

## Operational Hedging by Auto Producers

A study by Bartram et al looked at economic exposure in the automobile industry.<sup>1</sup> The following table shows global automotive sales and production in 2003. Panel A shows sales and panel B production. Notice that most manufacturers have significant sales in more than one market and are therefore potentially exposed to the risk of exchange rate fluctuations.

One solution is for the company to undertake operational hedging by balancing production closely with sales. Look, for example, at Ford. Thirty-eight percent of its sales are outside North America, but so is 44% of its production. Because its costs and revenues in each currency are reasonably closely balanced, exchange rate changes do not affect its profits nearly as much as would be the case if its production were concentrated in one country.

	Home Country	Europe	N. America	Japan	Other
<b>Panel A: Sales, %</b>					
Ford	United States	30.3%	62.3%	0.0%	7.4%
General Motors	United States	20.2	67.6	0.0	12.2
Hyundai	South Korea	17.5	31.1	0.0	51.4
Honda	Japan	7.5	54.8	25.6	12.1
Isuzu	Japan	1.8	14.0	27.8	56.4
Mazda	Japan	23.5	34.6	29.7	12.2
Mitsubishi	Japan	14.5	22.8	37.1	25.7
Nissan	Japan	18.8	40.2	31.5	9.5
Suzuki	Japan	14.2	4.5	41.9	39.4
Toyota	Japan	13.2	32.8	36.8	17.2
Fiat	Italy	80.1	0.0	0.0	19.8
BMW	Germany	64.6	30.6	0.0	4.9
DaimlerChrysler	Germany	28.4	68.4	0.0	3.2
Volkswagen	Germany	62.9	13.4	0.0	23.7

<sup>1</sup> S. M. Bartram, G. W. Brown, and B. A. Minton, "Resolving the Exposure Puzzle: The Many Facets of Exchange Rate Exposure," *Journal of Financial Economics* 95 (February 2010), pp. 148-173

Peugeot	France	92.8	0.5	0.0	6.7
Renault	France	90.6	0.8	0.0	8.6
<b>Panel B: Production, %</b>					
Ford	United States	35.2%	56.1%	0.0%	8.7%
General Motors	United States	24.2	64.5	0.0	11.3
Hyundai	South Korea	1.3	0.0	0.0	98.7
Honda	Japan	6.7	43.2	40.2	9.9
Isuzu	Japan	1.0	7.2	56.2	35.6
Mazda	Japan	0.0	16.9	80.2	2.9
Mitsubishi	Japan	6.0	10.7	64.6	18.6
Nissan	Japan	15.3	27.8	51.5	5.4
Suzuki	Japan	6.7	0.5	59.3	33.5
Toyota	Japan	6.9	18.8	62.6	11.6
Fiat	Italy	79.4	0.0	0.0	20.6
BMW	Germany	80.3	14.8	0.0	4.9
DaimlerChrysler	Germany	34.6	63.0	0.0	2.4
Volkswagen	Germany	68.1	5.8	0.0	26.1
Peugeot	France	94.3	0.0	0.0	5.7
Renault	France	95.7	0.8	0.0	3.6

Percentage sales and production of major automotive companies by geographic region for 2003. *Source:* Adapted from Table 1 in S. M. Bartram, G. W. Brown, and B. A. Minton, "Resolving the Exposure Puzzle: The Many Facets of Exchange Rate Exposure," *Journal of Financial Economics* 95 (February 2010), pp. 148-173

Other manufacturers, particularly the Japanese firms, have less operational hedging. For example, Toyota produces 63% of its output in Japan, but only 37% is sold there. Exchange rate fluctuations are potentially a more serious risk for Toyota. On the other hand, the Japanese companies operate in a wider range of markets than U.S. firms. They have therefore diversified away a good part of their currency risk.

Operational hedging rarely eliminates all exchange risk. Look again at Ford. It is a net importer of autos and components into North America and is therefore exposed to a decline in the value of the dollar. Of course, Ford could try to pass some of the higher dollar cost of imported autos on to the customer, but competition limits the extent to which this is possible. Therefore, in addition to operational hedging, Ford and other automobile companies also control exchange rate risk by using financial hedges. They do this by borrowing in foreign currencies, selling currency forward, or using foreign currency derivatives such as swaps and options

Bartram, Brown, and Minton estimate that financial hedges allow the automobile industry to reduce its exchange rate risk by 45–50%. Operational hedges provide a 10–15% risk reduction and a further 10–15% of the risk is passed through to the customer in the form of price adjustments. In total auto manufacturers are able to reduce their currency exposure by about three-quarters.