Appendix A

A diagram might help visualize the sticky price theory in action. Here is part of it -- a graph with a horizontal axis (below) and a vertical axis (left).

The horizontal axis measures both GDP and Sales. The vertical axis measures the average price level.

GDP is a nation’s annual production of goods & services. We will use GDP as a measure of “aggregate supply.”

Sales means a nation’s spending on goods & services. Sales will be our measure of “aggregate demand.”

More will be added later. We will keep it simple, adding just enough for our purpose -- visualizing the sticky price theory. When complete, you can think of it as a simplified picture -- a “model” -- of how an economy works. We call it the AS/AD diagram, short for Aggregate Supply & Aggregate Demand.

Note: Aggregate just means “nationwide total.”

Figure A1. AS/AD Graph Explanation Provided to Group G (#1)

Aggregate Demand (AD) is actually a relationship -- how sales depend on the price level.

The aggregate demand curve (AD) slopes downward to the right, indicating that households would purchase more goods and services at lower price levels.

Figure A2. AS/AD Graph Explanation Provided to Group G (#2)
Appendix A, continued

Aggregate Supply is also a relationship -- how GDP depends on the price level.

The long-run aggregate supply (LRAS) “curve” is a vertical line.

By drawing the LRAS as a vertical line, we are saying that long after any short-run disturbance in the economy, GDP depends on the available labor, capital, technology, and raw materials rather than the price level.

Therefore, the long-run growth trend for GDP would be Y0.

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The sticky price theory assumes there is also a short-run aggregate supply (SRAS) curve that is NOT vertical. It may be sloping upward or it may be flat, depending on how quickly producers adjust their input costs when product prices change.

Here, for simplicity, the SRAS “curve” is flat.

When the economy is in equilibrium, there is no difference between the short-run and long-run supply. In that case, the LRAS and SRAS curves will intersect at the long-term output rate where GDP = Y0.

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Figure A3. AS/AD Graph Explanation Provided to Group G (#3)

Figure A4. AS/AD Graph Explanation Provided to Group G (#4)
Appendix A, continued

Now we combine aggregate demand (AD) and aggregate supply (LRAS and SRAS) on the same graph.

To test how the sticky price theory works, we start in equilibrium, where AD, SRAS, and LRAS intersect. In equilibrium, aggregate supply (GDP) equals aggregate demand (sales), prices are stable, and there is no tendency for that to change.

The graph below tracks changes in GDP, sales, and price when they depart from equilibrium.

Figure A5. AS/AD Graph Explanation Provided to Group G (#5)

Figure A6. Sticky Price Theory Illustration Provided to Group G (#6)
Suppose a drop in consumer confidence leads to a drop in sales. The aggregate demand curve shifts to the left. The small graph shows the initial decline. We want to see what happens next.

Sticky price theory says that business firms will cut production before they cut prices, resulting in business cycles.

In the following slides, let’s see if this economic model helps visualize such behavior.

We will assume that prices are very sticky – taking one year to adjust to changes in demand. Thus, the price level does not change with the initial shift in the demand curve. With sales lower and price unchanged, GDP drops to \( Y_1 \) for the remainder of the year.
Appendix A, continued

Business firms finally cut prices a year after the initial drop in demand. That stimulates sales and raises GDP for the remainder of that year.

With production (GDP) still below long-run potential, prices are reduced further. The result is another rise in sales and GDP.

Figure A9. Sticky Price Theory Illustration Provided to Group G (#9)

Figure A10. Sticky Price Theory Illustration Provided to Group G (#10)
Appendix A, continued

During year 4...

It takes another price drop and sales increase before GDP approaches its long-run trend.

For the first time since the initial drop in demand, SRAS, LRAS, and AD intersect where GDP = Y₀.

During year 5...

If the momentum for growth is strong enough and prices sticky enough, the SRAS curve will not stabilize at the long-run output level.

In that case, GDP and sales will overshoot and rise above the long-run trend.

Figure A11. Sticky Price Theory Illustration Provided to Group G (#11)

Figure A12. Sticky Price Theory Illustration Provided to Group G (#12)
Appendix A, continued

During year 6...

At some point -- perhaps year 6 -- prices will start rising, due to above-normal production costs and customer purchases. The SRAS curve will rise and approach the intersection of the AD and LRAS curves, reflecting lower sales and GDP.

If we looked beyond year 6, we would see GDP dip slightly below the long-run trend line but soon rise and approach it again.

This business cycle is running out of steam. Sales and GDP are returning to normal, but prices will be lower.

Figure A13. Sticky Price Theory Illustration Provided to Group G (#13)

Research suggests that business cycles occur for many reasons. However, sticky prices seem to contribute to the up-and-down pattern.

The stickier the prices, the more GDP fluctuates around its long-run trend.

The quicker prices adjust, the sooner the short-run aggregate supply curve stabilizes at the long-run output rate, where the aggregate demand and the long-run aggregate supply curves intersect.

Figure A14. Sticky Price Theory Illustration Provided to Group G (#14)