

# Pragmatic Politicians, Adaptable Rights, and London's Expansion during the Industrial Revolution

## Abstract

London's eighteenth-century expansion required the reorganization of rights for large tracts of land. This property previously lay within equitable estates and agricultural villages. Removing property from these restrictive legal regimes proved problematic. Parliament catalyzed the process by passing acts reorganizing rights to land and resources. Two theories characterize Parliament's behavior during this period. The first views Parliament as an organization that limited access to acts in order to earn rents for themselves or to advance the interests of aristocrats. The second views Parliament as an enlightened institution, in which pragmatic politicians sought to promote the common good according to theories of government spreading at the time. We test these theories using time-series statistical methods and annual data on the number of acts passed by Parliament and the property market in Middlesex, the county surrounding London. The results are consistent with the conjecture of a pragmatic Parliament.

Dan Bogart

Assistant Professor of Economics, University of California at Irvine

Gary Richardson

Associate Professor of Economics, University of California at Irvine  
Research Fellow, National Bureau of Economic Research.

## **Section 1: Introduction**

Britain's eighteenth-century industrialization was a transcendent event. Explanations of the phenomenon emphasize Anglo-Saxon society's unique institutions, including the common law, constitutional monarchy, parliamentary democracy, and Protestant principles. Debate continues concerning the relative importance of these factors. Property rights remain a popular explanation. Changes in property rights coincided with the onset of industrialization. Between 1700 and 1830, Parliament passed thousands of acts reorganizing rights to land and resources. These acts facilitated improvements in infrastructure, authorized sales and leases of land, lowered the costs of transactions, and reallocated resources to more profitable uses (Bogart and Richardson 2008a, Bogart and Richardson 2008b). The process proved particularly important on the periphery of urban areas, whose expansion consumed large tracts of land previously locked within equitable estates and manorial arrangements.

London is an example. Between 1700 and 1830, London became the largest city in the world. London's population grew from 575,000 to 1,655,000. The expansion of the city consumed much of the land within the counties of Middlesex and Surrey. Doing so frequently required the passage of Parliamentary acts reorganizing rights to property.

What inspired Parliamentary passage of acts facilitating London's growth? Scholars debate this question. One school of thought holds that the leadership of the House of Lords and Commons limited the number of acts that it passed in order satisfy political and personal goals. Limiting access to acts increased their value, providing opportunities for extracting wealth, either indirectly through political 'contributions' or explicitly as outright corruption. Limiting access to acts may also have served the interests of the aristocratic classes, who controlled parliament, and used that institution to advance their class interests. In this view, the political system constrained

development, because constraining development was in the interests of those who controlled Parliament.

A competing view is that Parliament responded rapidly to landowners' desires to reorganize property rights. Parliament operated as a pragmatic institution. Parliament approved reasonable requests presented by private parties without trying to extract rents or expecting remuneration.

These competing views have different implications for patterns that should appear in the data that we have gathered from archives in the United Kingdom. Our first type of data consists of all acts passed by Parliament. We convert this data into a time series indicating the number of estate acts affecting property in Middlesex each year. This time series (for convenience refer to it as *acts*) indicates Parliament's decisions about reorganizing rights. A second type of data consists of deed registries. These registries report all property transactions – such as sales, leases, subleases, mortgages, conveyances, etcetera – for all property in Middlesex. We convert this data into an index indicating changes in the volume of transactions each year. This time series (for convenience refer to it as *deeds*) reveals the economy's influence on the London property market (Belcher, Cottrell, and Sheppard 1979). The two time series cover the years 1705 to 1830.

If the first conjecture – that Parliament restricted access to acts – is correct, then Parliament's decisions concerning acts should have constrained the public's demand for deeds. The public would possess some property that they wished to reorganize and put on the market, but which they could not subdivide and sell, because Parliament did not permit them to do so. Relaxing the political constraint would have permitted the public to engage in transactions which they wished to conduct. These transactions would generate documents which would be reported

in the registries of deeds. Statistically, increases in the series *acts* should generate increases in the series *deeds*.

If the second conjecture – that Parliament passed acts rapidly and without extracting rents – is correct, then Parliament’s decisions would not constrain the property market. Whenever the public desired to reorganize rights and put property on the market, they would approach Parliament, get an act, and do as they desired. In this case, changes in the desire for transactions would induce individuals to approach parliament, which would show up in our data as additional acts. Statistically, increases in the series *deeds* should generate increases in the series *acts*.

A statistical procedure exists for exploring this type of reciprocal relationships between time-series. The test asks whether changes in one time series consistently precede changes in another time series, after controlling for factors systematically influencing the paths of the intertwined series including past values of both series. If the answer is “exogenous changes in one time series consistently precede changes in the other time series,” then economists say the series that moves first “Granger causes” the other series.

Our analysis indicates that the series *deeds* Granger caused the series *acts*, but *acts* do not Granger cause *deeds*. This finding appears to be robust. Deeds Granger-cause acts even when we control for economic variables, like the volume of trade and the real interest rate, and for political variables, like war, elections, changes in the size of the majority party in Parliament, and changes in the identity of the Prime Minister. Placebo groups composed of private acts that do not alter property rights suggest our results do not arise for spurious reasons.

This statistical result is consistent with the view that Parliament was a pragmatic and responsive institution. The Granger-causality results suggest that as the property market increased, and landowners or property developers had a greater demand for estate acts, the

political system responded by supplying acts. By contrast the Granger-causality results suggest that Parliament was not extracting rents by restricting access. If this were the case then a positive shock to the political supply of estate acts should have enabled some landowners locked-out of the system to obtain Acts and then register deeds. Our results suggest there was no such response to political shocks indicating that lock-out was not common.

## **Section 2: Data Sources**

The data come from two principal sources. Information about estate acts comes from a database describing all acts of Parliament passed between 1600 and 1830. An earlier essay (Bogart and Richardson 2008) introduces this evidence. The database indicates for each act the clerical title, calendar year, regal year, and parliamentary session. Clerical titles summarize acts in paragraphs. Clerical titles reveal an array of information including the legal actions and economic transactions that acts authorize, the property rights that acts change, and the geographic location of the land that acts affect.

Our analysis focuses on the economic, geographic, and chronological information. During the years 1692 to 1830, Parliament passed 130 acts authorizing the sale of strictly-settled land in Middlesex County (excluding London) and 120 acts authorizing the lease of strictly-settled land. The sum of acts authorizing sales and leases indicates the total number of estate acts each year. This time series may exclude some relevant acts. Our database lacks geographic information for some acts, and a small number of these may have been in Middlesex. The missing observations might bias our conclusions if the missing information pertains to particular periods. We test for this possibility by regressing an indicator for omitted information on a vector

indicating ten-year intervals from 1710 to 1830. This exercise indicates after 1750, the omission of geographical information appears to have been random.

The dating of acts of Parliament also deserves discussion. For most of our sample period, a convention dated all acts passed by a session of Parliament as if they passed on the opening day of the session. This convention lingered from an earlier era when Parliament met infrequently at royal request and handled a limited volume of business in a short time period. Our data comes from the eighteenth and nineteenth centuries, when Parliament met annually. Sessions began in the fall, usually in the months of October, November, or December; lasted throughout the winter; and adjourned in the spring. Estate bills were usually introduced late in the winter and passed late in the spring. Thus, estate acts which our dataset labels as passing in year  $t$  (e.g. 1733) were actually introduced as bills in the early months of year  $t+1$  (e.g. 1734) and passed near the middle of that year. We account for the timing of estate legislation by adding one to the variable indicating the year in which an estate act passed.

Information about the property market comes from the Middlesex deeds registry. In 1708, Parliament required deeds pertaining to all property transactions in Middlesex County to be registered with an official clerk. The registries recorded sales, leases, conveyances, mortgages, assignments, and an array of other transactions concerning land. The registries have survived in entirety and include thousands of volumes. Belcher, Cottrell, and Sheppard (1979) report the number deeds registered annually from 1709 to 1914. The trio of authors argues that the number of registrations reflects the scale of building activity in the region surrounding London. The trio shows that the number of registrations rose when building activity increased, and the number of registrations fell when the pace of construction contracted. Belcher, Cottrell, and Sheppard's annual series serves as our measure of property-market activity in Middlesex.

To confirm the accuracy of Belcher, Cottrell, and Sheppard's annual count, we analyze the Middlesex deed registries for the years 1725, 1775, and 1825. Our analysis illuminates the types of transactions that the deeds recorded. Table 1 indicates the percentage distribution of these transactions. There is a fairly even distribution across types of deeds reflecting the broad nature of contracts in Middlesex.

<Table 1>

A set of standard sources provides economic and political variables. Larry Neal (1990) provides the nominal interest rate, measured as the yield on long-term government bonds, known as 2½% consols. Gregory Clark (2001) provides the consumer price index, from which we construct a rate of inflation and the real interest rate. Holmes (1993), Holmes and Szechi (1993), and Evans (2001) indicate years with Parliamentary elections, years when a new prime minister assumed office, the percentage of seats in the Commons held by the majority party, and years when wars began and ended.

### **Section 3: Methods**

At the outset we described two hypotheses about the behavior of Parliament with respect to estate acts. One is that Parliament restricted access to Acts in order to satisfy political or extractive ends. Another is that Parliament was responsive to the demands of individuals and provided an open forum for rearranging property rights. These two hypotheses are illustrated in figure 1. The shaded area in panel A shows the set of land that has entered the market and would be registered through deeds. The dashed line shows the boundaries on the set of land that the political system will allow to enter the market through estate Acts. In this scenario Parliament is more than responsive to the demand of landowners and property developers. In Panel B the dashed and the shaded area coincide and are smaller than before. The lightly shaded area

characterizes land for which it is profitable to enter the market but it cannot because the political system will not allow estate acts to be passed for these properties. In this second scenario Parliament is restricting access to estate acts, perhaps because it wants to extract rents.

The diagrams are useful in analyzing the effects of shocks to supply or demand. We begin with Panel A where Parliament is responsive. First, suppose that the dashed line shifts outward corresponding to an exogenous increase in the land for which Parliament is willing to change property rights. In this case there is no more land which will enter the market because the demand has already been satisfied and there will be no increase in deeds. Second suppose that in Panel A the shaded area expands because of an exogenous increase in the property market. There is an immediate increase in acts because the set of land for which Parliament is willing to change property rights was already larger. If the increase in the property market is especially large and Parliament is responsive then the dashed line may shift outwards leading to even more acts.

Now consider the effects of shocks in Panel B where Parliament restricts Acts. First suppose the dashed line shifts outward corresponding to an exogenous increase in the land for which Parliament is willing to change property rights. In this case the holders of land which was previously just outside the boundary will now seek to enter the market and deeds should therefore increase in response to an exogenous increase in acts. Second suppose that the land for which it is profitable to enter the market—the lightly shaded area— increases because of an exogenous increase in the property market. In this case there will be no corresponding increase in acts because the land for which Parliament is willing to change property rights—the dashed line—is smaller.

The predictions from the preceding analysis can be tested using Granger-Causality. In general Grange-Causality is a technique for determining whether one time series is useful in

forecasting another. Formally, a time series X is said to ‘Granger-cause’ Y if it can be shown that those X values provide statistically significant information about future values of Y (Granger 1969). In terms of the hypotheses here if Parliament was a responsive institution then deeds should Granger-cause estate Acts because deeds provide information about future values of acts. By contrast if Parliament restricted access then estate Acts should Granger-cause deeds because Acts provide information about future values of deeds.

Granger-causality can be performed using F-tests on coefficients for lagged variables in Vector Auto Regression (VAR) models. Equations (1) and (2) describe a Vector Auto Regression (VAR) model for deeds and acts.

$$acts_t = \sum_{k=1}^K \alpha_1 acts_{t-k} + \sum_{j=1}^J \alpha_2 deeds_{t-j} + \varepsilon_{1t} \quad (1)$$

$$deeds_t = \sum_{k=1}^K \beta_1 deeds_{t-k} + \sum_{j=1}^J \beta_2 acts_{t-j} + \varepsilon_{2t} \quad (2)$$

The first equation indicates that acts in year t are a function of acts and deeds in previous years. The second equation states that deeds in year t are a function of deeds and acts in previous years. If deeds Granger cause Acts then F-tests should indicate that the coefficients  $\alpha_2$  are statistically different from zero and if Acts Granger cause deeds then F-tests should indicate that the coefficients  $\beta_2$  are statistically different from zero.

#### **Section 4: Results**

Before reporting the Granger-causality tests it is first necessary to establish whether deeds and acts are stationary time-series. The annual number of estate acts authorizing sales and leases in

Middlesex is displayed in Figure 2 along with the annual number of deeds in Middlesex. The series on deeds shows a clear upward trend which suggests that it might be non-stationary. Augmented Dickey-Fuller tests confirm that null hypothesis for a unit root in the time series is not rejected for the level of deeds (see table 2). The null hypothesis of a unit root is rejected for the level of estate acts and the first difference of deeds. These findings suggest that it is appropriate to analyze the time-series relationship between deeds and acts in first differences rather than levels.

<TABLE 2>

It is also necessary to establish the length of the lag between acts and deeds. For simplicity we assume that that the lag lengths are the same (i.e.  $K=J$  in equations 1 and 2), but we allow the data to identify the length of the lag using a variety of tests statistics. Table 3 reports the lag recommended by each. The recommended lags are not all the same across the tests. In most specifications reported below four lags were included, but we also check whether the results are similar when three lags are used instead.

<TABLE 3>

Table 4 shows the Granger-Causality tests for the baseline model with first differences in deeds and the first differences in acts authorizing sales and leases. The results imply that deeds caused acts, but that acts did not cause deeds. The quantitative effect of deeds on acts is illustrated by the impulse response function in figure 3. It shows that after 8 years an extra deed leads to .0008 more acts. Put differently a one standard deviation increase in deeds of 511 would lead to an increase of 0.4 more acts after eight years which is equivalent to 17% of a standard deviation.

<TABLE 4>

Earlier we discussed the greater likelihood of measurement error in the geographic location of estate acts before 1750. We can investigate whether this influences the results by restricting the analysis to the period from 1750 to 1830 when measurement error on geographic location appears to be random. Table 5 reports results from Granger-Causality tests on this sub-sample. The conclusions are the same: deeds Granger-Cause Acts.

<TABLE 5>

The main finding is robust to specifications that add other variables. Table 6 reports Granger causality tests for a VAR model that includes the real yield on long-term government bonds. The results show that deeds still Granger-cause acts but acts do not Granger-cause deeds. They also provide some evidence that real interests Granger-caused acts, consistent with our hypothesis that changes in economic conditions influenced the passage of acts. However, the effect of real interest rates is not highly significant. The quantitative effect of real interest rates on acts is illustrated by the impulse response function in figure 4. It shows that after 8 years a one percentage point increase in the real interest rate would lead to 0.017 decrease in estate acts. Put differently a one standard deviation increase in the real interest rate would lead to less than a 4% decrease in the standard deviation of estate acts.

Table 7 reports Granger causality tests for a VAR model that includes political variables like dummies for years when there was an election, years when there was a new prime minister, the fraction of seats held by the majority party in a year, and dummies for years when there was a war. The results confirm once again that deeds Granger-cause acts. They also show that political shocks like elections, war, and the introduction of new Prime Ministers do not have a statistically significant effect on acts. There is some evidence that the size of the majority party influenced

estate acts, but the significance is fairly low. There is also some evidence that elections Granger-cause deeds but otherwise political variables have little effect on deeds.

<TABLE 7>

The analysis thus far focuses on estate acts and deeds in Middlesex. We now investigate whether Middlesex deeds have predictive power for all sale and lease acts in Britain. Middlesex was the largest and most important property market. Its fluctuations could have been correlated with fluctuations in property markets throughout the country. If so then Middlesex deeds could be correlated with the national total for sale and lease acts.

Table 8 shows Granger causality tests for first differences of sale and lease estate acts throughout Britain and first differences in Middlesex deeds. The results imply that Middlesex deeds Granger-cause estate acts in Britain but estate acts in Britain do not Granger-cause Middlesex deeds. One interpretation is that Middlesex deeds are an indicator of general economic activity, particularly construction, and therefore it has an influence on estate acts in the nation as a whole.

<TABLE 8>

We can further illustrate the robustness of the relationship between deeds and estate acts by using ‘placebo’ groups of acts. Marriage acts permitted individuals to marry and/or divorce in contravention of secular and religious statutes. Naturalization acts provided foreign-born denizens with the rights of native-born citizens. Name acts changed someone’s name for the purposes of inheritance. Office acts appointed individuals to positions in the royal household, courts of law, executive agencies, and other positions that provided government-funded livings. Important similarities existed between these non-estate private acts and the estate acts. When processing all of these acts, Parliament followed common procedures. Similarities also existed in

the clientele that requested these acts, the demographic and social forces that generated demand for these acts. A key feature, however, distinguishes estate and non-estate private acts. The value of estate acts varied with economic conditions that influenced the costs and benefits of reorganizing rights to land.

Elsewhere we use non-estate private acts to test for spurious relationships between estate acts and real interest rates (see Bogart and Richardson 2008). A similar approach is followed here. If Middlesex deeds Granger-cause non-estate private acts then this would suggest that economic fluctuations are linked with the passage of all types of private acts and not just acts that specifically authorized sales and leases of land. Table 9 reports the results of the Granger-Causality tests. Only in the case of Marriage acts did deeds Granger Cause non-estate private acts, but the effect was negative rather than positive. In other words increases in deeds lowered marriage acts, which is the opposite of the relationship between deeds and estate acts. Overall the results suggest that the link between deeds and estate acts is not spurious. Interestingly the tables also provide some evidence that marriage acts and naturalization acts Granger-caused deeds. The latter is perhaps less surprising because naturalizations are probably correlated with population growth in London which is likely to be driving force behind construction booms.

## **Section 5: Conclusion**

Considering the modest rate of economic growth before 1830, these acts probably contributed substantially to Britain's economic expansion (Allen 1994; Clark 1999; Bogart 2008).

Table 1: Middlesex Deeds, in Percent

Transaction Type	1775 (%)	1800 (%)	1825 (%)
Conveyance			25
Assignment			24
Lease			22
Lease and Release			17
Mortgage			4
Other			8
Total			100

Table 2: Augmented Dickey Fuller Tests for unit Roots

Variable	test statistic
Estate Acts in Middlesex	-8.169*
Deeds in Middlesex	-1.249
First Difference of Deeds	-8.376*

Table 3: Lag-Order selection Test

Test Statistic	lag selected
Final prediction error	4
Akaike's information Criterion	4
Hannan and Quinn information criterion	3
Schwarz's Bayesian information criterion	1

Table 4: Granger Causality Tests in the Baseline Model, 1709-1830

Model with 4 lags		
	Chi-Square Stat	P-Value
Deeds to Acts	19.535	0.001
Acts to Deeds	3.8262	0.43

Model with 3 lags		
	Chi-Square Stat	P-Value
Deeds to Acts	14.39	0.002
Acts to Deeds	3.9705	0.265

Table 5: Granger Causality Tests for the sub-sample, 1750-1830

	Chi-Square Stat	P-Value
Deeds to Acts	15.634	0.004
Acts to Deeds	2.9756	0.562

Table 6: Granger Causality Tests in Model with Real Interest Rates

	Chi-Square Stat	P-value
Deeds to Acts	18.975	0.001
Real interest rates to acts	8.3435	0.080
Acts to Deeds	3.1359	0.535
Real interest rates to Deeds	3.1151	0.539

Table 7: Granger Causality Tests in Model with Real Interest Rates and Political Variables

	Chi-Square Stat	P-value
Deeds to Acts	20.527	0.001
Real interest rates to acts	8.514	0.074
War to acts	4.4435	0.324
new prime minister to acts	1.8696	0.760
size of majority party to acts	7.8467	0.097
elections to acts	5.4678	0.243
Acts to deeds	2.6021	0.626
Real interest rates to deeds	3.1345	0.536
War to deeds	7.1981	0.126
new prime minister to deeds	4.9239	0.295
size of majority party to deeds	2.3531	0.671
elections to deeds	9.39	0.052

Table 8: Granger Causality Tests in model using all sale and lease acts in Britain

	Chi-Square Stat	P-value
Deeds to Acts (all Britain)	11.254	0.004
Acts (all Britain) to Deeds	2.4773	0.29

Table 9:

	Chi-Square Stat	P-value
Deeds to Marriage Acts	8.8656	0.065
Marriage Acts to Deeds	11.073	0.026
Deeds to Name acts	2.3123	0.679
Name Acts to Deeds	4.0676	0.397
Deeds to Naturalization acts	2.8416	0.585
Naturalization acts to deeds	16.297	0.003
Deeds to Office acts	2.8663	0.58
Office Acts to Deeds	1.22	0.875

Figure 1: An Illustration of the demand and supply for estate acts and land.

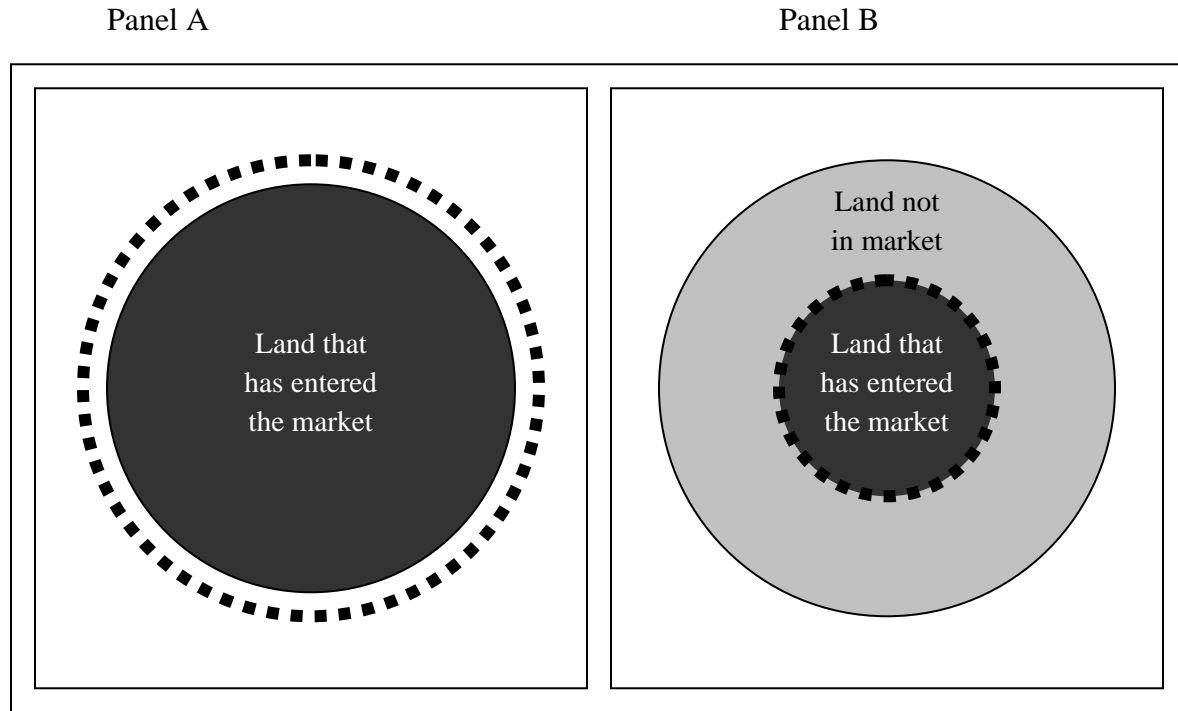


Figure 2

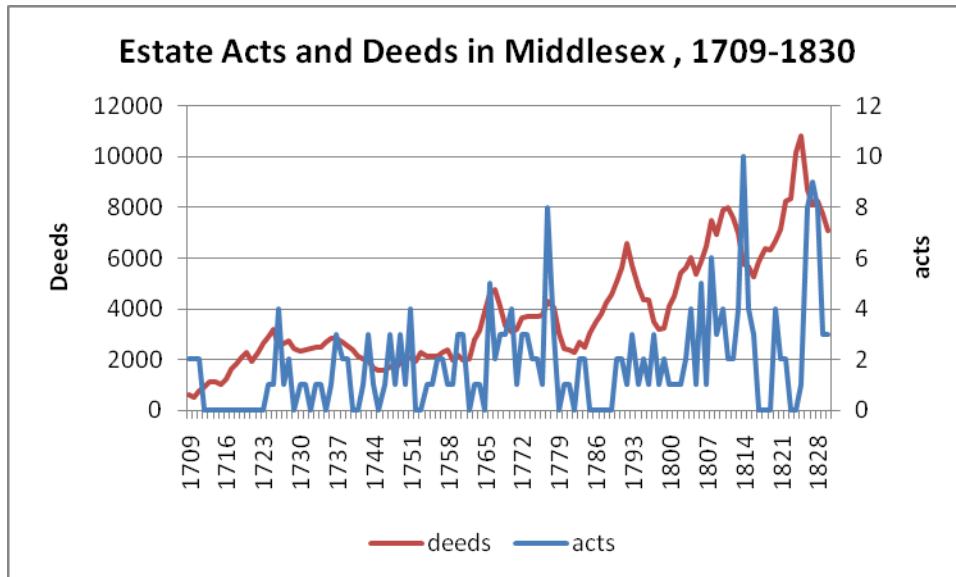


Figure 3: Impulse Response Function for Deeds to Acts

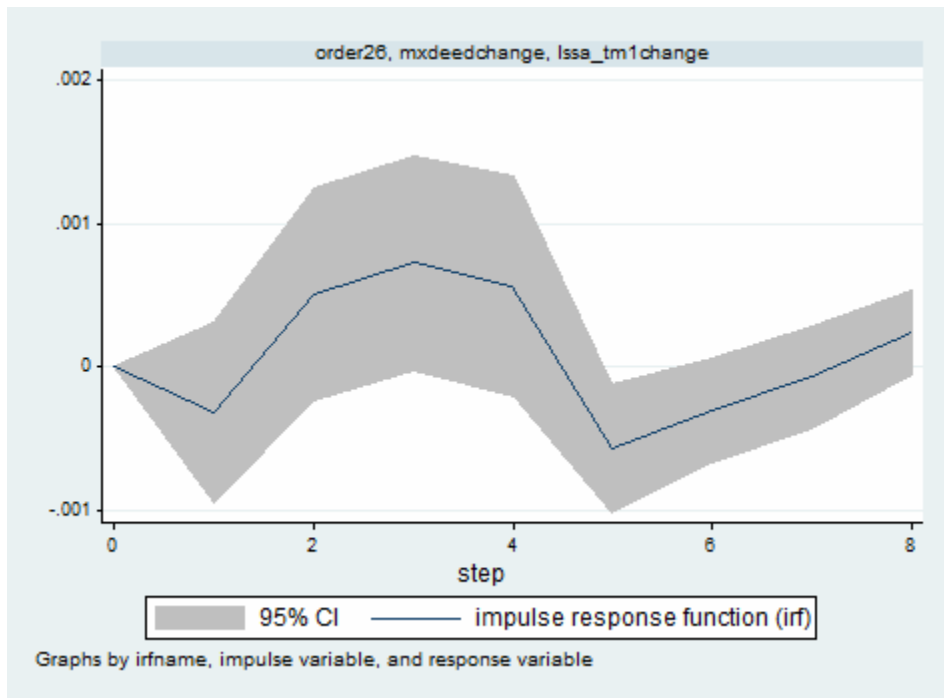
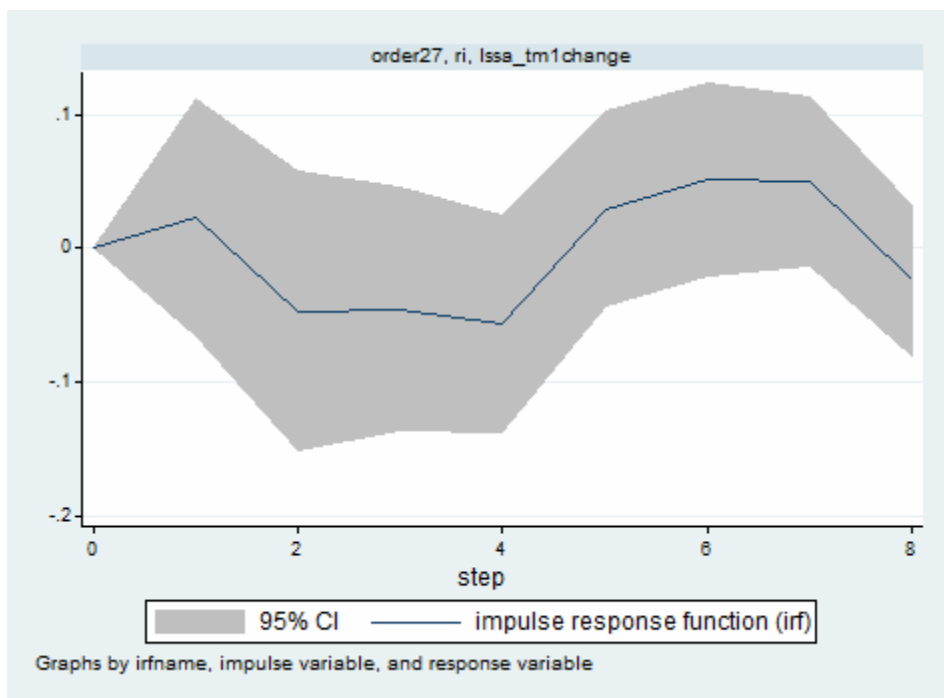


Figure 4: Impulse Response Function from Real Interest Rates to Estate Acts



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