
INSIGHTS

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LIMITS ON THE LEVEL OF DEMAND A COUNTRY CAN AFFORD

Jack Treynor

With home goods (e.g. urban services) output equals demand; when demand increases we put older machines back to work. But the real wage depends on the productivity of the marginal home goods plant. Because money prices go up when the real wage goes down, an increase in demand is inflationary.

On the other hand, with tradable goods (e.g., commodities), an increase in demand results in virtually no increase in local output, hence in an almost equal increase in the trade deficit.

In both cases, a failure to invest in plant capacity results in an increase in demand the country can't afford.



1 Complements or substitutes?

The key to this little paper is the assumption that, in industry, labor and capital are complements—not substitutes. Two hands on the steering wheel of a truck can be very productive; four hands is not more productive. But the same is true for other machines. It takes a certain number of workers to operate a rolling mill or an oil refinery. If you double the number of workers you won't increase their output at all. To be sure, labor and Nature's capital are probably substitutes—in hunting, fishing and even primitive farming. But since the

elegant Cobb–Douglas substitution model was published in 1928, Nature's contribution to the US economy hasn't grown at all.

Exhibit 1

The Cobb–Douglas production function

K = capital

L = labor

P = production

$$P(K, L) = AK^\alpha L^{1-\alpha}.$$

“Many economists have found that the Cobb–Douglas production function accurately describes

how the economy turns capital and labor into output.”

— Gregory Mankiw, *Macroeconomics*, Worth Publishing (1992).

All the subsequent growth has been capital supplied by Man. Growth in jobs requires the accumulation of machines.

Exhibit 2

Implications of complements

The age of plant governs its technology, and therefore the productivity of the worker.

Exhibit 3¹

Home Goods “Price achieves equilibrium between local supply and local demand.”

Tradable Goods “Price achieves equilibrium between global supply and global demand.”

Some of the machines produce home goods, some produce tradable goods. Countries that fail to invest in the former lower their real wage; countries that fail to invest in the latter hurt their trade balance. Either failure can impose a limit on the level of demand they can afford.

2 Machines that Make Home Goods

Like the technology of cars and appliances, the technology of machines is constantly improving. But the machines last a long time—many years. Employers use their newest machines.

The marginal machine determines the productivity of the marginal worker. If the owner pushes output to the breakeven point, all of the value of the marginal machine’s output goes to the worker—whose production consequently determines the real wage. But when demand changes, machines are idled or put back into production. The age of the marginal machine—hence the real wage—changes.

3 Two People Influence Inflation

The central banker ignores his effect on the wage negotiator; the wage negotiator ignores his effect on the central banker. By determining demand, the central banker determines which plant is marginal. But the productivity of the marginal plant determines the real wage. The wage negotiator extrapolates last year’s inflation in order to fix the money wage. The result of the new real wage fixed by the central banker and the new money wage fixed by the wage negotiator is a new level of money prices—and a new inflation rate—that neither of them intended.

Exhibit 4

From the familiar identity,

$$\text{real wage} \equiv \frac{\text{money wage}}{\text{money price}},$$

we have

$$\text{money price} \equiv \frac{\text{money wage}}{\text{real wage}}.$$

Together they determine money prices of home goods *Exhibit 3*, which defines home goods as opposed to tradable goods.

If, for example, in order to meet an increase in demand, employers put older, less productive plant back to work, the real wage will fall, and money prices will be higher than the negotiator expected. But when negotiators are surprised by the level of money prices, they are also surprised by its rate of change; next year they will be extrapolating a different inflation rate.

When a country invests in new plant, however, it can add workers without lowering the real wage. Investing in home goods plant raises the level of demand consistent with stable prices—the level of demand the country can afford.

4 Machines that Make Tradable Goods

When a central bank increases demand, home goods output increases. With home goods, demand determines output, which then determines the real price. But with tradable goods, the local price is determined by global demand. Unless local demand affects global price, it will have no effect on local output. But if it has no effect, when central banks increase demand, the trade balance gets worse.

The technology of the machines that make tradable goods is also improving. The global price of tradables, translated through the exchange rate, determines which of the old tradables capacity is still competitive. The local price determines the local output—which can be very different from local demand, with the difference contributing to the trade balance. If new plant is competitive at that price, it can not only increase output, hence improve the trade balance, but also provide the jobs tending the machines.

The only ways to improve the trade balance are to

- (1) Weaken the exchange rate.
- (2) Reduce total demand.
- (3) Increase production of tradables by investing in tradables plant.

Countries that don't invest enough must choose between a currency problem and an unemployment problem.

Exhibit 5

Tradables output

$$\frac{\text{global price}}{\text{exchange rate}} = \text{local price.}$$

Local price governs which plants are competitive:

$$\begin{aligned} &\text{output of competitive plants} - \text{demand} \\ &= \text{trade balance.} \end{aligned}$$

5 Current Examples

The world currently provides handy examples of the two limits—both examples of failure to balance investment and job creation with the two kinds of consumption: home goods and tradable goods. Russia has done a great job of expanding tradable goods production. But its neglect of home goods capacity has given it an inflation problem—i.e., a “soft currency.” The US has done a good job of expanding home goods production; we don't have an inflation problem. But we have neglected tradable goods capacity; we can't increase demand without making the trade deficit worse. And because it takes time build the missing plant capacity, the two problems are not going to go away quickly.

6 Conclusion

Could Russia have less unemployment if it produced more home goods? Could the US have less unemployment if it produced more tradable goods? To reduce inflation or a trade deficit requires more machines—either home goods plant or tradables plant.

When it is clear that both kinds of machines are themselves tradable goods, anything that hurts the trade balance imposes a limit on how many machines a country can afford. As Japan is currently reminding us, liquidity traps can still cause demand failure. Government spending may help with demand failure, but it hurts the trade balance. More investment requires either less government spending or less consumption.

Exhibit 6

Implications of complements

Machines supply the jobs

Investment supplies the machines

Saving supplies the investment.

Note

- ¹ Rudiger Dornbusch, Exchange Rates and Inflation, Introduction to Part 1, p. 3. The MIT Press, Cambridge, MA, 1991. Copyright 1988, MIT.

“The essay on the real and monetary effects of exchange rates integrates a broad range of approaches to devaluation. In the context of a model with home and traded goods, it is shown that a trade balance problem can be thought of as overspending, excessively high product wages in the traded goods sector, or an overvalued

real exchange rate. By showing the general equilibrium of spending decisions, home goods market, and labor market equilibrium, these various perspectives appear as alternative facets of the same disequilibrium.”

Keywords: Complements—not substitutes; home goods (urban services) vs. tradable goods (exports, commodities); productivity of the marginal machine; real wage; failure to invest