The Harrod-Domar Model, the Money Market and the Elasticity of the Investment Demand Curve

Alan Hochstein¹

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The Harrod-Domar (H-D) theory of economic growth was the first to question the amount investment must rise to permit continuous full employment equilibrium income growth (Harrod, *The Economic Journal*, 1939; Domar, *Econometrica*, 1946). In short, H-D developed the equation specifying the growth rate of investment necessary to permit capital to remain fully employed. Growth theory itself has grown with many authors following the lead of Solow and Swan (Solow, *Quarterly Journal of Economics*, 1956; Swan, *Economic Record*, 1956). The initial model has been criticized for several reasons. The absence of labor market considerations and the assumption of a fixed capital-output ratio are two examples. In spite of the criticisms, this model was the first to present the critical dual role of investment as demand-creating and supply-creating.

Previous works (Hochstein, *International Advances in Economic Research*, 2006; 2017) depicted how the initial H-D model can be illustrated on a production possibility curve and incorporated into the investment savings liquidity preference money supply (IS,LM) structure. Hochstein (*International Advances in Economic Research*, 2006) shows that the model can be illustrated by computing the investment amount necessary to permit a free market to jump from a point on one production possibility curve to another point on a shifted curve. Hochstein (*International Advances in Economic Research*, 2017) outlines the important role of the money market, represented by the LM curve. It is argued that if the model starts off in the liquidity trap region of the LM curve and the investment demand curve increases, shifting the IS curve, interest rates remain constant and the money market does not cause issues of concern. If the world begins in the intermediate range of the LM curve, as investment shifts, income rises, interest rates rise and crowd out some investment intentions. In the classical range, higher interest rates completely crowd

✉ Alan Hochstein
ahoch@jmsb.concordia.ca

¹ Concordia University, Montreal, Canada

out intended investment. In this range, full employment income growth cannot prevail. One would end up inside a shifting production possibility curve. This note expands on the work of Hochstein (*International Advances in Economic Research*, 2017) by incorporating the elasticity of the investment demand curve as the investment curve shifts.

The H-D growth model, using modern terminology, is as follows. Assume, as the model implicitly assumes, that interest rates are given and fixed. Begin at full employment income where saving equals investment in a two-sector model. To generate full capacity use of the net investment, one needs to know how much investment must rise (or the investment curve must shift) to permit the new equilibrium income to be the appropriate full employment one.

Consider starting at general equilibrium in the IS, LM model. Let IS shift to the right due to an investment increase. To repeat, in the liquidity trap region of the LM curve, interest rates are fixed and pose no problem. In the classical region, interest rate increases completely crowd out needed investment. Growth is not possible. In the intermediate region of the LM curve, when investment increases, the demand for money rises, and with a fixed money supply, the money market will force interest rates up. Higher interest rates cut investment. While the shift in the investment curve is a necessary condition, it is not a sufficient condition to bring us to full employment income. If the shifted investment demand curve is interest inelastic, overall investment will not fall very much if interest rates rise. Full employment growth can still occur in an increasing interest rate environment. However, suppose the investment demand curve is highly interest-elastic. Higher interest rates will significantly reduce profitable investment opportunities. In this case, it is very possible that the investment curve may not be able to shift enough to permit the appropriate amount of actual investment to take place. Unlike the case of the inelastic investment curve scenario, in this case, full employment economic growth is an uncertain issue.

In summary, full employment income levels are critically dependent upon the elasticity of investment demand, at least in the intermediate region of the LM curve. Consequently, discussion of the factors that affect the slope and elasticity of the investment demand curve become paramount when considering full employment economic growth. Without empirical data, one can only speculate about this issue at the moment. This note is written in the middle of the disastrous worldwide corona virus pandemic. If aggregate demand remains low for a while after a slow return to work is implemented, and if interest rates rise, there will be very few profitable investment projects on the shelf. Sadly, the investment demand curve today is most likely to be highly interest-elastic. Full employment growth of capital is unlikely in the current environment.