 did that and returned the Stuarts to the throne. King's Charles II reign was fairly stable compared to previous decades. However, two issues became more problematic as his reign went on. First, wars with European powers were becoming more expensive and it was not clear how they would be financed. The King's budget deficit rose to 50% of annual revenues during the Second Anglo-Dutch war in 1667. Something close to a balanced budget was the convention until that time. The second issue concerned the influence of the Church of England, and the rights of other religions and sects.

Religious issues had greater prominence in the 1680s when it became likely that the Catholic-leaning James II would inherit the Crown. James II's reign (1685-88) proved controversial as he was opposed by the Whigs in parliament and the Protestant elite. James II was forced to abdicate because of an invasion by William of Orange in 1688. The so-called Glorious Revolution made William and Mary the new King and Queen, but under the proviso that parliament would have greater say in governing the country. The House of

Commons became the dominant body especially concerning fiscal and regulatory matters. The two political parties, the Whigs and Tories, emerged as the key groups controlling the Commons, but there was much disagreement between them. There were a series of public finance crises in the 1690s and 1700s due to war. Deficits rose to 140% and 180% of annual revenues. For the first time the monarch largely paid for war by large-scale borrowing. The costs remained large, and loans were not always voluntary as we will see.

English institutions remained uncertain as late as 1715 when the last Stuart heir, Queen Anne, died and the Hanoverian line assumed the monarchy beginning with King George I. Gradually the political system stabilized with most elites accepting the balance of power between the monarch and parliament and through compromises on religious issues (Plumb 1967). As a result, the monarchy passed to George II in 1727 and George III in 1760 with less controversy. The challenges of public finance continued through the eighteenth century however. The monarch and parliament had to innovate through new taxes, debt instruments, and other schemes in order to manage the large deficits caused by war.

2.2   The partnership with the EIC

The EIC was one of the early innovations designed to meet the monarch's pressing fiscal needs. For merchants, the EIC provided a business and legal organization necessary for a new trade. The original charter by Queen Elizabeth designated the EIC a corporate body with a governor, committees, and an assembly of shareholders; it granted a monopoly over all trade between the Cape of Good Hope and the straights of Magellan, it gave the Company rights to export bullion, and the use of six navy ships. The charter also specified the monarch's rights to collect duties on imports, to recall naval ships, and to forbid trade that impinged on the monarch's foreign policy. The charter had a term of 15 years, but it contained a clause that the monarchy could void the charter with two years notice if it was "not profitable to itself, its heirs and successors, or to the realm" (see Hill 1887).

While the charter covered many aspects of the partnership, it was incomplete. There were no clauses on how disputes over taxes and the monopoly would be resolved. Moreover, the contract was vague on what it meant for the trade to be unprofitable to the realm, and to what degree the monarch should support the EIC in foreign relations. Due to its incompleteness, the EIC's charter was renegotiated on several occasions. In 1609, King James I granted the EIC similar powers as the original charter but with an indefinite term rather than 15 years. The King retained the right to void the charter if it was deemed unprofitable. Subsequent charter renegotiation in 1657, 1661, 1669, 1674, 1677, 1683, 1686, 1693, 1694 dealt with various aspects of the EIC rights (Scott 1912). Some expand their powers. For example the charter of 1657 helped to reformulate the EIC as a joint stock company. But, many were accompanied by side payments or loans to the monarch. For example, in 1661 coincidental to getting a new charter the EIC gave King Charles II a silver plate worth £3,000 and his brother James, Duke of York, received £1,000. The charter of 1677 was accompanied by loans to Charles II of £150,000 over a three year period from 1676 to 1678.

It is important to note that many renegotiations followed a change in the monarchy or executive power. The 1657 charter came four years after Oliver Cromwell was named as Lord Protector. The 1661 charter followed the Restoration of King Charles II. The 1686 charter was enacted one year after the ascension of James II to the throne. The 1693 charter occurred four years after William and Mary assumed the throne with the Glorious Revolution. Also notable is that some renegotiation followed periods of war and fiscal strain. The 1669 and 1674 charters were made in the midst of the Second and Third Anglo-Dutch wars. It is possible that the EIC found it advantageous to renegotiate following regime changes and fiscal crises, but it is more likely that the monarch found them opportune moments to extract the EIC's profits. A table in the appendix lists all forced loans, bribes, and gifts made to the monarch. The long list shows that extractions were common.

The monarchy also leveraged threats by private traders known as interlopers. Interlopers petitioned to enter the EIC's market and thereby capture some of their profits. Interlopers often offered loans or political support as bribes. They also mounted what could be termed a 'media campaign,' publishing pamphlets denouncing the EIC. The EIC usually followed with its own bribes and publications touting its benefits. In the end the monarch usually sided with the EIC and against the interlopers, but the process was often protracted and costly to the EIC. A list of all documented challenges by interlopers is provided in an appendix table. Notably many occurred in times of political instability.

Two examples illustrate how challenges by interlopers resulted in transfers to the monarchy. The first occurred in 1681 when interlopers submitted a proposal to King Charles II for a new monopoly company. The interlopers were denied and the EIC was granted a new charter in 1683. Coincidentally, the EIC gave Charles II a £10,000 gift and promised to offer a similar payment every New Year's Day for the rest of his reign (Chaudhuri 1978).

The second case occurred in the early 1690s and also illustrates the links with regime changes. The EIC was a strong supporter of the former monarch, James II. A body of interlopers close to King William proposed a new company (Chaudhuri 1978, p. 429). The interlopers were ultimately denied and the EIC got a new charter. In the process, the EIC is reported to have paid more than £200,000 in bribes to the King and his advisers (Scott 1912, p. 155). The EIC also suffered large losses in value. Between 1685 and 1695 its assets declined from £3.2 million to £2.3 million, and its liabilities rose from £0.8 million to £1.1 million. Moreover the EIC's share price fell relative to the Dutch East India Company (VOC). In 1685 the EIC's share price was 95% of the VOC share price. It fell to 35% in 1691 and 16% in 1694.[9]

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[9]Assets, Liabilities, and share prices for the Company are taken from Scott, Constitutions and Finance, Vol II, pp. 123-128, 177-179. The Dutch share price data come from Lodewijk Petram, downloadable at: http://dare.uva.nl/document/201694 .

2.3 Parliament and the partnership

The partnership between the EIC and the government changed in the wake of the Glorious Revolution of 1688. The House of Commons made a famous declaration in 1694 that "all subjects of England have equal right to trade in the East Indies, unless prohibited by act of parliament" (see Desai 1984). As a consequence, parliament was subsequently involved in all future renegotiation involving the EIC. The monarch remained a key player, but it no longer acted alone.

Parliament was not always friendly to the interests of the EIC. The most famous attack in parliament came in the 1690s during a period of political instability. In 1697 King William desperately needed a war-time loan. The EIC offered £700,000 at 4% interest. An interloper syndicate offered £2 million at 8% interest with the expectation that they would get the EIC's monopoly. The interlopers were supported by the new Whig minister Charles Montagu. The Whigs had recently taken a majority in the Commons, which was bad for the EIC because it was closely linked with the Tories. King William sided with the Whigs and accepted the offer of the interlopers. An act of Parliament in 1698 authorized the formation of the 'New' East India Company and gave it monopoly rights over the Asian trade as of September 1701 (Scott 1912, pp. 165-68).

The Old Company began a lobbying campaign to re-establish its trading rights. It benefited from an election in February of 1701, in which the Whig party lost seats in the Commons to the Tories. In the following year, a merger was approved by the monarch and eventually led to the creation of the United East India Company. The merger received royal sanction in 1709 following a new loan £1.2 million to Queen Anne. At this point, the EIC had £3.2 million in capital, all of which was dedicated to government loans.

Together the monarchy and parliament renegotiated the terms of the EIC's charter on several more occasions. Acts in 1712, 1730, and 1744 guaranteed the EIC's monopoly

privilege for a fixed term ranging between 13 and 36 years.[10] While the EIC gained greater legal protections through acts, it had to make loans or gifts in return. In 1730 the EIC made a £200,000 contribution to the treasury. In 1744 it lent £1 million to King George II.[11] It is notable for our purposes that two renegotiation events were linked with fiscal crises and regime changes. The 1744 extension occurred toward end of the War of Austrian Succession when the monarch was running large deficits. The 1730 extension was three years after George II came to the throne, and was linked to a failed proposal by interlopers to gain its monopoly.

The history of the partnership between the EIC and the government reveals frequent renegotiation and extraction, often following regime changes and fiscal crises. The connection raises the possibility that political instability affected EIC investment. The following section develops the theoretical framework and motivates the empirical analysis that follows.

3   Theoretical Framework

The incentive to renegotiate the EIC charter is related to the commitment problem, well known in the theoretical literature.[12] The idea is that absent effective constraints, rulers have an incentive to extract profits from firms. Extraction undermines incentives for investment because the more a firm invests, the more profits it generates, and the more is extracted by the ruler. This section shows that in theory the commitment problem gets worse following a regime change if it lowers constraints. Commitment also weakens in fiscal crises if they raise the ruler's marginal utility from extracting.

Consider a three period model. In period 1, the EIC decides on the number of ships s

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[10]Renegotiation also occurred in 1773, 1781, 1784, 1793, and 1813. The most significant were Pitt's India Act (1784), which increased government control, and the Charter Act of 1813, which permanently ended the EIC's monopoly on trade to India.

[11]The EIC remained profitable during this period despite the forced loans. Dividends were generally around 8%, and the EIC was able to finance voyages and operations by issuing short term debt. See Chaudhuri (1978) for more details.

[12]See Person and Tabellini (2002, ch. 12) for a review of the literature on commitment problems.

to hire and send to Asia for trade. In period 2 the monarch decides whether to renegotiate the charter, and if so how much to demand in payments e from the EIC. If there is no renegotiation in period 2, then in period 3 the EIC's orders its s ships to return to England with cargo and it earns $\pi(s)$ profits, where $\pi(\cdot)$ is the profit function. With no renegotiation, the monarch extracts nothing from the EIC but it gets $u(g)$ where $u(\cdot)$ is the monarch's utility function from money and g is the monarch's ordinary tax revenue. If there is renegotiation in period 2, then the EIC decides whether to return its ships with their cargo. If the ships return the EIC earns $\pi(s) - e$ in profits. If ships do not return the EIC dumps the cargo in the sea and earns zero profits (dumping is relaxed later). If the EIC returns its cargo then the monarch gets $u(g + e) - f$ in utility, where f is the monarch's cost of renegotiating the charter. One component of f is the loss in reputation from violating the EIC's privileges. In the future firms will not invest as much and the monarch will lose revenues. Offsetting the reputation loss there may be political gains because the EIC was a controversial company. One could also think of structural components coming from the strength of checks and balances. If the monarch has to spend much time and resources convincing parliament or the courts that it has the right to renegotiate then f will be higher. Lastly, note that if the EIC dumps its cargo in the sea the monarch gets $u(g) - f$ in utility, in which case it extracts nothing but it still suffers the costs of renegotiating.

A few assumptions make the analysis easier. The profit function $\pi(\cdot)$ is assumed to be continuous and differentiable in s. It achieves its maximum at s^{max}, which is the number of ships the EIC would choose if there was no threat of extraction. I also assume that the utility $u(\cdot)$ is increasing and concave in g and e . The monarch always likes more money, but at a diminishing marginal utility. I also assume that if the monarch's expected utility from renegotiating and extracting is the same as not renegotiating, then it prefers not to renegotiate. This implies ties go in favor of honoring the charter.

The model is solved using backward induction. Suppose in period 3 there has been no

renegotiation and the EIC has hired s ships. The EIC will return its ships and earn $\pi(s)$. There is no reason to dump. If there is renegotiation the EIC returns its cargo only if $\pi(s) - e \geq 0$. If $\pi(s) - e < 0$ it is better to dump and earn zero profits.

In period 2 suppose the monarch decides to renegotiate. Its utility will be $u(g + e) - f$, which implies it will demand $e^* = \pi(s)$ in payments. Demanding less than $\pi(s)$ will lower the monarch's utility and demanding more than $\pi(s)$ will lead to dumping and a zero payment for the monarch. The monarch will choose to renegotiate in period 2 if its utility from renegotiating is strictly higher than not, or $u(g + \pi(s)) - f > u(g)$. Notice there is a minimum number of ships at or below which the monarch will not renegotiate. Let the minimum number s^{reneg} be defined by the equation $u(g + \pi(s^{reneg})) - f = u(g)$.

Turning to period 1, the EIC chooses its optimal shipping capacity s^*. The EIC will choose a capacity such that $s^* \leq s^{reneg}$ because otherwise it expects the monarch to demand $e^* = \pi(s)$ in payments and the EIC earns zero profits. There are two potential outcomes depending on the maximal capacity s^{max} under no threat of extraction. If $s^{max} < s^{reneg}$ then the EIC will choose $s = s^{max}$ because at any other capacity it earns lower profits by definition. If $s^{max} \geq s^{reneg}$ then the EIC will choose $s = s^{reneg}$ because it expects the monarch will not renegotiate and that it will earn profits $\pi(s^{reneg})$. The choice of ships is illustrated in figure 2 when $s^{max} \geq s^{reneg}$. The EIC invests in fewer ships and earns lower profits than if they faced no threat of extraction. If f or g increases then s^{reneg} will shift to the right in figure 2.[13] In other words, increasing the monarch's tax revenue and the costs of renegotiation raises the minimum number of ships at or below which the monarch will not renegotiate. Lower f or g has the opposite effect.

The connection between regime changes, fiscal crises, and investment can now be made.

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[13]The reason is that $\partial s^{reneg}/\partial f > 0$ and $\partial s^{reneg}/\partial g > 0$. To see this let $I = u(g + \pi(s^{reneg})) - f - u(g)$. By the implicit function theorem, $\partial s/\partial f = \frac{-\partial I}{\partial f}/\frac{\partial I}{\partial s} = 1/[\frac{\partial u(g+\pi)}{\partial \pi} + \frac{\partial \pi(g)}{\partial s}]$. The denominator is positive because $u(\cdot)$ is increasing in profits and $\pi(\cdot)$ is increasing in ships if $s \leq s^{max}$. Similarly $\partial s/\partial g = \frac{-\partial I}{\partial g}/\frac{\partial I}{\partial s} = [\frac{-\partial u(g+\pi)}{\partial g} + \frac{\partial u(g)}{\partial g}]/[\frac{\partial u(g+\pi)}{\partial \pi} + \frac{\partial \pi(g)}{\partial s}]$. The numerator is positive because of the concavity of $u(\cdot)$. The denomenator is positive as before.

Figure 2: EIC ships and profits under the threat of extraction
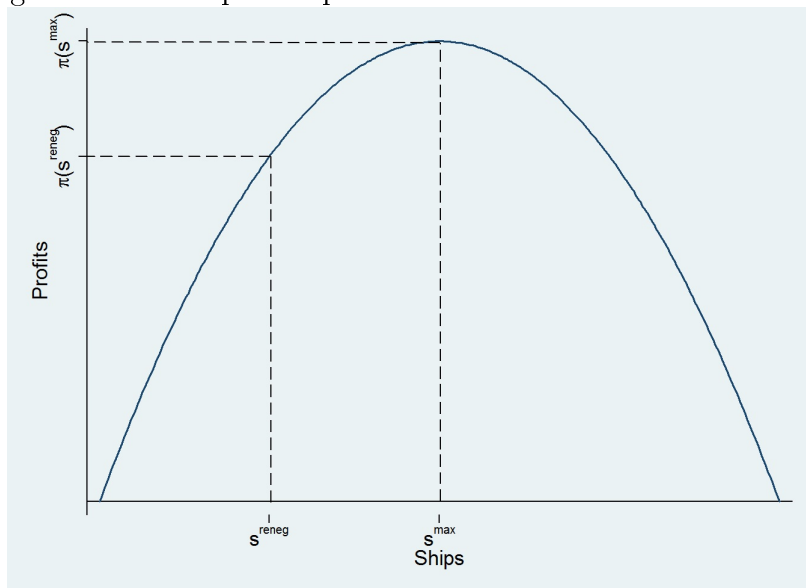
New monarchs and governments likely suffered less loss in reputation from renegotiating the EIC's charter because they could more easily argue the charter was no longer legitimate. New monarchs and governments could also gain more political support by renegotiating given the EIC was controversial. In either case, f will decrease after a regime change resulting in lower s^{reneg} and lower ships if $s^{max} \geq s^{reneg}$. The effects of fiscal crises follow a similar logic. These were times when tax revenues available for royal consumption declined significantly. As a result, g decreases, s^{reneg} decreases, and the EIC hires less ships as long as $s^{max} \geq s^{reneg}$.

3.1 Extensions

Two extensions of the model are useful for the empirical analysis. The first considers whether the EIC redeploys its existing fleet in response to regime changes and fiscal crises. Suppose that in period 1 the EIC has a fleet of ships s^f moving cargo from Asia to England. The existing fleet is assumed to be the EIC's best response to f and g in previous years. Now suppose there is a regime change lowering f. Let $s^{reneg} < s^f$ be the optimal number

of ships given the new environment, which implies that the EIC expects some extraction if it maintains operations. In the model above, there is nothing the EIC can do but dump its cargo, but now suppose the EIC can redeploy some proportion of its fleet to trade elsewhere, like the country trade. Suppose the EIC earns a profit $r(s)$ from redeployment, but that $0 < r(s) < \pi(s)$ for all $s < s^f$ and $r'(s) < \pi'(s)$ all $s < s^f$. In other words redeployment always earns less profits at the margin absent the threat of extraction. The main advantage of redeployment is that the monarch cannot extract profits from the country trade as it does not arrive in England. Thus when there is a regime change or fiscal crisis lowering f or g, the EIC will adjust its Asian-European fleet to $s^a = s^{reneg}$ and its redeployed fleet is $s^r = s^f - s^{reneg}$. The EIC's profit becomes $\pi(s^{reneg}) + r(s^f - s^{reneg})$. It exceeds the alternative of zero profits when the EIC maintains its Asian-European fleet at $s^a = s^f$, or $\pi(s^{reneg})$ if it dumps the cargo from $s^f - s^{reneg}$ ships. The main implication is that regime changes and fiscal crises may lead to the exit of ships from the Asian European trade due to increased risks of extraction. Following the same logic, the EIC might also choose to leave some of its ships idle, saving operating costs.

There is another extension that examines how regime changes and fiscal crises can affect investment by raising uncertainty. To develop intuition, imagine there is a regime change that creates uncertainty about whether the monarch's renegotiation costs are low or high. The new government might be less familiar to the EIC, or it may be difficult to predict how the new government will react to interloper demands and crises. As shown above, the EIC has an optimal investment response depending on whether renegotiation costs are low or high, but the problem is that the EIC may not know the costs when it invests. If the EIC decides to hire more ships and the monarch's cost of renegotiation turns out to be low then the monarch could extract all its profits. If it decides to hire few ships it will not be extracted, but in the event the monarch's cost turns out to be high, it will miss out on some profits.

The state of uncertainty is not likely to last and eventually the EIC learns whether the monarch's renegotiation costs are high or low. It can delay its investments until uncertainty is resolved and make the optimal choice. The problem is that it loses some profits during the interim. Depending on whether the EIC is sufficiently patient it may prefer to invest under uncertainty or delay until the uncertainty is resolved.

In the appendix I add uncertainty to the same model to illustrate its effects. I show that in the short-run, delays look like declines in investment. Note also that once the uncertainty is resolved investment should rise. The magnitude of the 'rebound' will depend on the revealed characteristics of the government and the state of their finances.

4 Empirical Framework

The correlation between lower EIC shipping capacity and extended periods of political instability was illustrated in the introduction. While suggestive, the effects need to be investigated more carefully by controlling for other factors influencing investment. Also as political instability is discontinuous across time, more is learned by analyzing the effects of regime changes or fiscal crises when instability rises. The error correction investment model provides a good baseline to examine EIC investment. It allows for flexible dynamics and adjustments of the capital stock to its long-run equilibrium.[14] A standard error correction specification adapted to shipping is given in equation (1):

$$\Delta k_t = \beta_1 \Delta y_t + \beta_2 \Delta y_{t-1} + \beta_3 (\Delta y_t)^2 + \beta_4 (y - k)_{t-1} + \varepsilon_t \tag{1}$$

where k_t is the natural log of shipping capacity in tons and Δ represents the difference in logged variables from year t to $t-1$. The dependent variable Δk_t approximates the growth of capacity in year t, and as I show below it is similar to a net investment rate. The first and second explanatory variables, Δy_t and Δy_{t-1}, are the log difference in company sales, or the

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[14]See Bond and Lombardi (2006), Bloom et. al. (2007), Fuss and Vermeulen (2008), and Stein and Stone (2013) for discussions of reduced form investment models.

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growth rates in the current year and the previous year. They are expected to have positive signs for two reasons. Growth in sales signals greater demand, and as the EIC financed investment out of retained earnings and borrowing, the growth in sales also lowered the cost of financing. The third variable $(\Delta y_t)^2$ is the square of the growth of sales, and captures a convex response. The fourth variable $(y - k)_{t-1}$ is the error correction term and equals the log difference in sales and capacity in the previous year. Its sign should be positive, or an upward adjustment in the capital stock when sales exceeds capital.

I add two structural variables which apply to the setting of EIC shipping. The first is the log of the per ton rental rate of shipping capacity in year t denoted r_t. From around 1660 the EIC hired ships owned by others. Under the so-called chartering system, the EIC would decide on the number of ships and tonnage to hire for the upcoming sailing season. The EIC would agree to pay a per ton freight rate for each ship's voyage plus an additional daily fee if the ship stayed in India beyond an agreed upon date. The freight rate was determined in part by supply and demand conditions in the British shipping sector. Thus when overall shipping demand was higher, freight rates should rise, and one would expect the EIC to hire fewer ships. Another factor noted by Chaudhuri (1993) is that freight rates reflected marine risks. In particular, they rose in times of war due to the risk of privateering. In the estimation, the per ton rental rate is lagged by one year $(t-1)$ in order to lessen the simultaneity problem between EIC demand for shipping and the determination of freight rates. The second added variable is the lagged log difference between EIC and VOC shipping capacity denoted $(k^{eic} - k^{voc})_{t-1}$. As the two company's were competitors the EIC's investments were likely higher when its capacity was much below the VOC. In such situations, greater investment by the EIC diminishes its capacity gap and would help to preserve or grow its market share.

For our purposes, the most important additions to the baseline model are variables for fiscal crises and regime changes.[15] $deficitratio_t$ is the ratio of government deficits to

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[15] I build on the policy uncertainty and investment literature which uses indicators for elections. See Julio

revenues. $newmonarch_t$ is 1 if the monarch changed in year t and 0 otherwise. $election_t$ is 1 if there was an election to the House of Commons in year t and 0 otherwise. The main specification analyzed below is given in equation (2).

$$\Delta k_t^{eic} = \beta_1 \Delta y_t + \beta_2 \Delta y_{t-1} + \beta_3 \Delta y_t^2 + \beta_4 (y - k^{eic})_{t-1} + \beta_5 r_{t-1} + \beta_6 (k^{eic} - k^{voc})_{t-1} +$$

$$\pi_1 deficitratio_{t-1} + \pi_2 election_t + \pi_3 newmonarch_{t-1} + \varepsilon_t \tag{2}$$

Notice that deficits and new monarchs are lagged one year as it takes time to observe and adjust investment plans. Elections enter in the current year because they were often known in advance and thus with adjustment lags they likely have contemporaneous effects on the growth of capacity. I also add a number of other control variables including dummy variables for each monarch or political party in power, indicators for years at war in Europe and India, and the tax revenue to GDP ratio in England.

There are several points regarding identification in equation (2). Changes in the monarchy are treated as exogenous because with one exception they were driven by the death of the previous monarch.[16] Elections are potentially endogenous because the monarch could call a new election whenever it was dissatisfied with the present government. One possibility is the monarch called elections when the economy was struggling and thus the timing of elections may be endogenous to unobservable factors that influenced EIC investment. Fortunately, there were laws mandating elections if the parliament extended beyond a time frame. Below I use these laws to identify elections whose timing was exogenous. Deficits are more problematic because they rose in times of war between England and European powers. The EIC's financing and supply chain was disrupted in war and demand was also depressed because taxes increased. Thus deficits could be correlated with unobservable variables that

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and Yook (2012, 2014) and Durnev (2010).

[16]The one exception is the Glorious Revolution where James II was forced to abdicate the throne. The results are similar when the Glorious Revolution change is dropped.

also influence shipping. I address this issue by including indicator variables for years at war with European powers as well as other controls for taxes. The aim is to see how the estimates for deficits change after purging the effects of correlated factors.

Several additional specifications are used to examine robustness. They include alternative investment series, and a specification with flexible timing including anticipation and lagged effects. I also explore the channels through which regime changes and fiscal crises affected investment. The investment rate in larger, more specialized ships and the exit rate of ships are studied using the same framework. Heterogeneity in the effects of regime changes are also examined. Lastly I include a proxy variable for policy uncertainty to examine its effects, but more importantly to see whether the estimates change for regime changes and fiscal crises. The following section describes the data, before turning to the estimates.

5   Data

The estimates of EIC shipping capacity are based on Sutton (1981) and Farrington's (1999) ship-level data. Sutton lists 1237 ships in the service of the EIC from 1600 to 1834, including the ship name, its tonnage, number of voyages, the first and last year of the season it set sail from Britain, and whether the ship had a special ownership status, like a private ship, or a New Company ship.[17] Farrington (1999) provides similar information but also includes the voyages of each ship, including all ports of call and the dates of arrival. I use both sources, but the baseline series is based on Sutton because of its consistency in dating voyages and tonnage.[18]

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[17]Sutton (1981) relies on Krishna (1924) to identify ships from 1601 to 1672. Krishna uses a variety of sources, but in the period under study here (1660-1673) two main sources are used: Home Miscellaneous Vol. 15 and Court Book 25a (see Krishna p. 332). For 1673 to 1790 Sutton uses information from Ship Book, East India Company Records Vol. II at the British Library. Note that when tonnage was missing in Sutton I estimated it using the average tonnage for ships that first sailed in that year.

[18]Dating is relevant because wind patterns meant that ships were outfitted in the fall and usually sailed in the winter and spring. Regardless of whether a ship sailed in December or January, Sutton dates the first or last voyage by the calendar year when the fall sailing season started. Thus one avoids assigning ships to December or January calendar years simply because of delays in outfitting or weather. Farrington's data can be organized by sailing season with additional work. Sutton also provides tonnage estimates for 98% of

The baseline shipping capacity series is based on the tonnage of each ship and years of activity, which is equal to the last year of sailing minus the first year of sailing. An example illustrates the calculation. The African was a 240 ton ship which first sailed from London during the season starting in 1660 and for the last time in the season starting in 1664. I record the EIC as employing the African's 240 tons in 1660, 1661, 1662, 1663, and 1664. The same procedure is repeated for all ships in the Sutton database excluding private and New Company ships in order to capture the investment of the incumbent EIC. In a robustness check below I include New Company ships to analyze investment by both companies in the period from 1697 to 1709.

Several points are worth noting about the distribution of tonnage across ships. Tonnage is disperse over the period from 1600 to 1760, but much tighter around 499 tons from 1710 to 1760 (see the appendix for kernel density estimates). There are two reasons. One is that ships got larger on average over time. Second, there was a requirement to employ a chaplain on ships over 500 tons and many EIC ships were registered just under 500 to avoid this regulation. The size of ships is significant because larger ships are more specific to the Asian trade as most coastal and Atlantic ships were under 300 tons.

There are two peaks in the distribution of years active around 1 year and 11 years. After 1710, the number of one-year ships falls and most average 11 years (see the appendix). One year ships were different from most other ships as they generally had lower tonnage. Also some ships were sent to Asia with the intention of never returning, and some are likely to be one-year ships because non-returning ships do not reoccur in the data.

The capacity series in log tons from 1610 to 1830 is shown in black in figure 3. In gray the yearly log difference is shown. It approximates the yearly growth rate of capacity, and will be the main investment variable in the empirical analysis. Notice that capacity growth exhibits high volatility in the mid 1600s and around 1700. Higher volatility matches the

Figure 3: EIC shipping capacity and growth of capacity, 1610-1830
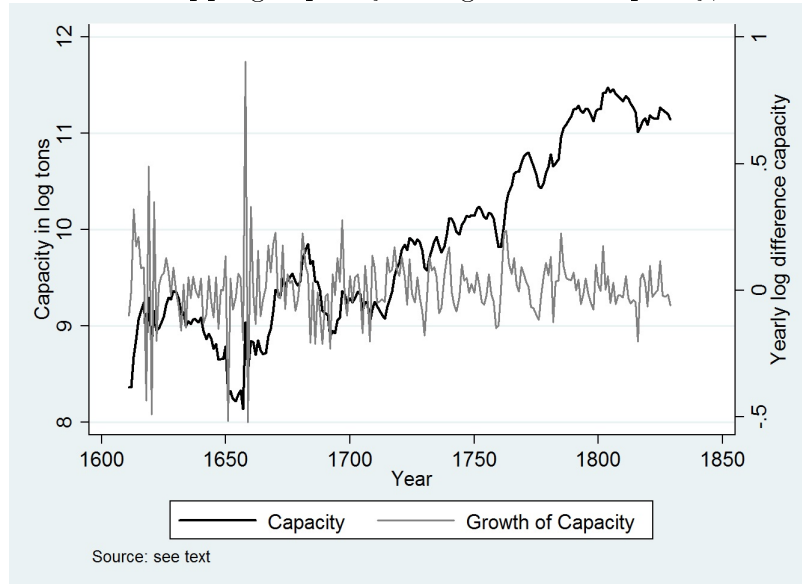
Source: see text.

periods of political instability noted earlier.

I create several alternative series to explore robustness. 'Net investment' is calculated as the difference between the tonnage of ships sailing for the first time, and the tonnage of ships that sailed for the last time in the previous year. I divide net investment by the stock of tonnage in the previous year to get the rate. The net investment series is further decomposed into an investment rate, the tonnage of ships sailing for the first time divided by the existing stock of tonnage, and an exit rate, the tonnage of ships that sailed for the last time in the previous year divided by the stock. I also calculate the net investment rate restricted to ships over 300 tons.

More series are constructed by combining Sutton and Farrington. Detailed voyage level data is the main value added from Farrington. I match ships in Sutton with Farrington to identify those with long gaps between arriving in Britain and sailing again to Asia. Their idleness might be influenced by political or fiscal events. The idleness adjusted capacity series is otherwise similar to the baseline series except that if a ship is idle for a sailing

the ships, while Farrington provides tonnage data for 83% of ships.

season, then its tonnage is not counted for that year.[19] Lastly, I calculate the growth of capacity after adding ships that are in Farrington but missing in Sutton.[20]

A summary of the investment series between 1661 and 1760 is shown in table 2. The baseline yearly log difference in capacity has a mean of 0.010 which implies an average growth rate of approximately 1.0%. The other investment series exhibit a similar average but with different standard deviations in some cases. Most series are highly correlated with the baseline, with the exception of the investment rate and exit rate.

Table 2: Summary statistics for investment series

Variables					Correl.
	Mean	Stand. Dev.	Min.	Max	w/ baseline
Yearly log diff. in capacity, baseline	0.010	0.104	-0.231	0.276	1.00
Net investment rate	0.015	0.105	-0.194	0.318	0.99
Investment rate	0.144	0.088	0	0.402	0.65
Exit rate	0.128	0.080	0	0.344	-0.58
Net investment rate, large ships	0.017	0.098	-0.203	0.318	0.94
Yearly log diff. in capacity, including NC ships	0.010	0.105	-0.231	0.356	0.93
Yearly log diff. in capacity, with utilization	0.010	0.145	-0.408	0.539	0.87
Yearly log diff. in capacity, with Farrington	0.010	0.145	-0.408	0.577	0.86
N					99

Sources: see text.

5.1   EIC sales and freight rates

There is a published annual series on the EIC's sales which can be matched with the tonnage data. Chaudhuri (1978) provides yearly EIC revenues from imports to Britain and exports to Asia. Chaudhuri's import series covers 1664 to 1760 and the export series covers 1660 to 1760. I sum them to get a series on sales revenues from 1664 to 1760, and I use Broadberry et. al. (2011)'s GDP deflator to construct a constant price sales series. For the

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[19]First, I identified all ships in Sutton with more than two years between voyages on average. I then matched all ships in Sutton with Farrington. If a returning ship did not sail the next season, then the ship was classified as idle. A similar procedure is used for each following season to classify idleness until a ship sails again.

[20]The combined Farrington and Sutton capacity series is not necessarily better. Farrington reports more ships in the EIC service, but Farrington is more conservative in stating tonnage. Thus there may be less error using Sutton's estimates which are better on tonnage.

four years from 1660 to 1663 I use an index of export revenues to estimate sales revenues. Complete data on EIC sales before 1660 is lacking, and constructing such a series requires strong assumptions. Therefore, in the empirical analysis below I focus on the period from 1660 to 1760, where sales and shipping capacity overlap. In the appendix, the sales and capacity series are shown from 1660 to 1760. As one might expect, a close relationship between sales and shipping tonnage is exhibited throughout.

Chaudhuri (1993) provides a series on the per ton freight rate paid by the EIC. Chaudhuri's series starts in 1676 and continues to 1760. For 1660 to 1676 Krishna (1924) provides approximate figures for freight rates. I merge Krishna's figures and interpolate for 13 missing years.

5.2   Dutch Company Capacity

The shipping records of the VOC are very detailed and have been complied by Bruijn, Gaastra, and Schöffer (1979).[21] I create a series for the shipping capacity of the VOC which is similar to the EIC based on the tonnage of ships sailing. The Dutch ship-level data contains dates of all sailings. I assign the dates of first and last sailings to the season to ensure comparability with the Sutton data. A figure in the appendix shows the evolution of capacity for the two companies. Consistent with the earlier figures for European shipping to Asia, the VOC pulled ahead in the seventeenth century.

5.3   Political regimes and fiscal data

The identity of the monarch and dates when the monarch changed are taken from standard political histories of Britain (Holmes 1993, Holmes and Szechi 1993). The same sources also identify years with elections to the House of Commons. The years with new monarchs and elections are shown in figure 4. There were 6 changes in the monarchy and 22 elections from 1660 to 1760. Notice that both are more common in the period of instability between 1685

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[21]Bruijn et al.'s data are now available through http://resources.huygens.knaw.nl/das/index_html_en

Figure 4: New Monarchs and Elections, 1660-1760
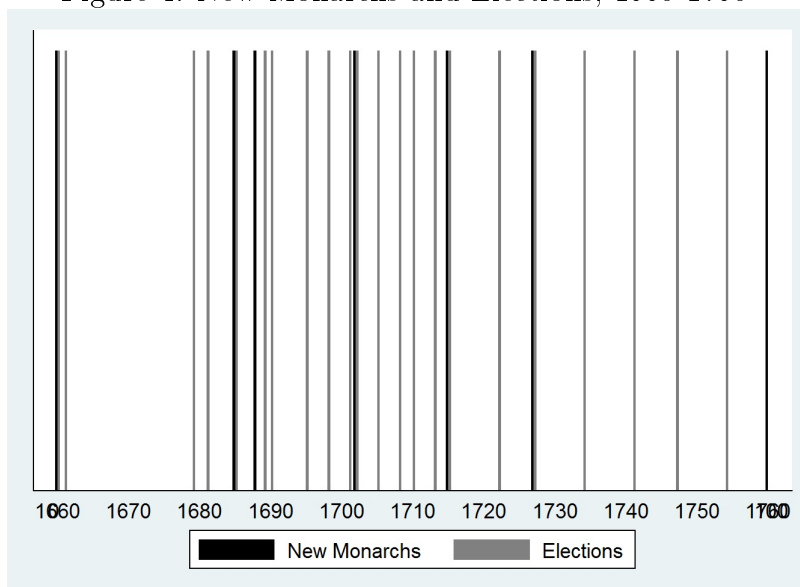
Source: see text.

and 1715.

The Triennial Act in 1694 and the Septennial Act in 1716 required elections at least every 3 and 7 years respectively. I code an election that was mandated by the Triennial Act or Septennial Act if there were three legislative sessions since the last election from 1694 to 1715 and seven legislative sessions since the last election from 1716 to 1760. Before 1694 there were no mandated elections.

The identity of majority party in the Commons and elections that changed the majority party are also coded. Drawing on the standard histories of parties (Holmes 1993, Cruickshanks, Handley, and Hayton 2002), I create indicator variables for years with Whig or Tory majorities and match majority party changes with elections. Note that the era of the 'Court' party in the 1660s and early 1670s is the omitted majority party indicator.

The deficit ratio, defined as (expenditure-revenue)/revenue, is available for Britain from 1661 onward (see Dincecco 2011). Figure 5 shows the movement of deficits with each European war. The dates of European wars are taken from the standard histories of Britain listed above. The deficit ratio is close to 0 in years of peace, and large and positive in years

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Figure 5: Deficit Ratios and Wars, 1661-1760
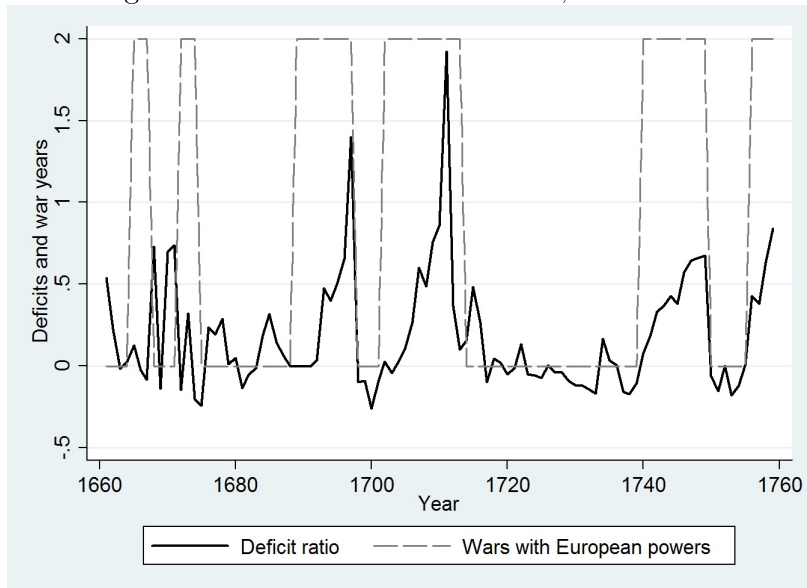
of war. From 1690 to 1750 the deficit ratio progressively rises with each year of war and peaks between 0.6 and 1.8 in the final years of war.

5.4 Media measure of policy uncertainty

Recent studies have used newspapers articles on the economy as an indicator for uncertainty in the US economy (Baker et. al. 2013). I follow this approach and use counts of the number of publications with East India and Company in the title. The English Short Title Catalog identifies the titles of all printed works from the 1500s through 1800.[22] Titles containing EIC vary in content but many advocate a policy change or the maintenance of the status quo. A particularly clear example is from an anonymous writer in 1730: "A scheme for raising £3,200,000 for the service of the government, by redeeming the fund and trade now enjoy'd by the East-India Company, and reserving to the publick an annuity of 96,000 l. for the disposition of parliament." Another from 1721 has the same emphasis on policy: "To the

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[22]For the English Short title Catalog see http://estc.bl.uk. There were clearly some titles that referred to the same work but had slightly different words or characters. I dropped duplicates.

Figure 6: Percentage of publications with East India Company in Title, 1660-1760
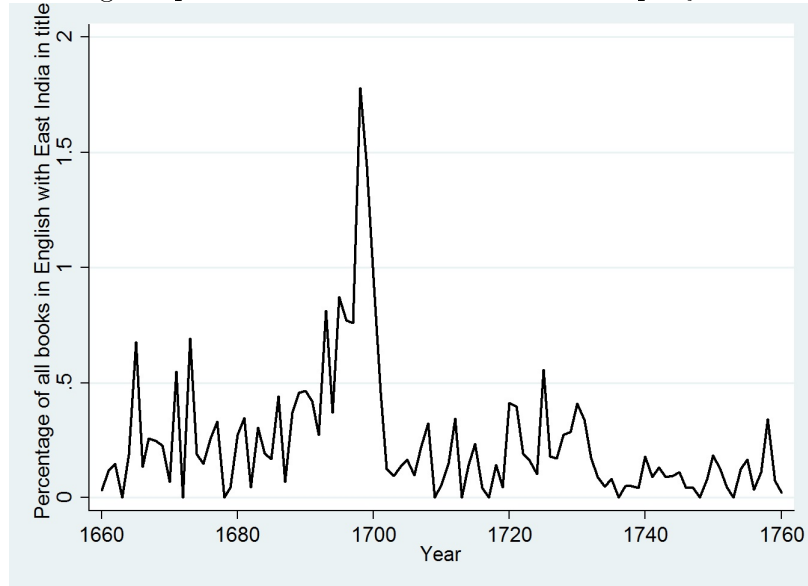
Right Honourable House of Lords. The humble petition of merchants and traders of Great Britain, and others interested in the Bank, East-India, or South-Sea Company, sufferers by the fall of the stock."

I scale the number of EIC titles by the total number of books printed as there was an upward trend in publishing. Figure 6 shows that EIC books are a relatively high percentage of the total in the 1660s and again in the 1690s. The peak year is 1698 which is when the New East India Company was founded. The coincidence with likely periods of uncertainty suggests EIC book titles contain useful information.

5.5   Additional Variables

Several other variables are created which could potentially influence the growth of shipping capacity. One is an indicator for years with military conflicts in India involving the EIC or the British army. Indian military conflicts are identified from Riddick's (2006) chronology of British India. The ratio of government tax revenues to GDP is created as an additional

measure of fiscal capacity. The series on tax revenues is taken from O'Brien and Hunt (1993) and is available from 1600 onward. It includes the sum of direct taxes (mostly land), indirect taxes (customs and excise), earnings from the mint, and earnings from Crown assets. Loans are not included. I use Broadberry et. al. (2011)'s GDP series to create the ratio. Summary statistics for all the explanatory variables in the model are shown in table 3.

Table 3: Summary Statistics for explanatory variables

Variables	Mean	Stand. Dev.	Min.	Max	N
Panel A: Sales, Capacity, and freight Variables					
Yearly log difference in sales	0.019	0.342	-1.578	1.088	99
(Yearly log difference in sales)^2	0.117	0.324	0.000	2.490	99
Ln EIC Sales - Ln EIC Tonnage	4.114	0.495	2.030	4.826	99
Ln EIC tonnage - Ln VOC Tonnage	-1.283	0.293	-1.819	-0.533	99
Ln per ton freight rate	3.355	0.282	2.843	4.011	99
Panel B: Regime Change and Fiscal Variables					
Deficit Ratio	0.187	0.363	-0.263	1.924	99
New Monarch	0.060	0.239	0	1	99
Election	0.202	0.403	0	1	99
Election (mandated)	0.091	0.289	0	1	99
Panel C: Regime Variables					
Reign of James II (1685-87)	0.030	0.172	0	1	99
Reign of William & Mary (1689-1701)	0.141	0.350	0	1	99
Reign of Anne (1702-14)	0.131	0.339	0	1	99
Reign of George I (1715-26)	0.121	0.328	0	1	99
Reign of George II (1727-1760)	0.333	0.473	0	1	99
Years with Whig Majority	0.616	0.488	0	1	99
Years with Tory Majority	0.212	0.411	0	1	99
Panel D: Additional Controls					
Tax to GDP Ratio	0.069	0.023	0.020	0.099	99
War in Europe or America	0.424	0.496	0	1	99
First year of War in Europe or America	0.060	0.239	0	1	99
War in India	0.202	0.403	0	1	99
Panel E: Uncertainty variable					
Percentage of EIC titles	0.119	0.156	0	1.047	99

Sources: see text.

6 Results

6.1 Baseline Model

I begin with the main specification shown in equation (2). Throughout Newey-West standard errors are reported to address heteroskedasticity and auto correlation. I use four lags following the convention $n^{0.25}$ applied to 99 observations. The standard errors are similar using 3 lags or when using only heteroskedastic-corrected standard errors. Column (1) in table 4 reports estimates for all elections along with deficits, new monarchs, and the main structural variables. New monarchs have a negative and significant effect. Deficits have a negative effect, but the coefficient is not statistically significant. Elections have zero effect. Column (2) reports estimates from a specification that includes only mandated elections, but is otherwise similar to (1). The election variable is now larger in magnitude and has a significant negative effect. Thus the results suggest some endogeneity from all elections, and for the remainder of the paper I use mandated elections only. Regarding the other variables, most of the results are the same.

The results in column (1) and (2) also show that sales have several effects on investment. There is a positive effect from higher contemporaneous sales growth and its square implying that investment increases in a convex manner with sales growth. The positive sign on the lagged level of sales minus capacity points to an adjustment process where investment increases if the previous years sales were high relative to existing capacity. The results also show a negative effect on lagged EIC capacity relative to VOC capacity. This result implies that the EIC increased its investment when its capacity was low relative to its main competitor. Lastly, the results in columns (1) and (2) show that a higher freight rate in the previous year lowered investment, which makes sense if the freight rate captures the rental cost of capital.

Table 4: Baseline regression results

Variable	(1) Coefficient (Stand. Err.)	(2) Coefficient (Stand. Err.)	(3) Coefficient (Stand. Err.)
Deficit ratio t-1	-0.032	-0.035	-0.057
	(0.024)	(0.027)	(0.033)*
New monarch t-1	-0.083	-0.085	-0.067
	(0.032)**	(0.031)***	(0.030)**
Election t	-0.004	-0.072	-0.070
	(0.025)	(0.038)*	(0.039)*
Growth in EIC Sales t	0.144	0.145	0.138
	(0.021)***	(0.020)***	(0.024)***
Growth in EIC Sales t-1	-0.029	-0.021	-0.039
	(0.016)*	(0.016)	(0.029)
(Growth in EIC Sales t)^2	0.103	0.104	0.114
	(0.026)***	(0.026)***	(0.026)***
Ln (EIC Sales t-1/EIC Tonnage t-1)	0.074	0.077	0.129
	(0.016)***	(0.016)***	(0.035)***
Ln (EIC tonnage t-1/VOC Tonnage t-1)	-0.075	-0.078	-0.132
	(0.034)***	(0.031)***	(0.060)***
Ln (Freight rate t-1)	-0.088	-0.083	-0.005
	(0.032)**	(0.032)**	(0.079)
Mandated elections only	No	Yes	Yes
Additional Controls	No	No	Yes
N	99	99	99
F-Stat	11.45	12.48	9.27

Notes: Newey West Standard Errors with four lags are reported. *, **, *** indicates statistical significance at the 10%, 5%, and 1% level respectively. The controls in column 3 are all lagged one year, and include dummy variables for each monarch, the party in power, years of war in India, years of war in Europe, the first year of war in Europe, and a variable for the ratio of tax revenues to GDP.

Specifications (1) and (2) are parsimonious but they may omit important factors, like regime effects associated with each monarch. It could also omit a channel for wars in Europe and India. The specification in column (3) adds several control variables described in the data section and in the notes to table 4. The results reported in column 3 show that the addition of more controls increases the estimated negative effect of deficits to the point that the variable is significant at the 10% level. Once the effects of wars and taxes are purged, deficits are shown to negatively influence EIC investment. In (3) the effect of new

monarchs diminishes but still remains significant. Here the coefficient changes because of the addition of the monarch indicator variables. As one would expect, monarchs differed to some degree in their policies and capabilities and so transitions in the monarchy differ to some degree depending on the previous monarch. There is one other finding of note in column 3. The negative effects of freight rates disappear once the additional controls are added. This suggests that variation in freight rates mainly reflected marine risks associated with war, taxes, and political regimes.

In terms of magnitudes, the estimates in column 3 imply that new monarchs reduced EIC capacity by 6.7% and that elections reduced capacity by 7.0%. In periods of war the deficit ratio increased by an average 1.2, which according to the estimates would lead to a reduction in capacity by 6.8% How large are these effects? Considering that the average growth rate of capacity is 1%, and allowing for adjustment effects given that capacity falls relative to sales by 7%, it would take approximately 5 years of average growth for capacity to recover from a regime change or fiscal crisis.[23] Another useful comparison is with the effects of sales growth. A decrease in sales growth of 32% (one-standard deviation below the mean) would reduce capacity by 3.2% after accounting for convexity in the relationship between investment and sales growth.[24] Thus regime changes and fiscal crises were equivalent to an exceptional negative shock to sales growth.

The effects of regime changes and fiscal crises are also large in comparison to most of the control variables. The estimates reported in the appendix show that entry into European wars is the only significant control variable. Capacity growth is 9.2% higher one year after a war in Europe began. Other years of war have no impact conditional on all the other variables. The temporary positive effect from European wars is perhaps surprising. One

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[23]If capacity falls by 7% then the adjustment effect implies that in the next year tonnage should grow by 0.074*0.07 log points or 1.5%.

[24] The effect of a 32 percent decline is sales growth is 0.138*-0.32 +0.114*(-0.32)*(-0.32)= -0.032

conjecture is that the EIC anticipated more risks for their ships and thus they invested more at the start of a war to protect their cargo and fleet.

Also noteworthy is the finding that all regime variables are insignificant. Whig or Tory majorities do not lead to different outcomes compared to the pre-1679 period where the Commons was run by a coalition of court interests. None of the monarchs after Charles II (1660-1685) is associated with a higher average growth in capacity. Thus the results suggest that on average political regimes did not significantly differ from one another in terms of the overall policy environment. Only regime changes significantly mattered.

6.2 Robustness I: alternative investment series

The results are further examined in a series of robustness checks. The first group makes adjustments to the Sutton capacity series after adding new company ships from 1697 to 1701, after incorporating idleness of capacity, and after adding ships missing in Sutton that are included in Farrington. The results for deficits, new monarchs, and elections are reported in table 5. In column (1) the addition of New Company ships lowers the magnitude for new monarchs, but it remains sizable. The most likely reason is that the transition to Queen Anne in 1702 coincided with a period of competition between the two companies. The results in column (2) show that the magnitude for elections and new monarchs increases if idleness is incorporated. As I argue above keeping ships idle from the inter-continental trade was another mechanism for reducing the risks of extraction following a regime change. In column (3) the combined Farrington and Sutton series is used. The results are nearly identical to the Sutton only series.

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Table 5: Alternative Capacity Growth Series

Variable	(1) New Company ships added Coefficient (Stand. Err.)	(2) Ship idleness incorporated Coefficient (Stand. Err.)	(3) Missing ships in Farrington added Coefficient (Stand. Err.)
Deficit ratio t-1	-0.062	-0.071	-0.064
	(0.023)**	(0.044)	(0.029)**
New monarch t-1	-0.046	-0.088	-0.059
	(0.027)*	(0.039)**	(0.028)**
Election t	-0.062	-0.099	-0.070
	(0.030)**	(0.044)**	(0.035)**
Mandated elections only	Yes	Yes	Yes
Sales, capacity, freight rate variables	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes
N	99	99	99
F-Stat	21.1	10.76	11.74

Notes: Newey West Standard Errors are reported. *, **, *** indicates statistical significance at the 10%, 5%, and 1% level respectively. The additional controls are listed in table 4.

Another set of specifications examines investment rates. Column 1 in table 6 uses the net investment rate as the dependent variable and finds similar results for elections, new monarchs, and deficits. These results are to be expected as the net investment rate is very similar to the growth of capacity. Column 2 has the net investment rate for large ships only (more than 300 tons). The results indicate that the magnitudes for deficits, new monarchs, and elections are all lower. These findings suggest that the effects of regime changes and fiscal crises are not as significant for the most specialized investments, large ships. In other words, the main effect of regime changes and fiscal crises was not to reduce more irreversible investments. Below I discuss this issue more when considering the role of uncertainty.

Columns 3 and 4 report specifications that use investment rates and exit rates as the dependent variable. They show a negative and significant effect of deficits and elections on the investment rate but not the exit rate. It appears these variables affect the addition of new tonnage but not the exit of tonnage. The opposite is true of the new monarch variable

as there is a positive effect on the exit rate, although not statistically significant. The last result suggests that in part the EIC responded to new monarchs by scrapping ships or by redeploying them to other trades. As I argue above, such actions were an alternative mechanism for sheltering profits from the monarch.

Table 6: Net investment rates

	(1)	(2)	(3)	(4)
	all ships	large ships	all ships	all ships
	Net invest rate	Net invest rate	Invest rate	Exit rate
	Coefficient	Coefficient	Coefficient	Coefficient
Variable	(Stand. Err.)	(Stand. Err.)	(Stand. Err.)	(Stand. Err.)
Deficit ratio t-1	-0.059	-0.049	-0.070	-0.011
	(0.033)*	(0.028)*	(0.025)***	(0.029)
New monarch t-1	-0.065	-0.043	-0.008	0.057
	(0.031)**	(0.027)	(0.032)	(0.036)
Election t	-0.070	-0.057	-0.060	0.009
	(0.037)*	(0.032)*	(0.028)**	(0.026)
Mandated elections only	Yes	Yes	Yes	Yes
Sales, capacity, freight variables	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes
N	99	99	99	99
F-Stat	8.38	12.47	11.02	9.08

Notes: Newey West Standard Errors are reported. *, **, *** indicates statistical significance at the 10%, 5%, and 1% level respectively. The additional controls are listed in table 4.

6.3 Robustness II: Flexible timing and dynamics

The previous models impose a timing structure on EIC investment decisions. They do not allow for anticipation effects from elections in the coming year. They also rule out rebound effects where investment rises two or three years after the new monarch or increase in the deficit. I use the following specification with flexible timing to consider these effects:

$$\Delta k_t^{eic} = \sum_{j=0}^{3} \beta_j \Delta y_{t-j} + \eta(\Delta y_t)^2 + \gamma(y - k^{eic})_{t-1} + \vartheta(k^{eic} - k^{voc})_{t-1} + \sum_{j=0}^{3} \alpha_j r_{t-j} +$$

$$\sum_{j=0}^{3} \kappa_j deficit_{t-j} + \sum_{j=0}^{3} \lambda_j newmonarch_{t-j} + \sum_{j=0}^{2} \mu_j election_{t+1-j} \qquad (3)$$

Sales growth Δy_t and the log of freight rates r_t are included contemporaneously and for 3 yearly lags. The same is done for deficits and new monarchs. An indicator is included for elections one year forward $t + 1$, the current year t, and the following year $t - 1$. The square of sales growth, the error correction terms, and the relative capacity of the EIC and VOC are included only once as before. The point estimates are shown graphically along with 95% confidence intervals in figure 7. Consistent with earlier results, capacity falls by 8.5% in the year of an election, by 9.9% in the first year after a new monarch, and by 8.3% in the year after the deficit ratio rises to one. Notably there is no increase in investment two or three years after new monarchs. There is a slight increase in investment two years after an increase in the deficit, but it is not large in magnitude or significance. With regard to elections there is no significant decrease in investment in the year before an election, or in the following year. Thus the dynamics show no anticipation or rebound effects. This finding goes against the view that regime changes and fiscal crises worked primarily through uncertainty assuming that uncertainty was resolved in one year. If so then investment should rebound in the years following a new monarch, election, or rise in the deficit. There is no such effect.

6.4   Extensions I: Heterogeneity

This section examines whether regime changes had heterogeneous effects. One possibility is that investment decreased by varying amounts depending on the length of the previous regime. Another possibility is that investment decreased by a different amount if elections resulted in a new majority party. I test these for heterogeneous effects by including an interaction between new monarchs and a variable for the previous monarch's reign in years. I also include indicators for elections that resulted in a new majority party. The specifications are otherwise identical to the baseline model reported in column 3 of table 4.

Column (1) in table 7 examines the longevity of monarchs. The results show a negative

Figure 7: Coefficient Plot for Flexible Timing Specification
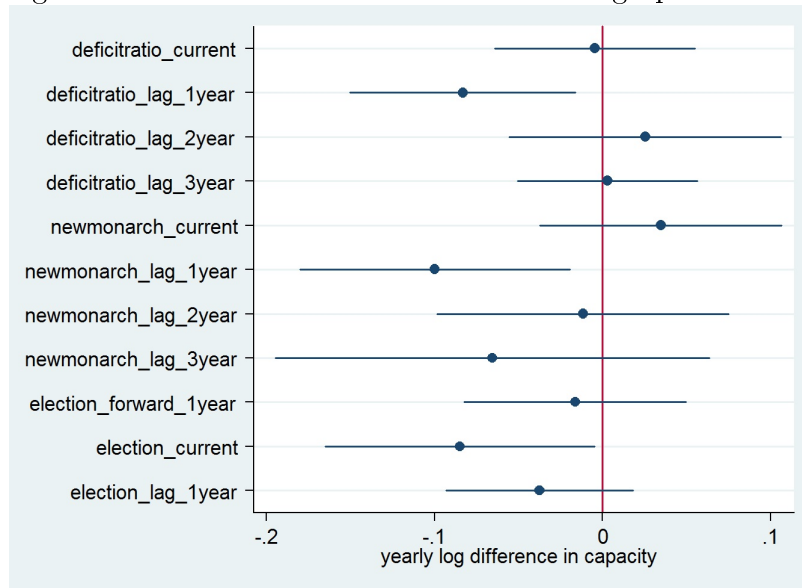
Source: see text.

interaction effect between new monarchs and a long-lived predecessor. The estimates imply that if the previous monarch's reign was 7 years or less there was no negative effect from the regime change. If the previous monarch's reign was 15 years then capacity would fall by 10%. One potential reason is that the costs of renegotiating the EIC's charter were lower for a new monarch that had a long-lived predecessor. Perhaps the previous monarch renegotiated with the EIC many years earlier making the current charter seem 'out of date' in the eyes of the courts and parliament.

Column (2) adds elections changing the majority party in the year prior and the year the election occurred. The main new finding is that investment is significantly lower in the year prior to an election which changed the majority party. One explanation is that the EIC anticipated a new majority party in the Commons and expected greater potential for extraction due to the new government.

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Table 7: Heterogeneity in regime changes

Variable	(1) Coefficient (Stand. Err.)	(2) Coefficient (Stand. Err.)
New monarch t-1	0.0987	0.198
	(0.052)*	(0.068)***
New monarch t-1 * reign previous monarch	-0.013	-0.019
	(0.003)***	(0.004)***
Mandated election t+1		0.025
		(0.042)
Mandated Election t	-0.073	-0.066
	(0.039)*	(0.040)
Election, change party t+1		-0.081
		(0.038)**
Election, change party t		-0.022
		(0.031)
Sales, capacity, freight rate variables	Yes	Yes
Additional controls	Yes	Yes
N	99	99
F-Stat	34.0	30.09

Notes: Newey West Standard Errors are reported. *, **, *** indicates statistical significance at the 10%, 5%, and 1% level respectively. The additional controls are listed in table 4.

6.5 Extensions II: the uncertainty channel

Many of the results above suggest that regime change and fiscal crises affected investment by raising the risks of extraction. Another possibility is that regime change and fiscal crises lowered investment by raising uncertainty. There are some doubts about this mechanism based on the absence of a rebound effect and the smaller impact on investment in large ships shown earlier. This section provide additional evidence that uncertainty operating through other factors. It uses a media-based measure of policy uncertainty, the percentage of EIC book titles. If the effect of new monarchs, elections, and deficits diminishes once EIC titles are added then this would suggest that the former operated in part through an uncertainty channel.

I examine the effects of uncertainty by running the same regression as the baseline, but

now adding the share of EIC titles lagged one year. The results are reported in column 2 of table 8. For comparison column 1 shows the baseline coefficients without EIC titles. The coefficients on new monarchs, elections, and deficits decline, but not to a large degree. Thus these variables are not entirely masking the effects of the policy uncertainty variable. With regard to EIC titles, the coefficient is negative and significant. A one standard deviation increase in EIC titles lowers capacity by 3.1%. This last finding suggests that policy uncertainty was an additional factor affecting the EIC's investment. Moreover, since EIC titles were highest in years of instability, policy uncertainty could be interpreted as an additional channel through which instability affected investment.

Table 8: Regression results with EIC titles

Variable	(1) Coefficient (Stand. Err.)	(2) Coefficient (Stand. Err.)
Deficit ratio t-1	-0.057	-0.073
	(0.0333)*	(0.028)**
New monarch t-1	-0.067	-0.054
	(0.030)**	(0.032)*
Election t	-0.070	-0.066
	(0.039)*	(0.040)
Share of EIC titles t-1		-0.201
		(0.075)***
Mandated elections only	Yes	Yes
Sales, capacity, freight rate variables	Yes	Yes
Additional Controls	Yes	Yes
N	99	99
F-Stat	9.27	11.81

Notes: Newey West Standard Errors are reported. *, **, *** indicates statistical significance at the 10%, 5%, and 1% level respectively. The additional controls are described in table 4.

7 Conclusion

This paper studies the investment of the East India Company (EIC) during its first 150 years. It argues that political instability associated with regime changes and fiscal crises

weakened the government's commitment, and resulted in less investment. In part, regime changes weakened commitment because new governments suffered little loss in reputation by renegotiating a controversial charter granted by a previous government. Fiscal crises played a similar role by raising the monarch's need for revenue.

This paper makes several contributions. First, it contributes to the broader literature on instability, policy uncertainty, and investment by providing new evidence from an important firm over a long time span. Second, this is the first paper in the historical literature on the EIC to construct comparable time-series on investment and model Company behavior. Third, concerning British institutions it argues the British monarch and even parliament could not make credible commitments to controversial entities like the EIC during the seventeenth century and early eighteenth century. Changes in formal institutions following the Glorious Revolution, did not offset the effects of greater political instability.

Readers may wonder whether the commitment problem with the EIC hindered Britain's economic growth. The answer is not clear. The EIC was not regulated in the public interest for most of its history. The mark-up on Asian goods was high and declined little over the eighteenth century. It is conceivable that investments by the EIC generated few benefits to the broader economy, especially in the short-run. That said, easing the commitment problem for other government sanctioned monopolies does appear to be important for Britain's growth. As time went on the government partnered with numerous authorities providing trading and transport infrastructure. Their legacy is seen in Britain's huge stock of ships, harbors, roads, canals, marketplaces, and railways by the mid nineteenth century. In most cases, they were prevented from exercising too much monopoly power and their investments were probably more growth enhancing. The EIC's history is useful because it strongly suggest that British corporations of the nineteenth century would have been far less successful had they operated in the political instability of the seventeenth and early eighteenth century.

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8 Appendices

8.1 List of forced loans, extractions, and challenges by interlopers

All forced loans involving the EIC from 1600 to 1760 are listed in appendix table 1. There were forced loans in 12 separate years between 1641 and 1744. The frequency was greatest in the mid-seventeenth century, but the largest loans happened in 1698, 1708, and 1744. The repayment of forced loans was least likely before 1660. For three out of the four loans from 1641 to 1660 the Company suffered a loss in principal. One example occurred at the close of Charles I's reign in 1641. The King forced the EIC to hand over its stock of pepper which was valued at £63,283. The so-called 'pepper-loan' was to be repaid in four installments. The Company recovered around £21,000 by the late 1640s, but at this point Charles I was executed and the Monarchy was abolished. The remainder of the pepper loan was only partly recovered in the 1660s (Foster 1929 p. 463).

Appendix table 1		Forced Loans
Year	Amount	Description
1641	£63,283	Charles I forces Company to give its pepper stock. £31,500 unpaid
1643	£6,000	Loan to Committee of Navy in Long Parliament. Payment unknown
1655	£50,000	Loan to Council of State. £46,000 unpaid
1659	£15,000	Loan to Council of State. Canceled at Restoration
1662	£10,000	Loan to Charles II. Payment unknown
1666	£50,000	Loan to Charles II. Repaid in 1667
1667	£70,000	Loan to Charles II. Payment unknown
1676	£40,000	Loan to Charles II. Repaid in 1678
1678	£110,000	Loan to Charles II. Repaid in 1679
1698	£2,000,000	Loan to William by New East India Company. Redeemed in 1793
1708	£1,200,000	Loan to Anne. Redeemed in 1793.
1744	£1,000,000	Loan to George II. Redeemed in 1793.

Source: see Bogart (2015) for details.

Besides forced loans there were other instances where the government extracted revenues from the EIC. Appendix table 2 lists the major cases of 'fiscal extraction'. Customs duties on East India goods were raised on several occasions from 1636 to 1703 often under the threat of its privileges being renegotiated. From 1660 to 1695 it was common for the Company to offer gifts to the King. For example, a large gift was made to King George II's treasury in 1730 following a threat from interlopers.

Appendix table 2	Fiscal Extractions
Year	Description
1620	James I demands £20,000 payment following the Company's capture of Ormuz
1636	Duties on pepper imports increased by 70%.
1660	Gift of £4000 to Charles II and James II at Restoration
1681-88	Annual Gift to King of 10,000 guineas
1685	Additional duty of 10% on imports of Indian linens and silks
1690	Additional duty of 20% on East Indian imports
1692	Tax on 5% on value of Company's stock
1692-95	Gifts to King and Bribes to MPs estimated at £200,000
1697	Additional duty of 5% on imports of Indian linens and silks
1703	Additional duty of 5% on imports of Indian linens and silks
1730	Payment of £200,000 to government to renew charter

Source: see Bogart (2015) for details.

Appendix table 3 lists all known instances where interlopers petitioned to enter or where the government authorized their entry from 1600 to 1760.

Appendix Table 3	Interloper challenges to the monopoly
Year	Description
1604	James I gives charter to interlopers to trade in Asia.
1607	James I gives interlopers license to discover Northern passage to Asia.
1617	James I gives Scottish East India Company charter to trade in Asia
1635	Charles I gives Courteen Association license to trade in Asia.
1637	Charles I gives Courteen Assoc. charter to trade in places with no EIC factories
1649	Assada Adventurers appeal to Council of State for voyage to Asia.
1658	Richard Cromwell gives interloper license to trade in Asia
1681	Interlopers linked to Whigs petition Charles II to form a rival joint stock company
1689	Interlopers led by Papillion petition William to dissolve EIC and incorporate new.
1695	Act of Scottish Parliament gives Darien Company license to trade in Asia .
1698	Act of Parliament authorizes new East India Company with monopoly trading rights.
1730	Interlopers petition Commons to form company licensing trade to India for a fee.
1758	Tea dealers petition Treasury for licenses to import tea from China

Source: see Bogart (2015) for details.

8.2   Theoretical appendix: Uncertainty channel

The following framework illustrates the EIC's decision whether and how much to invest under the uncertainty from a regime change.[25] I focus on uncertainty over the costs of renegotiation

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[25]See McDonald and Siegel (1986), Caballero (1991), Rodrick (1991), Dixit and Pindyck (1994) Abel and Eberly (1994), and Bloom et. al. (2007) for theoretical models on uncertainty.

but there could also be uncertainty about the monarchs tax revenues g following a fiscal crisis which will produce similar results. Suppose that in period 1 the EIC has an opportunity to hire ships and it believes with probability p the renegotiation cost will be f^l and with probability $1 - p$ the cost will be f^h, where $f^l < f^h$. Intermediate values of p like 0.5 are meant to capture the most uncertainty. The reason is that in period 2 the probability p becomes 0 or 1 and the variance disappears. Supposing that the EIC knew the monarch's costs with certainty its optimal number of ships would be s^l when $f = f^l$ and s^h when $f = f^h$. In each case it earns just enough profits not to be extracted. To simply notation let the EIC's profits under certainty be denoted π^l and π^h, corresponding to $\pi(s^l)$ and $\pi(s^h)$.

It can be shown that if the EIC hires ships in period 1 it will choose either s^l or s^h.[26] If it chooses s^l it earns π^l no matter what happens. If it chooses s^h it earns π^h with probability $1 - p$ and zero with probability p because all its profits get extracted when the renegotiation costs are low. Deciding between these two choices the EIC will hire s^l ships if $\pi^l \leq (1 - p)\pi^h$ and otherwise it will hire s^h ships. Rearranging terms implies it will hire s^l if the probability p exceeds some threshold $p^l = 1 - \frac{\pi^l}{\pi^h}$. Less ships is preferable if the probability of the bad state (low renegotiation costs) exceeds the relative difference between high and low profits.

The EIC also has the choice to delay in period 1, learn the costs of the monarch, and then hire ships in period 2. At that point the EIC will choose its optimal number of ships s^l when $f = f^l$ and s^h when $f = f^h$. From the perspective of period 1, the option value of delaying investment is the discounted expected profits that the EIC will receive, or $\beta p \pi^l + \beta(1 - p)\pi^h$, where β is the time discount factor. Notice there is an assumption here that the EIC has the same investment opportunity in period 2. Also investment is irreversible so that if ships are hired in period 1; they cannot be scrapped at full value and hired again in period 2. Both of these assumptions appear reasonable as the EIC was a monopoly and its sailings were largely irreversible. The qualification is that ships could be redeployed at some loss in profits as I argued above.

Drawing on the theory of investment under uncertainty, the EIC will choose to hire ships in period 1 if the expected profits at that time exceed the option value from delaying. As its expected profits in period 1 depend on p, π^l, and π^h there are two different scenarios. In scenario 1, $p \geq p^l$ and the EIC's expected profits are π^l because it never gets extracted. It can be show that the expected profits π^l are higher than option value of delaying $\beta p \pi^l + \beta(1 - p)\pi^h$ if and only if the probability p exceeds some threshold $p^{dl} = \frac{\beta \pi^h - \pi^l}{\beta \pi^h - \beta \pi^l}$. I refer to the threshold as p^{dl} because it marks the probability at which the EIC shifts from delaying to hiring s^l in

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[26]The expected profits are π^l if $0 < s \leq s^l$, $(1 - p)\pi^h$ if $s^l < s \leq s^h$, and 0 if $s^h < s$. Thus they are maximized at two ship choices: s^l or s^h

Figure 8: Investment in EIC ships under uncertainty
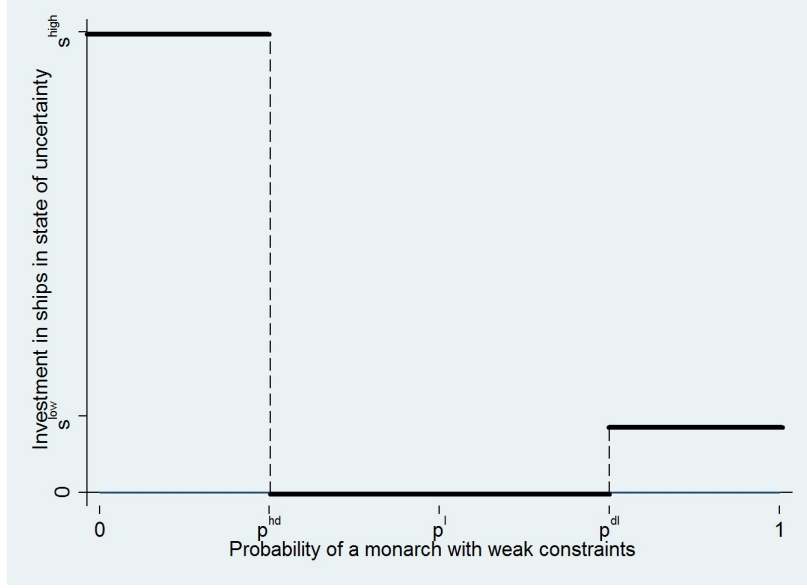
period 1. Notice that p^{dl} rises with higher values of β. Delaying becomes more attractive with greater patience all else equal. In scenario 2, $p < p^l$ and the EIC's expected profits are are $(1-p)\pi^h$. The expected profits are higher than the option value if and only if $p < p^{hd} = \frac{(1-\beta)\pi^h}{(1-\beta)\pi^h - \beta\pi^l}$. Here the threshold probability for delaying as opposed to investing in more ships increases with higher values of β.

Fixing the values of π^l and π^h there are different investment outcomes in period 1 across two or three regions for the probability. The three region case occurs when the EIC is sufficiently patient that delaying becomes a strategy. Otherwise it always invests low or high numbers of ships in period 1.[27] Figure 10 illustrates the three region case. For probabilities $p < p^{hd}$ the EIC will invest in the higher number of ships in period 1. Going with more ships is preferable because the bad state (low renegotiation costs) is unlikely. For $p^{hd} < p < p^{dl}$ the EIC does not invest in period 1 and delays its decision to period 2. Here the level of uncertainty is high so there is value in delaying. For $p \geq p^{dl}$ the EIC invests in low numbers of ships in period 1 because the bad state is likely.

8.3   Additional results

Appendix table 4 shows the estimates for the additional control variables from table 4.

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[27] There is a third region if $p^{dl} > p^l$. After rearranging this occurs when $\frac{\pi^l\pi^h}{2\pi^h\pi^l - (\pi^l)^2} < \beta$ or when patience is high.

Appendix table 4: Estimates for Controls

Variable	(1) Coefficient (Stand. Err.)	Variable	(2) Coefficient (Stand. Err.)
Reign of James II	-0.030	Whig Majority t	0.038
	(0.059)		(0.053)
Reign of William & Mary	-0.075	Tory majority t	0.028
	(0.068)		(0.064)
Reign of Anne	-0.110	Tax to GDP ratio t-1	-0.964
	(0.086)		(1.55)
Reign of George I	-0.040	War in Europe, t-1	0.044
	(0.071)		(0.041)
Reign of George II	-0.048	War in Europe, First Year, t-1	0.092
	(0.062)		(0.037)**
Reign of George I	-0.040	War in India, t-1	-0.024
	(0.071)		(0.028)
		Constant	-0.604
			(0.330)*
N			99
F-Stat			9.27

Notes: Newey West Standard Errors are reported. *, **, *** indicates statistical significance at the 10%, 5%, and 1% level respectively.

## 8.4 Figures for key variables

The following graphs show kernel density estimates for the tonnage and years of activity for EIC ships, a comparison of the log of EIC sales (gray) with the log of EIC capacity (black), and a comparison of the log of EIC capacity (black) with the log of VOC capacity (black).

Figure 9: Kernel Density Estimates for Tonnage of EIC ships in Sutton, 1660-1760
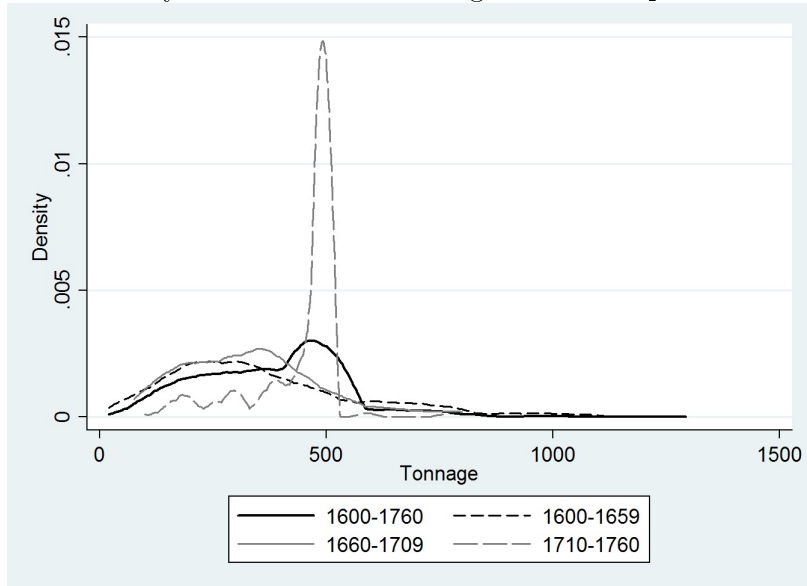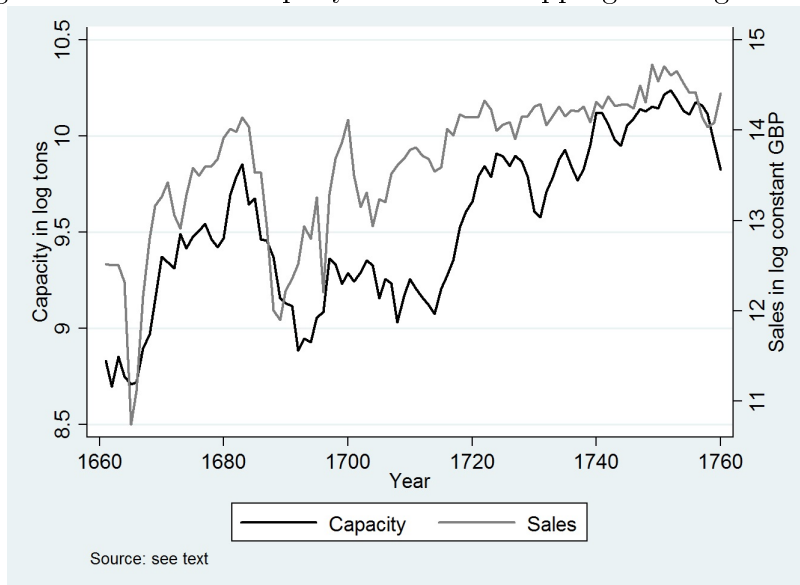

Source: see text.

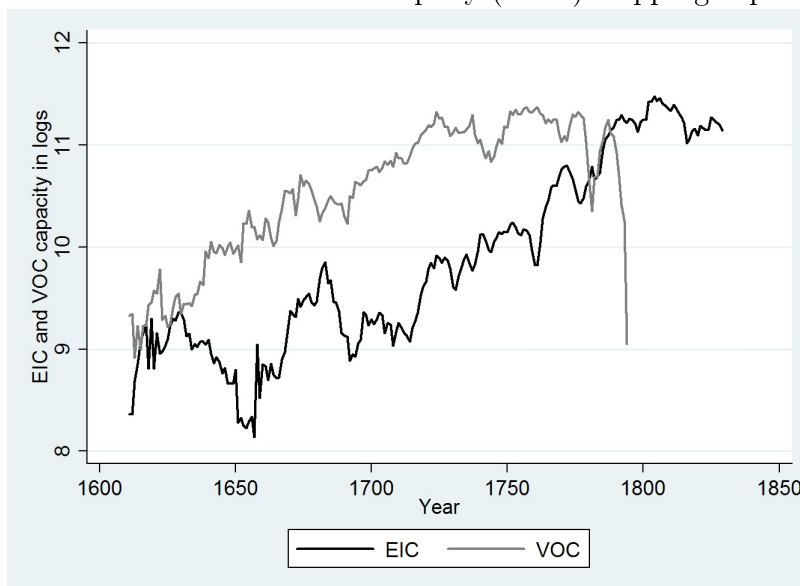Figure 10: Kernel Density Estimates for Years of Activity EIC ships in Sutton, 1660-1760
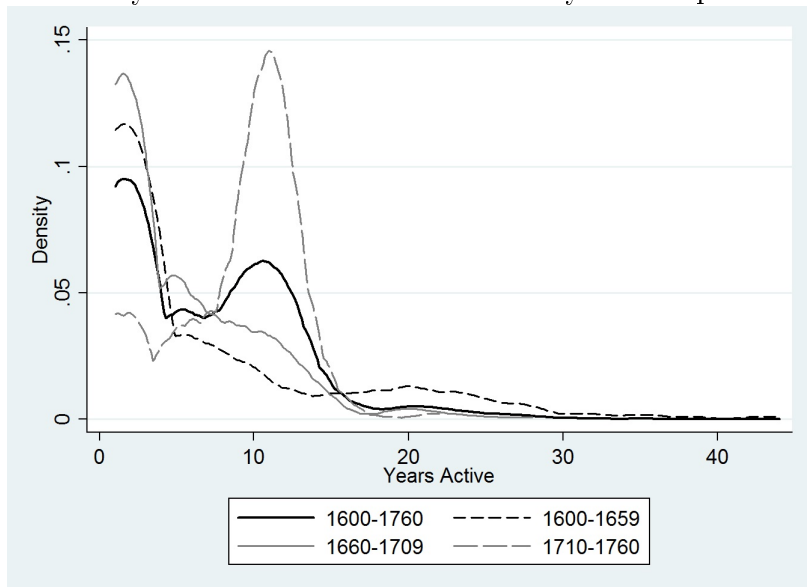
Source: see text.

Figure 11: English East India Company Sales and Shipping Tonnage in Logs, 1660-1760

Source: see text.

Figure 12: EIC and Dutch East India Company (VOC) shipping capacity, 1610-1830

Source: see text.