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The pitfalls of estimating transactions costs from price data: Evidence from trans-Atlantic gold-point arbitrage, 1886–1905 ☆

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Abstract

This paper argues that bilateral spatial price models do not estimate bilateral transactions costs when trade with third cities is important. The paper examines trans-Atlantic gold arbitrage during the gold standard era by assembling a database indicating when trans-Atlantic gold shipments occurred. It shows that two-way gold shipments between New York and London frequently occurred prior to 1901. However, in 1901 gold shipments to London ceased and were replaced by triangular arbitrage shipments through Paris. Consequently, New York and London gold price data cannot be used to estimate New York–London transactions costs after 1901, as no trade took place.

Keywords: Gold standard; Threshold models; Price arbitrage

1. Introduction

In recent years several researchers have developed econometric techniques to estimate transport costs from the prices of goods in two different locations. These techniques have

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been based upon theories of bilateral arbitrage in which it is assumed the maximum difference between prices in two locations depends on the cost of shipping goods from one location to another. Three well known examples of these techniques include the switching regression model of Spiller and Wood (1988a), the threshold autoregression model of Obstfeld and Taylor (1997), and the technique used by Engel and Rogers (1996) in which the variances of the price differences between two cities are compared to the distance between the cities.

In this article, I question the identification strategy of these papers. These techniques are appropriate only if bilateral trade between a pair of cities occurs and trade with other centres does not occur. However, if trade with a third city regularly occurs, these estimation techniques are not identified. The problem can be simply illustrated with an example. Suppose one wanted to estimate shipping costs from New York to London. If third markets were unimportant, New York would export to London when the London price exceeded the New York price by the New York–London shipping cost, and the maximum price difference between the two cities should reflect this shipping cost. In these circumstances, the bilateral price data can be used to estimate the shipping costs. If it were always profitable for Paris to import from both cities, however, this reasoning is false. Rather, New York exporters would ensure the Paris price never exceeded the New York price by much more than the New York–Paris transport cost, and London exporters would ensure the Paris price never exceeded the London price by much more than the London–Paris transport cost. Consequently, the London price would never exceed the New York price by much more than the difference between the New York–Paris and the London–Paris transport costs, and no exports from New York to London would occur. If someone used a switching regression or a threshold autoregression to estimate transport costs from London and New York price data, they would estimate the difference between New York–Paris and the London–Paris shipping costs, not the true New York– London shipping cost.

One way to circumvent this identification problem is to use trade data in conjunction with price data. If the occasions when one city exports to another are known, the prices in the two cities on these occasions can be used to estimate transport costs. Trade data are hardly ever used for this purpose, however, because they are difficult to obtain at the same frequency as price data. Nonetheless, such data may need to be procured if bilateral transactions costs cannot be identified from bilateral threshold models.

This paper assembles a dataset covering a famous example of commodity arbitrage to demonstrate the difficulty of estimating transport costs from price data when third market effects are important. The example concerns the gold shipments between New York and London between 1885 and 1905, during the Gold Standard era. This example has been chosen partly because it has been widely studied—indeed, previous authors have used both switching regression techniques and threshold autoregression techniques to estimate transactions cost from price data—but mainly because it is possible to collect high frequency trade data to illustrate the problem. The paper establishes three main results:

(i) prior to 1901, gold exports from New York to London frequently occurred and New York–London shipping costs can be estimated from these cities' gold prices;
(ii) after 1901, New York exported gold to Paris, not London, and New York–London shipping costs cannot be estimated from these cities' gold prices;