The Case (In Brief) for Unencumbering Interest Rate Policy at the Zero Bound[1]

Marvin Goodfriend[2]
Carnegie Mellon University

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Much has changed since my exploration of negative interest rate policy in a paper for the 1999 Federal Reserve System conference "Monetary Policy in a Low Inflation Environment."[3] Since then, negative nominal interest rate policy has gone from a theoretical possibility to practical reality in much of the advanced world. In light of these developments, my current paper makes the case for unencumbering interest rate policy altogether so that negative nominal interest rates can be made freely available and fully effective as a realistic policy option in a future crisis.

First and foremost, the zero interest bound should be removed—much as the gold standard and fixed foreign exchange rate encumbrances were removed in the 20th century—to free the general price level from the influence of relative prices over which a central bank has little control. The gold standard was abandoned so that fluctuations in the gold price of goods would no longer destabilize the price level. Fixed foreign exchange rates were abandoned to insulate domestic price levels from movements in the international terms of trade. Those encumbrances were abandoned so that central banks could pursue monetary policy independently to stabilize domestic employment and inflation without costly subsidiary policies highly disruptive of international relations, trade, and finance.

Likewise, the zero interest bound encumbrance on monetary policy is to be removed so movements in the intertemporal terms of trade can be reflected fully in interest rate policy to stabilize employment and inflation over the business cycle with a minimum of potentially inefficient and costly alternative policies. A simple model borrowed from a 2002 paper of mine is employed to identify the underlying determinants of the intertemporal terms of trade and its counterpart the natural interest rate that interest rate policy must respect in order to stabilize employment and inflation.[4]

The idea is straight-forward. By lending instead of consuming, a household can exchange one unit of current consumption for "1 + r" units of future consumption, where "r" is the real interest rate and the intertemporal terms of trade is "1 + r". A higher real interest rate "r," means a more favorable intertemporal terms of trade. Households plan lifetime consumption, given the intertemporal terms of trade, so that the present discounted marginal utility of present and future consumption is equalized. The more favorable the intertemporal terms of trade, the more a household would like to lend in order to

[3] M. Goodfriend. 2000. "Overcoming the Zero Bound on Interest Rate Policy," *Journal of Money, Credit, and Banking* (November), pp. 1007-1035.
[4] M. Goodfriend. 2002. "Monetary Policy in the New Neoclassical Synthesis: A Primer," *International Finance* (Summer), pp. 165-191. Reprinted in Federal Reserve Bank of Richmond *Economic Quarterly* (Summer, 2004), pp. 21-45.

move consumption from the present to the future.[5] The less favorable, the more a household would like to borrow to bring consumption from the future to the present.

Roughly speaking, the natural interest rate " r^N " is the interest rate that makes desired lifetime consumption plans <u>conform</u> to present and expected future <u>potential output</u>, respectively--where potential output is the level of available consumption that sustains full employment and stable inflation.[6] The important point is that the natural interest rate (r^N) and its counterpart the natural intertemporal terms of trade ($1+r^N$) are governed by expected future potential output relative to current potential output. Current and future potential output, in turn, depend on current and future <u>productivity per hour</u> and <u>hours worked</u>, where we allow potential hours worked to be impacted adversely by <u>distortions</u> such as taxes, regulations, and markups. So the natural interest rate is directly related to i) the rate of time preference, ii) productivity growth, and iii) the expected growth of potential hours worked.

Let me explain. Most relevant for today's historically low interest rates is the pessimistic case. If households foresee little productivity growth and expect future hours worked to decline relative to current hours worked because future distortions are expected to exceed current distortions, then households would like to move consumption from the present to the future by lending. According to the model, households pessimistic about higher future taxes and lower hours worked would depress the intertemporal terms of trade and the natural interest rate as they attempt to move wealth and consumption to the future where consumption is expected to be more valuable at the margin. In aggregate, however, such pessimistic beliefs drive the intertemporal terms of trade and the natural interest rate low enough to i) deter households from wanting to lend, ii) clear the credit and goods markets, and iii) make household's content with a pessimistic lifetime consumption plan.

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[5] The representative (average) household in the model will neither lend nor borrow in equilibrium; so interest rate fluctuations always move average current consumption inversely. There is only the substitution effect, but no wealth effect. There would be a wealth effect on individual consumers that are either lenders or borrowers. For instance, if interest rates are reduced, lenders (borrowers) would suffer (benefit from) a negative (positive) wealth effect. The negative wealth effect would lead lenders to cut current and future consumption. Hence, for lenders the negative wealth effect of lower interest rates could overcome the positive substitution effect and actually cause lenders to reduce current consumption. The positive wealth effect of a decline in interest rates would reinforce the incentive for borrowers to raise current consumption. Thus, for instance, an interest rate cut in a currency union would tend to be received unfavorably in countries which are net lenders and favorably in countries that are net borrowers.
[6] Output must be consumed contemporaneously in the model; goods are not storable and there is no physical investment.

If the nominal policy rate (R) is prevented from going very far below the zero bound, and expected inflation ($E\pi$) is too low or negative, then the real policy rate $r^P = R - E\pi$ might be precluded from shadowing a low or negative natural interest rate. The positive spread between the policy rate and the natural rate ($r^P - r^N > 0$) would then precipitate a deficiency of aggregate demand relative to potential output that would weaken labor markets and put downward pressure on inflation to a degree depending on the expected magnitude and persistence of the spread.

Around the world today, a widespread pessimism about future relative to current prospects is <u>plausibly</u> at work depressing the intertemporal terms of trade and the natural interest rate. Pessimism with regard to higher future taxes and their depressing effect on future potential output seems plausible given the large and growing overhang relative to GDP built up in the United States and around the world in recent decades of public debt and mandatory government spending on social security, health care, pensions, and other transfers. For instance, Reinhart, Reinhart, and Rogoff (2012) point out that today the average level of gross public debt to GDP in advanced countries as a whole exceeds 90 percent, a threshold that in their study of 26 episodes since 1800 of public debt overhang in advanced economies appears to slow the expected growth of potential output significantly.[7]

Nor are businesses taking advantage of exceptionally low interest rates to finance investment in physical, organizational, or technological capital. Perhaps a contraction in potential hours worked is holding back the complementary investment. Growing industrial concentration, in part due to increasing regulatory burdens such as that evident in the United States, also may be decreasing business dynamism.

Businesses no doubt also see themselves in the "crosshairs" of much higher future taxes to help finance mandatory government spending. So the before-tax rate of return hurdle for investment is elevated by the same expectation of higher future tax rates that depresses the intertemporal terms of trade and the natural interest rate. From this perspective, business investment is plausibly held back by a problem reminiscent of the "debt overhang" problem in corporate finance: a large portion of value created by new business investment is likely to go <u>not</u> to business owners themselves, but in higher taxes to back publicly mandated spending.

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[7] C. Reinhart, V. Reinhart, and K. Rogoff. 2012. "Public Debt Overhangs: Advanced-Economy Episodes Since 1800," *Journal of Economic Perspectives*, (Summer), pp. 69-86.

Disparate developments around the world today are <u>also</u> working to depress the intertemporal terms of trade and the natural rate of interest. <u>First</u>, rising income inequality within many if not most countries around the world has for some time been creating political economy conditions evermore favorable to tax and transfer policies. <u>Second</u>, falling population growth around the world means a slower expansion or outright contraction of future hours worked to support social security and healthcare for the elderly. <u>Third</u>, global GDP is increasingly made up of output from less developed countries with less secure property rights, less stable politics, and less security in old age. <u>Fourth</u>, waning support for liberalization of international trade portends a slowing if not a loss of gains from trade. <u>Fifth</u>, productivity growth has been slowing throughout the developed world since the early 21st century and in developing and emerging economies since the 2007-09 credit turmoil, plausibly due to the aforementioned distortions, although a slowing of opportunities for technical progress may also be to blame. <u>Sixth</u>, looming downside risks due to the incapacitation of monetary and fiscal stabilization policy may be increasing the demand for precautionary savings.

Reflecting an intensification of global pessimism, market interest rates around the advanced world have drifted precipitously lower in recent decades. King and Low (2014) report that average inflation-indexed yields on 10-year government bonds for the G7 excluding Italy, and in the United States alone, fell steadily since ranging around 4% from the mid-1980s to 1997 to -1% in mid-2013, and have ranged between 1/2% and 0% since then.[8] Interest rate policy has had no choice but to follow the natural intertemporal terms of trade lower; otherwise the intertemporal terms of trade would have encouraged households to move too much consumption to the future, leaving too little current consumption to support full employment and price stability.

The dramatic decline in long term real interest rates appears to reflect more than a decline in the intertemporal terms of trade and the natural interest rate. Long term bonds bundle two services: i) bonds move wealth and therefore consumption to the future at the intertemporal terms of trade and ii) bonds transfer risk. Comparing U.S. 10-year TIPs yields with the time series of real short-term natural interest rates estimated by Laubach and Williams (2015) suggests that the price of risk transfer in long-term real interest rates in the United States has fallen by as much as 2 percentage points since the mid-1990s.[9]

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[8] M. King and D. Low. 2014. "Measuring the "World" Real Interest Rate," NBER Working Paper 19887 (February).

[9] T. Laubach and J. Williams. 2015. "Measuring the Natural Rate of Interest Redux," Federal Reserve Bank of San Francisco Working Paper Series 2015-16 (October).

The decline in the price of risk transfer on long bonds since the mid-1990s plausibly reflects the fact that cyclical risk in the U.S. economy has gradually shifted from "inflation-fighting risk"--when higher interest rates to fight inflation precipitate a joint collapse in bond prices and consumption, to "deflationary-recession risk"--when lower interest rates to fight deflation and weak consumption precipitate a rise in bond prices. Plausibly, the price of risk transfer in long bonds has fallen as "inflation-fighting risks" recede, and long bonds are seen increasingly as a valuable hedge against "deflationary-recession risks."

The problem for monetary stabilization policy is that the precipitous decline in long term nominal interest rates leaves little leeway for the usual cyclical decline of short term nominal rates below long term nominal rates in the recovery from recessions. To stimulate the recovery from each of the eight recessions experienced in the United States since 1960, the Fed pushed the federal funds rate more than 2½ percentage points below the 10-year nominal Treasury bond rate, and on five of those occasions the Fed cut the federal funds rate over 3½ percentage points below the bond rate.

At the current 1½ % 10-year Treasury yield in the United States today, the federal funds rate might have to be taken down at least to -1% and more likely to -2% to stimulate recovery from the next cyclical downturn. It is questionable whether such persistently negative nominal interest rates would be feasible in the face of current institutional arrangements which freely accommodate the demand for paper currency at par.

Even if such negative cyclical interest rate policy actions could be sustained, they would likely exert considerably less stimulus in the presence of the zero bound than otherwise. The reason is that aggressively negative nominal interest rate actions would simultaneously signal a central bank's pessimism. With the potential "follow through" of additional easing encumbered by the zero interest bound, aggressive negative policy actions and the pessimism they signal could be counterproductive by causing the natural interest rate to fall as much or more than the negative interest rate policy action itself.

Balance sheet policy is not the answer either. Pressure to rely more heavily on balance sheet policy in lieu of interest rate policy will tempt central banks increasingly to exert stimulus via fiscal policy initiatives such as i) the monetary funding of credit to the private sector, ii) the monetary funding of a bond market carry trade, and iii) the monetary funding of public debt. Such "balance sheet policies" are poor substitutes for interest rate policy as general-purpose stabilization policies involving, as they do, distortionary credit allocation, the assumption of credit risk, and maturity transformation---all taking risks on behalf of taxpayers, all involving the central bank in controversial fiscal policy

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matters, and all moving central banks ever closer to destructive inflationary finance.

Continuing the point, balance sheet policies may have a useful role in financial stability as they did in the 2008-09 credit turmoil. But unencumbered interest rate policy is far superior as a general-purpose stabilization policy. Why? Interest rate policy is <u>necessary</u> and possibly sufficient for countercyclical stabilization purposes. Interest rate policy can be implemented with a minimal central bank balance sheet free of credit and interest rate risk. Interest rate policy is far more flexible, less intrusive of markets, and has proven capable of credibly stabilizing inflation. Moreover, interest rate policy can be managed decisively by an independent central bank reasonably free of politics because it makes little use of fiscal resources. Interest rate policy merely shadows the natural interest rate to stabilize employment and inflation.

It is now well understood that a central bank can impose negative nominal interest rates on the economy <u>by satiating</u> the demand for bank reserves to force the interbank interest rate down to the interest-on-reserves floor…<u>and then charging</u> banks a negative nominal interest rate for reserve balances held at the central bank. To avoid negative interest on reserves, banks attempt to lend reserves to each other until the interbank rate falls to the <u>negative</u> interest-on-reserves floor. Competition and cost minimization among banks <u>then transmit</u> negative nominal interest rates more broadly to the economy.

However, the long-standing commitment by central banks to accommodate the deposit demand for paper currency at par limits the scope for <u>negative nominal interest rate policy</u>. Under current arrangements, a deeply negative, sustained nominal interest rate policy would precipitate a dangerous disintermediation of banks and money markets <u>financed</u> by the central bank's provision of paper currency at par for deposits.

Negative interest rate policies pursued around the world today demonstrate that the cost of handling, storing, and insuring paper currency, and the greater versatility of deposits for facilitating transactions, create some leeway for policy to push nominal interest rates below zero without encouraging a run from deposits into paper currency. Moreover, a central bank can raise the cost of exercising the currency option by discontinuing the issuance of large denomination bills, or charging banks and the public whenever paper currency is paid out or received. However, the central bank <u>risks</u> a chaotic, disorderly loss of control of the deposit price of paper currency should it rely too heavily on such impediments to create <u>more leeway</u> for negative interest rate policy. In any case, relying on such impediments could not overcome the lack of "follow through"

discussed earlier that makes problematic the effectiveness of interest rate policy encumbered by the zero bound.

The zero bound encumbrance on interest rate policy could be eliminated completely and expeditiously by discontinuing the central bank defense of the par deposit price of paper currency. The central bank would no longer let the stock of paper currency vary elastically to defend the par deposit price of currency. Instead, the central bank could grow the aggregate stock of paper currency according to a rule designed to make the deposit price of currency fluctuate around par over time.

The reason to abandon the pegged deposit price of paper currency is analogous to the aforementioned reasons for abandoning the gold standard and fixed foreign exchange rates—here it is to let fluctuations in the deposit demand for paper currency be reflected in the deposit price of paper currency so as not to destabilize the general price level—in this case to guard against a deflationary contraction of employment and output. .

How would the flexible deposit price of paper currency be determined? For the sake of argument, suppose that negative interest rate policy is passed through fully to deposit rates and money market rates. The excess demand for paper currency relative to deposits and money market instruments would then put upward pressure on the deposit price of paper currency. The deposit price of paper currency would rise above par to the point where it is expected to fall back toward par at a rate equal to the negative nominal interest rate. Along the equilibrium price path, banks and the public would be indifferent between holding deposits or money market securities paying negative nominal interest, on one hand, and holding paper currency whose value is expected to depreciate at an equivalent rate in terms of deposits.[10] The equilibrating jump in the deposit price of currency would be greater, the more negative and persistent the market expects the central bank's negative interest rate policy actions to be.

In effect, the deposit price of paper currency would adjust flexibly much as floating foreign exchange rates adjust to equilibrate the foreign exchange market when international interest rates differ from each other.

More relevant, the flexible deposit price of paper currency would behave much like it actually did when the payment of currency for deposits was restricted in the United States during the banking crises of 1873, 1893, and 1907. Friedman and Schwarz (1963) report that market-determined flexibility in the deposit price

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[10] Pricing could also take account of marginal convenience yields for deposits and paper currency, respectively.

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of currency worked reasonably well in those episodes, especially under the circumstances, writing…"The 1907 restriction involved the refusal of banks to convert deposits into currency at the demand of the depositor; it did not involve, on any large scale, even the temporary closing of banks or the cessation of their financial operations, let alone the permanent failure of any substantial number. It lasted for several months, and once adjustment was made to the use of two only partly convertible media of payment—currency and deposits—could have continued for a much longer period, as in some earlier episodes, without producing an economic breakdown and indeed could have continued in conjunction with economic revival." [11]

A central bank less favorably disposed to a freely floating deposit price of currency could intervene in the style of a "managed" foreign exchange rate policy to produce a "crawling peg" deemed more consistent with the central bank's intended interest rate policy path. Under current arrangements, a managed float would not be without potential complications, however. Central bank intervention to stabilize the current deposit price of paper currency against speculation of an imminent policy easing would <u>finance</u> a potentially disruptive disintermediation of banks and money markets. In any case, a central bank would have to be on guard against the potential for destabilizing speculative disintermediation ahead of the initial floating of the deposit price of paper currency.

To sum up, the method of unencumbering interest rate policy by floating the deposit price of paper currency is attractive in many ways. The regime completely removes the zero bound encumbrance with relatively few technological or institutional requirements for implementation. In principle, the deposit price of paper currency could be floated expeditiously, if need be, in a future crisis. Most of what is needed involves clarifying that henceforth taxes would be assessed in units of deposits and that contracts previously written in the national unit of account would be enforced in terms of deposits. It would also be useful to facilitate currency services if paper currency was made free of capital gains tax. To stabilize the deposit price of paper currency somewhat, the central bank could run an <u>asymmetric float</u>—and intervene to absorb the excess supply of currency whenever the deposit price threatened to fall <u>below</u> par. Finally, the inconvenience of the flexible deposit price of currency might be offset to a degree by the fact that paper currency would perform as a hedge against income and consumption risk, since the deposit price of currency would rise whenever nominal interest rate policy turned negative to fight a recession.

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[11] M. Friedman and A. Schwartz. 1963. "A Monetary History of the United States: 1867-1960," Princeton University Press, page 167 and Goodfriend (2000), footnote 23.

In conclusion, removing the zero lower bound is nothing more than the sensible application of monetary economics, progressing along a path that has increasingly unencumbered interest rate policy to sustain price stability and full employment. If the zero bound were removed completely, then interest rate policy could enable the public to enjoy the benefits of a fully stable purchasing power of money. Credibility against inflation is tied to credibility against deflation—the central bank would no longer shrink from action against inflation for fear of having to fall back with little room to act against recession. It would be up to financial regulators to prevent excessive leverage and maturity transformation from precipitating an unstable credit cycle when negative nominal interest rate actions stimulate asset price appreciation and the incentive to borrow against elevated collateral values.

With inflation credibly under control, the public could safely hold longer term nominal bonds free of inflation risk, and thereby minimize its exposure to <u>negative short term</u> interest rates. Thus, we can imagine a mutually reinforcing equilibrium in which the public extends the maturity of its savings and the central bank with the public's support feels free to pursue negative nominal interest rate policy on occasion to perpetuate full employment and price stability. The idea of negative nominal interest rates takes some getting used to, but such flexibility is well worth it to provide better employment security <u>and</u> more secure lifetime savings.