DOC 4. FW Electricity elasticity SECUNCLASSIFIED.txt

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To:
Cc:
Subject: Electricity elasticity

Below are some further observations regarding the "Electricity elasticity" in MMRF.

(1) There is no single, constant elasticity of electricity demand in MMRF as you might find, for example, in a time-series econometric model of the electricity market, or in a technological dispatch model like that used by MMA.

(2) There is a constant elasticity in the LES household-budget allocation system which can be calculated. However in the current MMRF set up, households do not demand electricity directly. Instead, their demand is indirect through purchases of electricity-equipment services. Thus to calculate the implied household demand elasticity for electricity you need to first calculate the share of electricity in the total cost of each electricity-equipment industry. These shares will show by how much the price of each equipment-service industry will change when there is a one per cent increase in price of electricity, all else unchanged. Then calculate explicitly the own price elasticity of household demand for each equipment-service industry. The own price elasticity of electricity in household demand can then be calculated as a (household-consumption) weighted average of the equipment-service own-price elasticities pre-multiplied by the relevant electricity-cost shares.

There is also the "Green" substitution term for electricity in industry demand for current production. Probably, a weighted average of the green substitution elasticity and of the derived household demand elasticity will be your best approximation to a conventional overall electricity price elasticity in MMRF.

(3) The elasticity calculated in (2) is a partial equilibrium elasticity. Such elasticities are useful in gauging the response in demand for a one per cent change in price with all else unchanged. But they are terribly restrictive. Just like concepts such as Effective rates of protection, they are useful as a guide, but that's about it.

This is the point of the story. You don't have to be concerned about partial equilibrium elasticities when a much fuller story is available through MMRF. Using MMRF you can calculate a general equilibrium elasticity in which "all else unchanged" is not assumed. I would suggest using MMRF in comparative static mode to calculate in a conventional closure the impacts of an ex ante one per cent increase in price of electricity. Allow consumption, trade and other prices, etc., to adjust. The resultant impact on overall production of electricity will be, depending on closure, either a short-run general equilibrium elasticity estimate, or a long-

run estimate. Overall, relative to a partial-equilibrium elasticity, the general equilibrium elasticity
will be a more general and reliable estimate of the overall response in demand to a one per cent
increase in electricity price. Accordingly, in my view, it should be your preferred estimate.

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