

Testing supply-side substitution through analysis of prices and margins

Introduction

1. The technical factors allowing all three types of methylamines to be produced in the same plant (see paragraph 4.13) suggest that if there are differing margins for the three methylamines, then producers can change the ratios of the different types of methylamines produced, in order to raise production of those with higher margins. Similarly we were told that there is supply-side substitution in the production of the three AAA products (see paragraphs 4.18 to 4.20). Consequently the supply of the product with higher margins can increase and market prices may reduce, while supply of the products with lower margins becomes restricted. This implies a supply-side restraint on the pricing of each of these products, up to the technical limits of the flexibility of the production plants—there is not complete freedom to change the ratio of products produced without increasing costs.
2. Whether this supply-side constraint is effective can be tested by looking at relative price and margin trends. Any differences in margin should be corrected by supply substitution. Note that prices could move in parallel due to common cost changes even if products were not supply substitutes and so high price correlations do not provide conclusive evidence regarding supply-side substitutability. However, very low price correlations in the absence of identifiable differences in cost conditions imply no close substitutability.
3. Taminco provided us with data on the major raw material costs involved in manufacturing methylamine, which we used to calculate a margin of price minus raw material costs. In the presence of supply-side substitutability, price cost margins for different products should be closely correlated over time. However, it is not possible to calculate exactly product specific margins as these will depend on the mix of products produced and hence the efficiency of the production process (ie the input-output ratio depends on the mix of outputs produced).¹

Methylamines

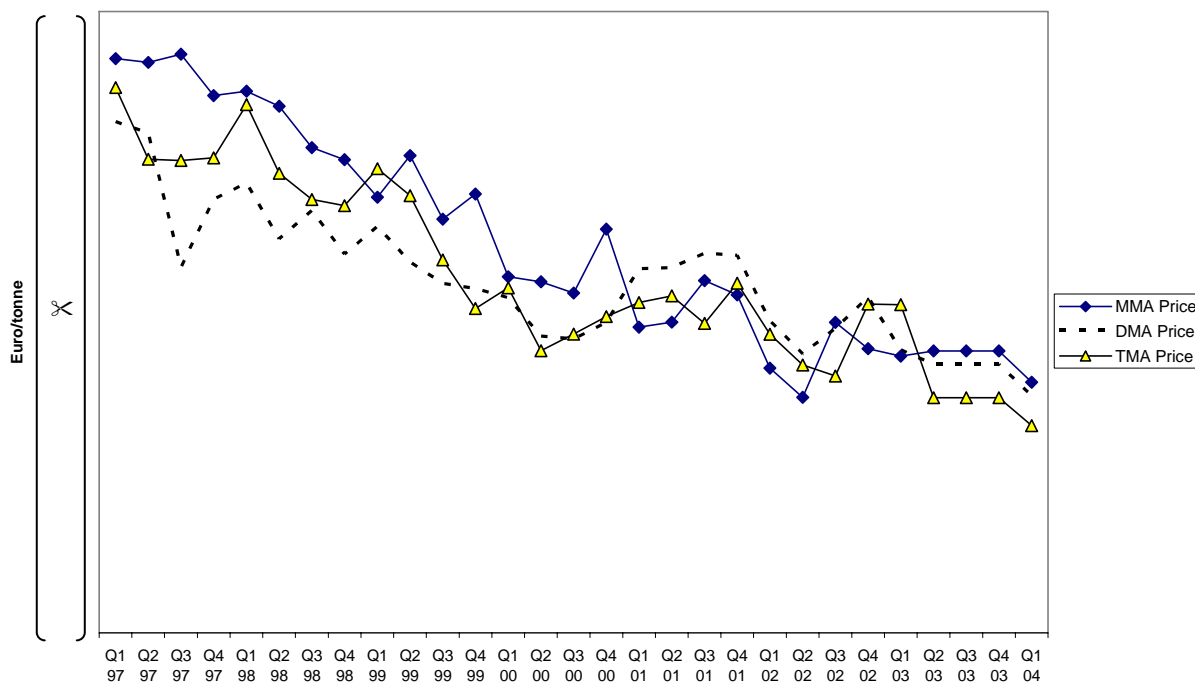
4. Taminco provided a series of average realized prices of methylamines (see Figure 1).² There are no available markets or spot prices for these products, and so there is considerable volatility in these series arising from the negotiation of new contract prices by Taminco and its customers. There are not divergent trends in prices for the different methylamines. This is consistent with, but not conclusive evidence for, supply-side substitutability.

¹Feedstocks are the only costs considered. Taminco said that it was not aware of any significant changes in other costs over this period that would change the relative patterns of margin correlation.

²Air Products did not possess historic prices for the individual categories of methylamines.

FIGURE 1

Average realized prices of methylamines

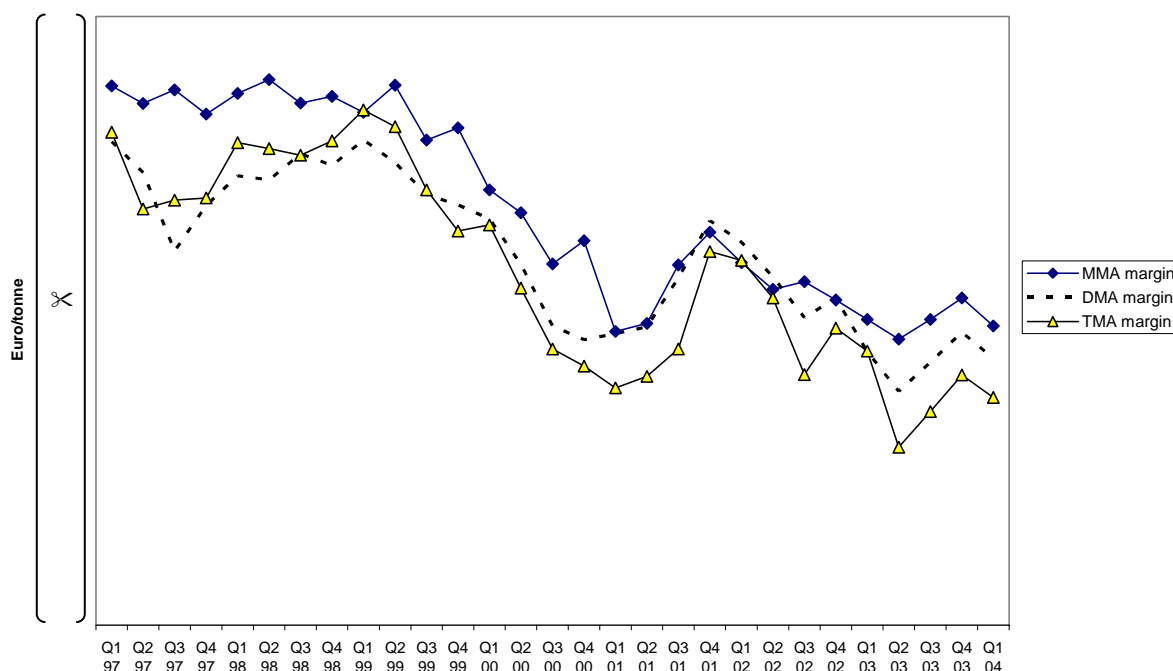


Source: Taminco.

- Figure 2 shows the margin of average realized prices over indicative feedstock costs for these same products. This should provide a closer indication of supply-side substitutability as it removes the effect of raw material cost changes where the ratio of raw materials used varies between products. The data are based on Taminco's average realized prices (which have some variability due to the different contracts agreed), while raw material costs are a data series provided by Taminco consisting of a mixture of quoted prices and actual prices paid. Input volume requirements are based on normal operating conditions for a typical plant.

FIGURE 2

Margins (prices minus raw material costs) for methylamines



Source: Taminco.

- The graphs show a closer correlation between gross margin values for methylamines than there is for price. This is confirmed by calculation of correlation coefficients between the different products; the correlations are shown in Table 1. These figures show a close correlation between prices and margins for these products after allowance for changes in input costs. The high correlation coefficients are consistent with close supply-side substitutability.

TABLE 1 Correlation coefficients for prices, and for margins, of methylamines

	Price correlations	Margin correlations
MMA-DMA	0.832	0.916
MMA-TMA	0.910	0.943
DMA-TMA	0.907	0.973

Source: CC calculations.

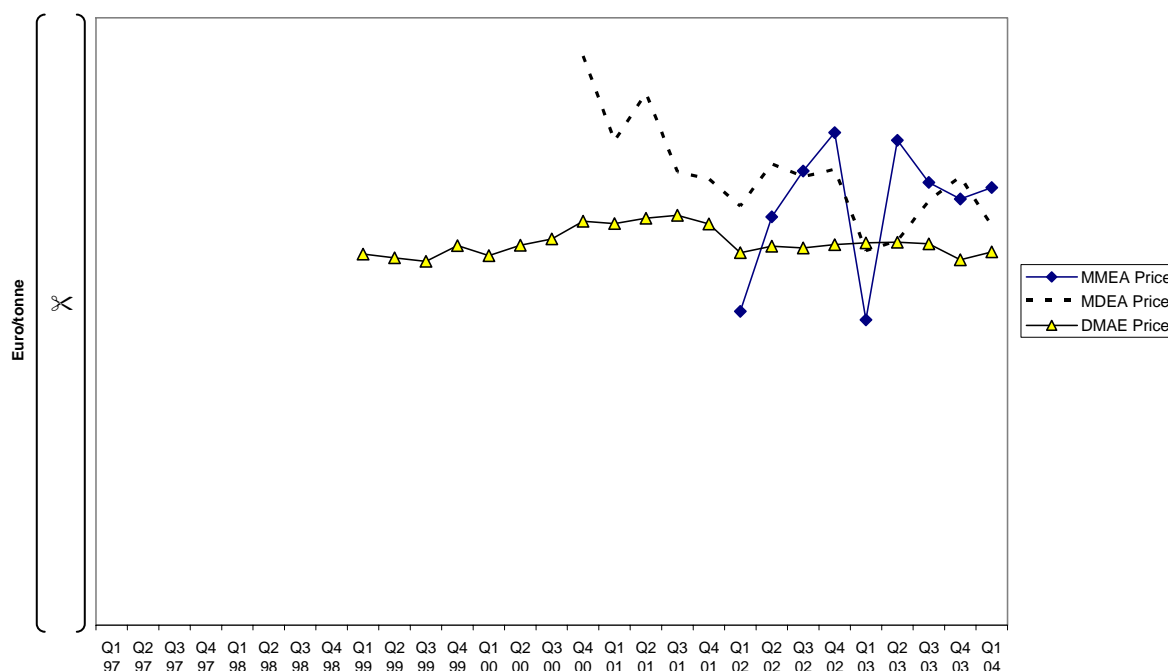
AAAs

- We received a much shorter run of average realized prices for AAAs from Taminco than for methylamines.³ This was because Taminco have only entered the production of AAAs over the last few years. This data on average realized AAA prices are shown in Figure 3.

³Air Products did not possess historic prices for the individual AAA products, although it did provide a series representing the average for all AAA sales.

FIGURE 3

Average realized prices for AAA



Source: Taminco.

- We calculated correlation coefficients for the prices for the AAAs, and for the margins of prices minus raw material costs (see Table 2). The values are low indicating little evidence of competitive interactions or supply-side substitution.

TABLE 2 Correlation coefficients for prices, and for margins, of AAAs

	Price correlations	Margin correlations
MMEA-MDEA	0.351	0.343
MMEA-DMAE	0.150	-0.370
MDEA-DMAE	0.598	0.490

Source: CC calculations.

- Taminco told us that because the price series was relatively short, and because it reflects a start-up of new operations during which there was a lot of volatility in average realized prices depending on the negotiation of contracts, the data were unreliable for establishing the extent to which market prices would normally be correlated. Taminco also argued that some prices may have reflected the need to bring base load capacity to the plant.