Does Public Sector Fuel Price Hedging Make Economic Sense?

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Introduction

The hedging of risk through the use of financial derivatives is a common phenomenon in private markets. Some farmers, for example, purchase corn futures that promise a given price at a given time for their crop in order to avoid the risk of an unexpected substantial drop in that price when the crop is ready for sale. Alternatively, various airlines purchase options to buy fuel at a fixed price at a future date to avoid the risk of a sudden upwards surge in the price that would squeeze operating margins. These phenomena are relatively well understood.

But why would a public agency such as a local or regional transit agency engage in fuel price hedging? After all, local or regional governments have large budgets that cover many activities, of which transport usually is a small portion. Further, fuel is only a small expense for a public transit agency, often on the order of two to three percent. In addition, a public transit agency might raise fares or it might dip into general taxpayer funds to fund a shortfall caused by a sudden fuel price surge.

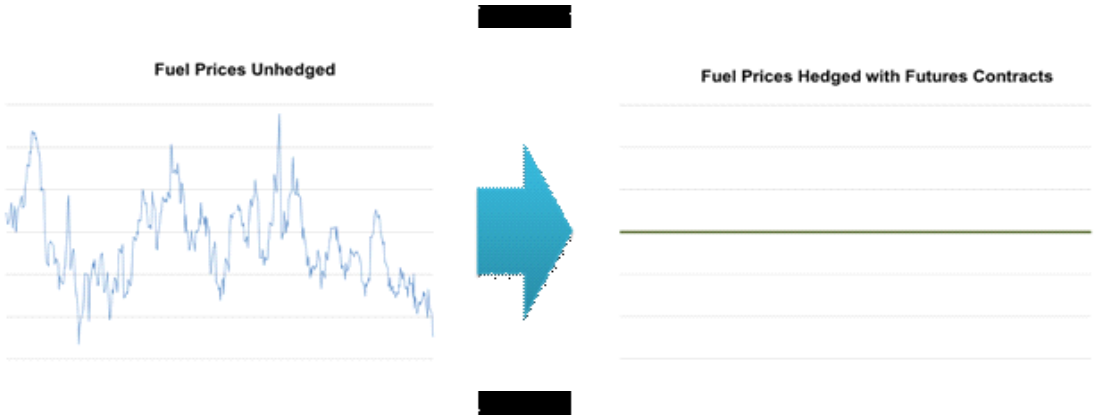
Yet some public transit agencies do hedge fuel prices. The Metropolitan Transportation Authority of New York (MTA), for example, hedges fuel prices through arrangements made with large banks. Similarly, the Washington Metropolitan Area Transit Authority (WMATA) hedges fuel prices, as does the Nashville transport authority, which acts in conjunction with a number of smaller local agencies. Fuel hedging has been and is an ongoing activity for these public agencies.

The main task taken up herein is to offer an explanation why a public agency might choose to take such action though superficially such entities would not seem prime candidates for doing so. In proceeding, we first examine what fuel hedging is, how it is done, and who does it. We then examine alternatives to hedging, strategies like passing through price changes or diversifying one's assets. Finally, we look at public transit agencies and the options they have in adjusting to unanticipated fuel price changes. Our ultimate explanation for public agency fuel hedging is that by so hedging these agencies impose a constraint upon themselves that, on balance, furthers the public interest.

Fuel hedging

Fuel hedging involves the use of financial derivatives to offset pricing events in real markets. A futures contract, for example, involves the purchase (or sale) of the right to acquire (or sell) a fixed quantity of fuel of a given quality at a fixed future date at a price established in the contract. The purchase of such a contract provides relative certainty that the buyer will be able to secure the fuel at the price on the date named. Figure 1 below illustrates how futures contracts alter the prices paid for fuel from a variable to a fixed quantity.

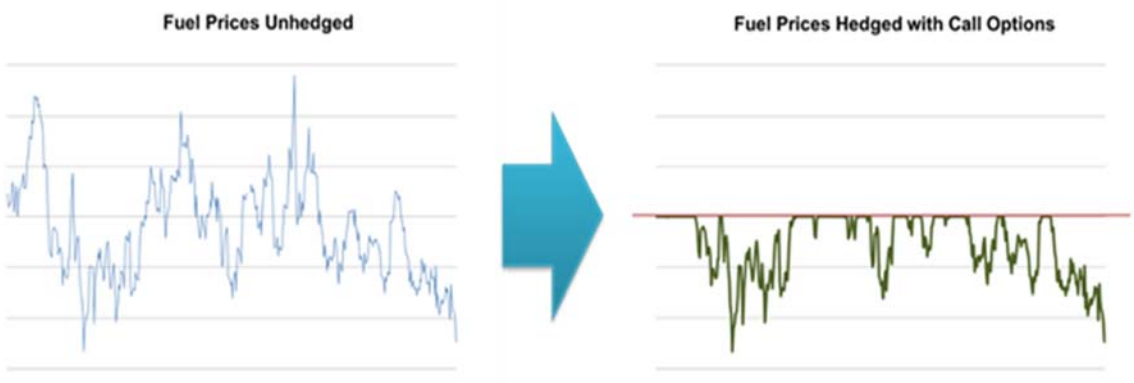
Figure 1. Fuel Price Exposure Over Time Using Futures Contracts



In practice, most futures contracts are settled without the physical transfer of fuel. That is, an amount of money changes hands to reflect the difference between the futures contract price and the price on the contract date as reflected in actual markets. But the effect is the same. A futures contract buyer who wishes to avoid the risk of a substantial price rise is compensated if the price does rise, offsetting what he or she must pay in actual markets. Of course, prices might fall, in which case the purchaser of the futures contract must pay the difference between what they have committed to in the contract and the actual price. But in that case, they benefit from the lower purchase price in the market. In the latter case, they have foregone the potential benefit of a lower market price in return for protection against a sudden sharp price rise.

Futures contracts are one of two main ways to hedge fuel prices. The other is the use of options, either call options, which establish the right, but not the obligation, to purchase a fixed quantity of fuel of a given quality at a fixed future date at a fixed price; or put options, which establish the right, but not the obligation, to sell such a fixed quantity. Options are generally exercised if the price named in the option is favorable relative to the market price at the date fixed in the option, but are allowed to lapse if the option price is not favorable in that sense. As with futures, options rarely involve physical delivery but instead are simply financial means to adjust to an unanticipated change in fuel prices. Figure 2 shows how call options put a ceiling on the price that a buyer will pay, but does not limit the gain that might be made in the actual market if fuel prices drop.

Figure 2. Fuel Price Exposure Over Time Using Call Option Contracts



A fuel hedging strategy also might involve the combined use of futures and options or of call and put options. A collar, for example, involves the simultaneous use of call and put options. The same entity might purchase call options, fixing the price they will pay for fuel, while selling put options, limiting their downside exposure to a price drop. In this way, they can establish a band within which they will pay for fuel, with the sales of the put options partially or wholly paying for the costs of the call options. Figure 3 illustrates how call options would limit the range of prices paid for fuel.

Figure 3. Fuel Price Exposure Over Time Using Collars

Fuel hedging can be carried out on organized exchanges such as the New York Mercantile Exchange (NYMEX) or Over the Counter (OTC), in a more informally organized market. The organized exchanges operate more or less like other organized financial markets, with anonymous buyers and sellers carrying out well-defined trades in a relatively transparent manner. The OTC involves the coming together of counterparties who can agree to whatever terms they wish. In some cases, large banks act as counterparties or as brokers who find counterparties for customers wishing to engage in trades.

A fuel hedging strategy involves the choice of which kind of derivative to use, how much to hedge, when to engage in the hedging (e.g., continuously or within a particular time period), and what markets to use to engage in hedging. We emphasize that fuel price hedging is not a means to make money, but rather a means to protect one's position as a fuel buyer or seller. In effect, the activity involves the purchase of a kind of insurance, at a price which buyers believe is worth paying.

Who engages in fuel hedging?

A number of private and public entities engage in fuel price hedging. Some, such as large airlines, do so directly through participation in organized financial exchanges and through direct trades with counterparties such as large banks. For these companies, fuel costs are a significant share of total operating costs. According to press reports, different airlines hedge to varying

degrees; a few do not hedge at all.[1] Also, airlines and other private fuel buyers have additional means of dealing with unanticipated fuel price surges, such as fuel price pass-through mechanisms and asset diversification. The major U.S. carriers, for example, have applied a fuel price adjustment to ticket prices. Although this is not a hedge in the traditional sense, it does provide relief from fuel price surges, particularly where the short-run demand for the product is price inelastic.

Crude oil producers approach hedging from a different perspective. They are vulnerable to unanticipated price declines because they invest large sums up front that must be recovered and their short-run operating costs are largely fixed. To guarantee the prices they will receive, producers sell crude oil futures contracts. Reportedly, in 2015 payments from hedges accounted for at least 15 percent of first quarter revenue at 30 of the 62 oil and gas companies in the Bloomberg Intelligence North America Exploration and Production Index.[2]

Hedges of this sort are particularly important for smaller, undiversified crude producers. For example, SandRidge Energy, an Oklahoma City–based producer, hedged about 90 percent of its oil and natural gas liquids output in early 2015, according to a regulatory filing. And according to Bloomberg Business, SandRidge and other drillers were required to engage in such hedges by some of their lenders.[3]

Some large oil producers, such as ExxonMobil, Chevron and BP, have a different way of dealing with rapid crude oil price declines, namely diversification into refining, distribution, and marketing. When oil prices fall, these businesses gain from increased demand and improved margins even as production revenues diminish. Conversely, when oil prices rise, production operations gain while the downstream segments tend to be adversely affected.

Such diversification can include chemical or petrochemical operations. Rising fuel prices generally affect such operations adversely while falling prices affect them positively.

A few governmental entities engage in fuel hedging. For some, like the Mexican government, oil-related revenues are a significant share of operating budgets. Mexico currently produces around 2.3 million barrels per day, or about 840 million barrels of crude oil per year. According to the *Wall Street Journal*, Mexico insured 228 million barrels of oil for 2015 at $76.40 per barrel. Mexico used options to do so, paying $773 million for the right to sell the 228 million barrels at the fixed price during the year.[4]

Perhaps more surprisingly, some U.S. transit authorities also engage in fuel price hedging. For them, fuel costs constitute a relatively low proportion of operating costs. For example, the Metropolitan Transit Authority of New York (MTA) reported that fuel costs constituted only about 2.4 percent of cash operating expenses in 2013 and 2.3 percent in 2014, yet it reports that it

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[1] "Gambles That Haven't Paid Off," *Gulliver* (blog hosted by *The Economist*), January 19, 2015, http://www.economist.com/blogs/gulliver/2015/01/fuel-hedging-and-airlines.
[2] Asjylyn Loder and Bradley Olson, "Shale Drillers' Safety Net Is Vanishing," Bloomberg Business, July 1, 2015, http://www.bloomberg.com/news/articles/2015-07-01/shale-driller-losing-their-insurance-against-price-drops.
[3] Ibid.
[4] Juan Montes, Mexico Enters $76.40 Oil Price Hedge for 2015, November 13, 2014, *available at* http://www.wsj.com/articles/mexico-enters-76-40-oil-price-hedge-for-2015-1415917558.

engaged in oil and natural gas fuel price hedging in both years. As of June 2013, MTA's hedging exposure was about $150 million, representing roughly 50 percent of its annual fuel purchases.

MTA carries out its hedging program by contracting with counterparties such as JP Morgan, Deutsche Bank, and Goldman Sachs (via J. Aron and Co.).[5] The Authority's fuel hedging program is part of a broader hedging program that includes interest rate hedges as well.

WMATA has dealt with Bank of America as counterparty in its fuel hedging program. Basically, its hedges amount to swaps, wherein it is reimbursed if diesel prices rise above a predetermined fixed level but pays out if those prices fall below.

The Nashville Metropolitan Transport Authority fuel hedging program is carried out in partnership with four other local entities. These include a regional transportation authority, the metro schools, the metro fleet, and the nearby city of Franklin, TN.

Why do Public Transit Authorities Engage in Fuel Hedging?

Public transit agencies have large budgets within which fuel costs are a relatively small proportion. Conceptually, such an agency would have many ways of absorbing even a substantial fuel price increase. These would include shifting funds from other transit activities, shifting funds from other governmental activities, and raising fares. Is fuel hedging really necessary?

Generally, public authorities that hedge state that their aim is to attain budget surety. Though few explain exactly what this means, a likely interpretation is that they seek more stable fuel expenses so that there is less need to divert funds from other activity. MTA, for example, has indicated that its fuel hedging program reduced fuel price volatility, calculating that the standard deviation of prices it paid for ultra-low sulfur diesel over a period of several years was 7.12 percent with hedging whereas it would have been 11.58 percent without.

For a public transit agency, the raising of fares tends to be a political matter. Often such agencies are overseen by local or regional political authorities, which answer directly to the electorate. A fare price increase, no matter how justified by rising fuel costs, is not to be taken lightly.

Though public agencies have many responsibilities, the various functional departments likely will seek to protect their own budgets as much as they can. Thus, there is likely to be strong resistance to protecting the budget of a transit authority from fuel price increases by transferring funds from a different functional department.

That leaves it up to a transit authority how best to cope. Its expenditures include operations and maintenance, procurement, administration and (possibly) research and development. Cutbacks

[5] *Metropolitan Transit Authority Financial Derivatives Report*, September 16, 2013, available at http://web.mta.info/mta/news/books/docs/1309DerivativesReport.pdf. At the time of the report, MTA was negotiating with three more potential counterparties.

to operations are possible but unlikely. Not only are customers also voters, but the heavy capital costs of a transit system cannot be recaptured if services are cut.

Administrative costs might be cut, but these are usually a small portion of total costs. Further, transit managers will want to avoid cutting payrolls and then adding back to them every time fuel prices rise or fall.

A more likely alternative is to defer costs into the future. This might involve deferring maintenance, cutting back on procurement of new equipment, or reducing R&D expenditures. All can save money immediately but are likely to increase costs in the future. Deferred maintenance or procurement also could mean reduced performance even in the short run.

A prescient public transit manager might, however, anticipate that maintenance or procurement cost deferral is exactly what will be done if fuel prices surge. Given a choice between dealing with a problem immediately or deferring such a choice, the political imperative often is to defer, so a likely way to absorb a fuel price increase is to add to deferred costs.

The better option, however, might be to hedge. There is a cost to fuel hedging, but in some instances it may be less than the cost of expense deferral. The prescient transit manager might therefore see hedging as a cost effective way to protect the public's interest in a properly managed transit capital stock. Insofar as transit managers are long term office holders, the notion of managing over several periods may appeal. Thus, rather than absorbing short-term fuel price surge costs by imposing long term costs, such a manager might choose to pay for hedging in order to manage his budget efficiently.

We do not test this conjecture in this paper. But in principle, at least, it is testable. Transit managers with longer tenures in office should engage in more fuel hedging than managers with short time horizons. Politically appointed managers should have less interest in hedging than civil servants. Reductions in the costs of hedging should induce more public transit managers to hedge. And a richer set of hedging alternatives, closer in kind to the fuels used by a public transit agency, should induce more hedging.

Conclusions

There exist many opportunities to hedge oil prices, both here and abroad, and a wide variety of parties engage in such hedging, both in crude oil and product markets. In the United States, these parties include public transit authorities, for most of whom fuel is a relatively small expense. In this paper we have described the mechanics of hedging, its costs, and its benefits. We also have inquired why public transit agencies might want to hedge their fuel prices, and offered the conjecture that they utilize hedges to avoid deferring certain types of expenditures when fuel prices surge. In particular, we believe at least some transit managers are hedging fuel prices to avoid deferring maintenance or procurement when fuel prices surge. In short, they appear to be trying to manage their budgets efficiently over multiple time periods, something that is not common where political incentives dominate, but which may occur where bureaucrats have long time horizons. Future work will be needed to test this conjecture in a rigorous manner.