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Negative interest rates or 100% reserves: alchemy vs chemistry

Herman Daly [University of Maryland, USA]

The close connection of fractional reserve banking with alchemy was recently emphasized by Mervyn King, former head of the Bank of England, in the very title of his recent book, *The End of Alchemy: Money, Banking, and the Failure of the Global Economy.* He refers to the more thorough development of this connection by Swiss ecological economist H. C. Binswanger in his brilliant study, *Money and Magic.* Given this connection to alchemy, it is more than a coincidence that the earliest and most thorough critique of fractional reserve banking came not from an alchemist but from a real chemist, Nobel Laureate Frederick Soddy (See H. Daly, "The Economic Thought of Frederick Soddy", *History of Political Economy*, 1980, 12:4). Soddy's advocacy of full reserve banking was later picked up by Irving Fisher, and by Frank Knight and others of the Chicago School. Mervyn King stops short of advocating full reserve banking, but clearly is unhappy with the fractional reserve system.

Most Central Banks, however, seem to favor the alchemy of fractional reserves as a key part of their hyper-Keynesianism: the quest to stimulate real growth by increasing monetary growth, first by low, then by zero, and now by negative interest rates. Why hasn't it worked? Because real growth today is constrained by real resource shortages, while in the 1930s traditional Keynesianism's assumption of unemployed resources was reasonable. There is still unemployed labor to be sure, but not unemployed natural resources, which have become the limiting factor in today's full world. As growth converts more of nature into economy we see that these newly appropriated natural resources were not unemployed at all, but were providing ecological services that often were more valuable than the extra production resulting from their enclosure into the economy. Aggregate growth has become *uneconomic* – a condition unrecognized by economists long fixated on growth as panacea – but which ironically is logically implied by their absurd new policy of a negative interest rate! (http://steadystate.org/the-negative-natural-interest-rate-and-uneconomic- growth/)

Borrowing at a negative interest rate makes it profitable to invest in projects with a slightly less negative rate of return. Investing in uneconomic projects promotes uneconomic growth. We already have uneconomic growth at the macro level thanks to the mis-measures built into our System of National Accounts (http://steadystate.org/wealth-illth-and-net-welfare/). With negative interest rates we will in addition induce uneconomic growth at the micro level, compounding the collective idiocy. Savers at some point will prefer cash to paying the banks a fee to keep their money, and that will lead the banks and their politicians to push for the elimination of cash in favor of electronic deposits that the banks can control, thereby strengthening the death grip of centralized finance on the real economy.

Better than a policy of hyper-Keynesian negative interest rates is the policy of 100% reserves on demand deposits, first advocated by British Nobel chemist and underground economist Frederick Soddy, and then by the leading American economists of the 1920s, Irving Fisher and Frank Knight, among others. It dropped out of discussion with the Great Depression and

the Keynesian growth cure, because it was correctly considered a constraint on growth. The tradional Keynesian growth cure worked in the empty world with unemployed natural resources as well as unemployed labor, but in today's full world growth has become uneconomic and needs to be constrained. So it is time to reconsider 100% reserves.

What are its advantages?

1. The private banking system could no longer live the alchemist's dream of creating fiat money out of nothing, pocketing the seigniorage, and lending the created money at interest. These enormous privileges would be transferred to the public treasury. Money would be a public utility – a medium of exchange, a unit of account, a store of value. The idea is to nationalize money, not banks. http://steadystate.org/nationalize-money-not-banks/

2. Every dollar borrowed would be a dollar saved, and unavailable to the saver for the life of the loan. This restores the classical discipline of balancing investing and saving, rather analogous to chemistry's law of conservation of matter-energy. Savers and Investors cannot both claim the same dollar at the same time. Banks are intermediaries, charging interest to borrowers and paying interest to savers. The interest rate exists as a price equating savings with investment, but not as a price paid to the banks for their unnecessary and expensive "service" of creating money as private interest-bearing debt. That the public utility of money should be the by-product of the private activity of lending and borrowing is no better than when it was the by-product of the private activity of gold mining.

3. In the absence of fractional reserves there would be no possibility of bank failure due to a run on the bank by depositors, and therefore no need for deposit insurance and its consequent moral hazard. The entire debt pyramid would no longer collapse with the failure of a few big banks, bringing down the basic system of payments with it. The bargaining power of the banking system to extort large bailouts by taxpayers would be lost.

4. No longer would the money supply expand during a boom and contract during a slump, reinforcing the cyclical tendency of the economy. And the reserve ratio could be raised gradually.

5. Money would be issued by the Treasury, and spent into existence for public goods and services. *The amount of money issued would be limited by the amount of money that people are voluntarily willing to hold instead of exchanging it for real wealth*. If the Treasury issues more than that amount, people will spend it on real goods, driving up the price level. That is the signal to the treasury to print less money and/or raise taxes. The Treasury's policy target is a constant price index, not the interest rate, which is left to market forces, and would thus never be negative.

The internal value of the currency is determined by maintaining a constant price index, and thus the dollar ceases to be a "rubber yardstick" of value. The external value of the currency would be determined by freely fluctuating exchange rates.

This is too big a policy issue to decide in 1000 words. But I hope at least to raise the suspicion in reasonable minds that a 100% reserve requirement makes far more sense than a policy of negative interest rates.

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Why negative interest rate policy (NIRP) is ineffective and dangerous[1]

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Abstract
NIRP is quickly becoming a consensus policy within the economics establishment. This paper argues that consensus is dangerously wrong, resting on flawed theory and flawed policy assessment. Regarding theory, NIRP draws on fallacious pre-Keynesian economic logic that asserts interest rate adjustment can ensure full employment. That fallacious logic has been augmented by ZLB economics which claims times of severe demand shortage may require negative interest rates, which policy must deliver since the market cannot. Regarding policy assessment, NIRP turns a blind eye to the possibility that negative interest rates may reduce AD, cause financial fragility, create a macroeconomics of whiplash owing to contradictions between policy today and tomorrow, promote currency wars that undermine the international economy, and foster a political economy that spawns toxic politics. Worst of all, NIRP maintains and encourages the flawed model of growth, based on debt and asset price inflation, which has already done such harm.

Keywords: negative interest rate policy, zero lower bound

1. Introduction

In the wake of the Great Recession and ensuing Great Stagnation, central banks have increasingly embraced the idea of setting negative interest rates by charging commercial banks for reserves placed on deposit with the central bank. The list of central banks that have already adopted this policy includes the Bank of Japan, the European Central Bank, the Swiss National Bank, the Swedish Riksbank, and the Danish Central Bank.

Negative interest rate policy (NIRP) is now becoming part of consensus mainstream macroeconomics. In a December 2015 interview, former Federal Reserve Chairman Ben Bernanke said the Federal Reserve was likely to add negative interest rates as a policy tool. In February 2016 testimony before the US House of Representatives, Federal Reserve Chairwoman Janet Yellen stated negative rates were still on the policy table. And in April 2016 the IMF jumped on to the negative interest rate bandwagon when Managing Director Lagarde declared they are a net positive to the global economy.

This policy paper explores the new NIRP consensus and argues it is profoundly wrong. The new consensus embodies a double failure. First, negative interest rates are likely to have

[1] This paper was commissioned by the Private Debt Project and is published on their web site at: http://privatedebtproject.org/view-articles.php?Why-a-Negative-Interest-Rate-Policy-NIRP-is-Ineffective-and-Dangerous-20 It is based on a longer technical working paper titled "Why ZLB Economics and Negative Interest Rate Policy (NIRP) are Wrong: A Theoretical Critique". My thanks to Sherle Schwenninger and Jacob Feygin for many helpful comments and editorial suggestions. All errors are my responsibility.

counter-productive impacts on aggregate demand (AD). Second, NIRP actively encourages the continuation of the debt-led asset price inflation model of economic growth that has already caused so many problems. Not only will NIRP not solve the problems posed by the Great Stagnation, it risks aggravating them. The implication is mainstream economics has it wrong – once again!

2. The "modern" theory behind NIRP

NIRP represents an elaboration of the theoretical thinking that has shaped macroeconomic policy over the past thirty-five years. It continues the dependence of policy makers on interest rates as the critical lever for stabilizing the economy and ensuring full employment. It simply extends this framework to the embrace of negative rates, which central banks must set in times of demand shortage and low inflation as the market cannot due to the zero lower bound (ZLB) to nominal interest rates.

Thus, while NIRP appears revolutionary, its analytical foundation rests on the pre- Keynesian macroeconomic reasoning that regained ascendancy in the 1970s. That line of thinking was celebrated with claims of a "Great Moderation" (1980–2007) which prevailed prior to the financial crisis of 2008. Proponents of this narrative argued that macroeconomic performance, as measured by inflation and the frequency and depth of recessions, had been greatly improved after 1980 owing to improvements in the conduct of monetary policy.

According to Great Moderation boosters, two major changes were responsible for this improvement. First, at the theoretical level, there was a restoration of pre-Keynesian classical macroeconomic ideas which described the economy as stable and self-adjusting, moving relatively quickly back to full employment in the event of economic disturbances. According to classical macroeconomics the real interest rate is the essential macroeconomic price and it adjusts to clear the loanable funds market, ensuring that full employment saving equal full employment investment. Second, at the policy level there was a shift to targeting low rates of inflation, conducted via independent central banks, using clear credible interest rate rules. Policy identified an inflation target and then set a nominal interest rate consistent with the inflation target and the full employment loanable funds real interest rate.

Anytime the economy got into trouble, monetary policy engineered a lower nominal interest rate, which lowered the real interest rate, given an unchanged inflation target. That stimulated investment and lowered saving. Moreover, to the extent that lower interest rates increased asset prices, that was also beneficial since higher asset prices encouraged consumption which lowered saving and encouraged investment.

This policy response was adopted in the recessions of 1991-2 and 2001-2. It also constituted the immediate response to the financial crisis of 2007-8, the hope being that lower rates would quickly reflate asset prices and stimulate demand.

NIRP began to enter the picture when the policy interest rate was pushed to zero – the so-called zero lower bound (ZLB). In the first instance, hitting the ZLB prompted central banks to engage in quantitative easing (QE), which involves purchasing longer- dated bonds. When that failed to adequately stimulate the economy, NIRP became the next policy of choice

based on simple extrapolative logic. If lower interest rates stimulate AD, then lowering rates into negative territory should do the same.

3. Economists have forgotten Keynes' message that interest rates may not solve demand shortage

The idea that the ZLB explains stagnation has become mainstream received wisdom and has significantly informed policy thinking about negative interest rates. ZLB economics is a mix of classical and neo-Keynesian (sometimes called bastard Keynesian) economics. The classical dimension concerns its thinking about interest rates and their role in the economy. The neo-Keynesian dimension is the belief that a "rigidity" (i.e. the ZLB) prevents market economies from automatically self-adjusting to full employment. Both aspects of ZLB economics are wrong, showing why mainstream macroeconomics gets it wrong.

Keynes' (1936) *General Theory* fundamentally challenged classical macroeconomics and its theory of interest rates. First, Keynes challenged the classical claim that interest rates are determined by the supply (saving) and demand (investment). Instead, Keynes proposed that interest rates were determined according to his liquidity preference theory. Asset prices and interest rates adjust to ensure asset demands (including the demand for money) equal asset supplies.

Second, Keynes argued output, rather than interest rates, adjusts to equalize aggregate demand (AD) and aggregate supply (AS). That is Keynes' famous theory of demand-determined output. If AD exceeds AS, output expands until demand equals supply: if AD is less than AS, output contracts until the two are equal. According to Keynes, it is the level output (i.e. income) that adjusts to equilibrate the goods market, not the interest rate. Of course, interest rates may be affected as output adjusts owing to the impact that changed income has on portfolio demands for financial assets, but that interest rate impact is a secondary induced effect.

Third, for Keynesians, it is possible that saving and investment may not respond to lower interest rates. It is here that the "bastard" dimension in ZLB economics creeps in and obfuscates the debate by asserting the problem is a rigidity that blocks lower interest rates, rather than acknowledging the inherent limited effectiveness of lower interest rates. For Keynesians, however, lower interest rates may not increase AD if saving and investment are interest insensitive. Consequently, no matter how low the interest rate, AD does not increase because investment does not increase and saving does not fall. In effect, there is no interest rate that can deliver full employment output.

It is this line of thinking that has gotten lost in contemporary mainstream economics because of the re-embrace of classical "loanable funds" interest rate theory. This has major analytical and policy implications. First, the ZLB does not explain stagnation. Even if interest rates were to fall, stagnation would persist. That means another theory of stagnation is needed. Second, it means the policy of negative interest rates recommended by ZLB economics will be ineffective. In fact, as argued below, it may be worse than ineffective: it can be harmful.

There is a very simple, intuitive reason for why negative interest rates have no effect on investment. Once a firm's return on investment hits zero, it will prefer to use any additional financing to acquire non-produced assets whose return is still positive. Even if central banks make the cost of finance negative, firms will still refuse to invest more into value added assets and will prefer to acquire non-produced assets - such as land, commodities like gold, patents and copyrights, and technical know-how and organizational capital embodied in existing firms acquired through mergers.

Monetary policy works by decreasing the money market risk free interest rate, lowering the price of credit and the return on money. That induces firms to change the composition of their financing and asset holdings. A negative interest rate will have several effects. First, firms will switch from equity finance to loan finance because loan finance is cheaper. They can do this via debt financed share buybacks and special dividends to shareholders, which is exactly what has been happening since the 2008 recession. The result is increased corporate indebtedness and more leveraged balance sheets.

Second, even though the interest rate is negative, firms will not undertake additional investment once the return to investment falls to zero. That is because firms can do better using credit to purchase existing non-produced assets. Negative interest rates will produce debt-financed merger and acquisition booms that bid up existing asset prices, but they will not increase new investment. The problem is not the ZLB: it is that negative interest rates cannot spur new investment given the presence of other assets with higher returns.

4. Other structural factors limiting investment

This fundamental problem is compounded by other problems overlooked by mainstream economists. First, economists assume additional capital can always be put to use because they assume smooth substitutability between capital and labor. In their view, it is impossible to have excess capital because excess capital can be put to work by firing labor. However, if production is characterized by fixed proportions of capital and labor, it is possible to have excess capacity and no economic need for additional investment.

Second, capital is long-lived and lumpy. The willingness to use low interest rate loans to finance investment today depends on expectations of future interest rates. Even if today´s loan rates are negative, firms may be unwilling to borrow to finance relatively low yielding investment today if they think that those investment projects will be saddled with future high interest costs.

5. Can negative interest rates reduce saving?

The other side of the Keynesian demand shortage problem is saving. That raises the question if negative interest rates cannot increase investment, can they increase demand by reducing saving? Here too, the answer is probably not.

First, according to consumption theory, a lower real interest rate gives rise to both positive substitution and negative income effects. Consequently, the theoretical effect of lower real interest rates on consumption is ambiguous. The conflict between substitution and income effects is easily understood. Negative interest rates provide an incentive to save less and consume now. Balanced against that, negative interest rates lower future income and total lifetime income, which gives an incentive to increase saving to compensate for that loss.

Second, a negative nominal interest on money holdings (i.e. deposits) can be thought of as a form of tax on deposits. That lowers real wealth and will generate a negative "wealth effect" on consumption spending and AD. Balanced against this, there will be a positive wealth effect on AD owing to the portfolio shift away from money to other assets that increases the price of existing assets.

In sum, economic theory says the net impact of negative nominal interest rates on saving and AD is ambiguous. Negative interest rates could reduce saving, but they could also increase saving.

6. The effect of NIRP on AD reconsidered

The above arguments have profound implications. NIRP advocates simply assume that lower interest rates will increase AD by increasing investment and lowering saving. That assumption is wrong.

The impact of lower interest rates on demand may initially be positive, but the impact likely steadily diminishes and eventually becomes zero as the return on investment falls to zero. That means there may be no interest rate that can ensure sufficient AD to deliver full employment. Furthermore, if negative interest rates increase saving, NIRP will worsen the problem of demand shortage and further lower output and employment.

Lastly, there is a widespread perception that NIRP increases AD via deleveraging and refinancing which lowers interest transfers from high-spending debtors to creditors. That is certainly true of lower rates in a positive interest rate world, but it may not be true in a negative rate world. As will be discussed in the next section, if NIRP lowers the short-term interest rate, it may penalize savers without lowering the interest rate to borrowers. Indeed, it can even raise the interest rate for borrowers. If QE is used to push down the long bond rate, that helps government finances and it helps private borrowers who refinance. However, it can also increase total leverage and interest payments if private agents increase borrowing to finance asset purchases.

7. Financial disruption effects of NIRP

In addition to these adverse demand effects, NIRP may have adverse effects via the financial sector. These financial effects tend to get over-looked because mainstream economic theory views money as "neutral" (i.e. money only impacts prices and inflation, and not output and employment). However, money, and financial effects can indeed produce adverse effects

including credit disruption in the banking sector, the promotion of generalized financial instability, and macroeconomic policy whiplash effects.

a) Disruption of bank credit

Negative interest rates can disrupt the provision of bank credit and also raise the cost of credit. At this stage, it is necessary to discuss the two options for implementing negative rates. Option 1 has the central bank lower its lending rate to commercial banks below zero. Option 2 has the central bank charge commercial banks with interest on their deposits with the central bank. In practice, central banks have favored option 2 over option 1.

Option 1. If the central bank charges a negative lending rate, the wholesale cost of finance is negative. Banks will push their deposit rates below zero, penalizing depositors. Depositors will have an incentive to reduce money holdings and shift into other assets, and lower rates of return may then increase or decrease saving. Firms will not increase investment once the return on investment becomes zero. Instead, they will use negative interest rate credit to reduce equity (i.e. stock buybacks) and finance merger and acquisition activity.

Central bank lending at a negative interest rate is an implicit fiscal transfer.

Effectively, the central bank subsidies borrowing. Viewed in this light, a negative central bank loan rate is a form of helicopter money that drops money on the debtors and those with access to lines of credit. The fact that a negative lending rate is an implicit fiscal transfer, combined with the incentive it gives to increase leverage, may explain why central banks have shied away from setting a negative target interest rate.

Option 2. This involves the central bank charging commercial banks interest on reserves. This is a subtly different way of lowering interest rates as it works asymmetrically by lowering just the deposit rate.

Commercial banks will pass the central bank's charges on to ordinary depositors by lowering the deposit rate they pay. On the positive side, a lower deposit rate induces a portfolio shift into other financial assets, which drives up asset prices and generates a wealth effect that stimulates consumption. On the negative side, lower rates on deposits are akin to a tax that lowers depositors' interest income, which may decrease consumption spending and increase saving.

In addition to these simple effects, there are also more complex possible effects. Suppose depositors are valued by individual banks because they are a cheap and stable source of bank finance based on long-term customer relations. In that case, banks may refrain from passing on their costs to depositors. Instead, the central bank's deposit charge will be shifted to other areas. One possibility is that banks eat the cost, which will lower bank profits. That could cause banks to engage in credit rationing or to withdraw from providing credit to particular markets and customers which are more risky and only marginally profitable. That would adversely impact AD. A second possibility is that banks would pass the cost on to borrowers via higher loan rates. In that case, the central bank's attempt to generate negative interest rates to stimulate the economy would backfire in the form of higher loan rates that discourage borrowing and reduce AD.

b) Financial fragility and instability

A second financial problem from NIRP concerns financial fragility and instability. In general, these concerns can also apply to lower interest rates, but they are amplified in an environment of negative interest rates.

First, we have already seen that NIRP encourages risky balance sheet re- engineering by firms. The availability of negative interest rate credit will not induce additional investment. Instead, firms will use that credit to repurchase equity (i.e. shift toward debt financing) and to purchase existing assets (i.e. engage in speculative merger & acquisition activity). This is exactly what has happened since low interest rate policies have been implemented in the wake of the financial crisis and the result has been to leverage up corporate balance sheets. That balance sheet leveraging creates financial fragility as increased debt makes firms vulnerable to future unexpected adverse developments. It also poses a threat to future economic activity by limiting firms' capacity to undertake future investments.

Second, negative interest rates encourage asset price bubbles. With regard to firms, there is an incentive to engage in credit-financed mergers and acquisitions. With regard to households, there is an incentive to reduce portfolio holdings of money and bonds, and to increase holdings of risky assets and alternative stores of value in a chase a chase for yield and capital gains. Both of these actions inflate asset prices.

c) Financial disintermediation

Another set of challenges concerns the possible impact of NIRP via financial disintermediation. Negative deposit rates induce economic agents to reduce money holdings and look for other stores of value and media of exchange. This search for alternate stores of value may show as precious metals inflation, commodity price inflation and land inflation as agents look for other ways to hold wealth. Changes in media of exchange may result in the increased use of cash and credit cards, the introduction of new monies such as bit-coin, and allocation of more resources to minimize money holdings subject to holding charges.

These developments constitute a form of inefficiency that reduces potential economic output. Money reduces transactions costs. Imposing a penalty on money raises transaction costs, which can both discourage productive transactions and reduce the gain from those transactions that are undertaken. This constitutes an adverse "supply-side" effect of NIRP. Furthermore, particularly as regards use of cash, there may be adverse fiscal implications in the form of tax evasion and the increased size of the underground economy.

Additionally, ultra-low and negative interest rates can cause financial disruption by jeopardizing the business models of insurance and retirement income provision sectors, which are large and important financial sub-sectors. Insurance companies rely on investment income to meet claims, while pension funds rely on investment income to meet future pension payments. Both insurance companies and pension funds are threatened by ultra-low and negative interest rates which lower their income.

In response, insurance companies may raise premiums, which is the equivalent of a small tax that lowers aggregate demand. Both insurance companies and pension funds will also shift

the composition of their portfolios toward risky assets, in a search for yield. That shift will add to asset price bubble pressures, and it also makes their balance sheets more fragile and vulnerable in the event of future asset price reversals. This vulnerability has no immediate impact today, but it is a channel for future economic disruption. It illustrates how the use of monetary policy today can impose significant costs tomorrow.

8. Whiplash effects of NIRP

The potential future costs of financial fragility and asset price bubbles raise the prospect of policy whiplash effects due to contradictions between current and future policy actions.

The economy currently suffers from shortage of AD owing to systemic failings related to income inequality and trade deficit leakages. That demand shortage was papered over by a thirty-year credit bubble plus successive asset price bubbles, which eventually burst with the financial crisis of 2008. Now, central banks are seeking to revive AD via negative interest rates that will reflate the credit and asset price bubbles.

This policy is based on a contradiction. If it is successful, it will necessitate raising interest rates in future. That risks triggering another financial crisis as the new bubbles burst and the effects of accumulated financial fragility magnify the ensuing fallout. When asset prices are inflated, subsequent very small upward moves in the interest rate can produce large capital losses. In effect, policy measures to revive the economy now via NIRP can generate even greater imbalances that produce whiplash effects later.

This whiplash dynamic has been building over the past thirty years. Disinflation allowed successive lowering of interest rates from their double digit levels of 1980, thereby producing successively larger boom – bust cycles. That process appeared to be ended by the financial crisis of 2008 which pushed the economy to the ZLB. However, central banks are now seeking to circumvent the ZLB circuit-breaker via NIRP. If NIRP is pursued for an extended period of time, without remedying the deep causes of AD shortage, the prospect is a future more intractable economic crisis.

9. Competitive devaluation and NIRP

In addition to these adverse domestic economic effects, NIRP also has adverse international economic effects. Those adverse effects concern the process of competitive devaluation, which Brazil's former finance minister Guido Mantega has referred to as "currency wars".

The problems of competitive devaluation were illustrated in the Great Depression of the 1930s. In the run up to the Second World War, competitive devaluation produced a "beggar-thy-neighbor" international political economy. In an economic environment of demand shortage, countries have an incentive to depreciate their currencies. That makes their exports cheaper and imports more expensive, which together increases demand for domestically produced goods and services. The trouble is the demand comes at the expense of demand for other countries' products: hence, the beggar-thy-neighbor label.

This problem was pervasive in the 1930s and has re-emerged with NIRP, which generates competitive devaluation on steroids. Negative interest rates give private investors an incentive to exit a country's money and exchange it for another's to earn higher rates elsewhere. These incentives have only been strengthened by financial capital mobility and capital account openness. For example, in Japan negative interest rates have sparked a carry-trade that involves borrowing yen and then converting into dollars to buy higher yielding dollar denominated securities.

Additionally, globalization has increased policymakers' incentives to engage in strategic competitive devaluation by encouraging an offshore manufacturing model in which corporations from developed countries either build export production platforms in developing countries or outsource manufacturing to those countries. Developing countries then sell that production in developed country markets. This has accelerated the prevalence of export-led growth whereby developing economies grow by increasing their exports rather than by developing their own domestic markets. Since exchange rates are key to the export-led model, this intensifies policymakers' incentives for competitive devaluation because countries are trapped in a dog-eat-dog struggle for export markets and new foreign investment. NIRP may worsen this proclivity to monetary policy conflict between countries by increasing the sensitivity of exchange rates to the policy interest rate.

Worse, competitive devaluation does not just shift demand between countries, it may also reduce total global demand by creating financial uncertainty, which undermines firms' incentives to invest. Firms will refrain from making costly investments if they think that future exchange rate movements may undermine the competitiveness and profitability of those investments.

10. Political economy and future stagnation dangers of NIRP

A last set of issues concerns NIRP's political-economic impacts on wealth distribution. Like QE, NIRP aims to increase the price of financial assets – particularly risky assets like equities which become more attractive as interest rates fall. Since such risky assets are predominantly held by wealthier households, that further increases the relative wealth of those households at a time of heightened income and wealth inequality.

That may have significant adverse impacts on politics and policy. First, given the powerful role of money in politics, increasing the wealth of the wealthy enables them to further influence politics. Second, to the extent that the wealthy are satisfied with the impacts of NIRP, that diminishes the pressure for other policies to strengthen the economy which could have a greater effect on other segments of the population. NIRP therefore does double damage: it has a plutocratic bias and it also removes the pressure for other more substantial policies.

NIRP also has profound effects on the outlook for retirement and retirement income. Lower interest rates reduce the capacity to save for retirement, and negative interest rates have an even worse effect. Ordinary households are more risk averse because of their lower wealth and inability to bear losses. Thus, asset price gains induced by policies like QE and NIRP are likely to bypass those households because they cannot afford to take the risk of holding risky asset classes and suffering potential future losses.

Historically, bank certificates of deposit (CDs) and bonds have provided risk- appropriate returns for such households, but NIRP takes both off the table. CD yields can go negative and bonds become vulnerable to price losses in the event that future interest rates are higher. In a NIRP fed environment of asset price bubbles, ordinary risk averse households are stuck between the devil and the deep blue sea - the devil of negative interest rates and the deep blue sea of potentially disastrous capital losses from a burst asset price bubble. Moreover, this tradeoff comes at a time when defined benefit pensions have been significantly curtailed and the risk of retirement income provision has been shifted on to individual households. That microeconomic impact is over-looked by monetary economics which tends to focus exclusively on macroeconomic concerns, and it explains why NIRP has encouraged bitter political feelings that foster toxic political outcomes.

Younger workers are also vulnerable to NIRP induced asset market distortions.

Those who acquire equities for their retirement portfolios risk large future losses if interest rates revert to normal levels, which is the express goal of NIRP. Historically, retirement income has been facilitated by an equity premium. NIRP risks transforming that into an equity penalty.

The problem is even worse with house prices, which are particularly prone to NIRP induced bubbles. House purchases are largely financed with mortgages, and lower interest rates therefore drive up prices by lowering mortgage payments and increasing cash-flow affordability. However, there are massive downsides stemming from mortgage debt. The interest payment on a $200,000 home at 6% is the same as the payment on a $400,000 home at 3%. Yet, purchasers are saddled with a larger mortgage that they must pay back in the future, and they also lose financial flexibility and are rendered more financially vulnerable. If house prices subsequently fall back because interest rates mean revert (i.e. revert to normal), then borrowers will find themselves underwater. That may prevent them from selling and moving to take up better employment opportunities elsewhere. If the household suffers an economic shock (e.g. a job loss), it may be unable to pay its mortgage and risks default and the lasting losses that go with that.

The benefits of NIRP induced stock price and house price inflation go to existing owners. Normal future capital gains are brought forward and transferred to current owners, while buyers are subjected to significant financial risk. Viewed in such a light, asset price inflation is a form of inter-generational transfer that loads the future with burdens and risks while the transfer of future capital gains removes an important source of future economic stimulus.

Putting the pieces together, using NIRP to fight stagnation today is likely to be ineffective and possibly counter-productive for reasons discussed above. At the same time, NIRP may shift stagnation into the future via asset transactions that burden the future, and that process can generate future disappointments and resentments that produce ugly politics.

11. Conclusion: the misguided new consensus of ZLB economics and NIRP

NIRP is quickly becoming a consensus policy within the economics establishment. This paper has argued that consensus is dangerously wrong, resting on flawed theory and flawed policy assessment.

NIRP draws on fallacious pre-Keynesian economic logic that asserts interest rate adjustment can ensure full employment. That logic has been augmented by ZLB economics which claims that times of severe demand shortage may require negative interest rates, which policy must deliver by either charging banks for holding reserves or via extreme QE focused on long bonds.

NIRP turns a blind eye to the possibility that negative interest rates may reduce AD, cause financial fragility, create a macroeconomics of whiplash owing to contradictions between policy today and tomorrow, promote currency wars that undermine the international economy, and foster a political economy that spawns toxic politics. Worst of all, NIRP maintains and encourages the flawed model of growth, based on debt and asset price inflation, which has already done such harm.

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Japan's liquidity trap

Tanweer Akram[1] [Thrivent Financial]

Abstract

Japan has experienced stagnation, deflation, and low interest rates for decades. It is caught in a liquidity trap. This paper examines Japan's liquidity trap in light of the structure and performance of the country's economy since the onset of stagnation. It also analyzes the country's liquidity trap in terms of the different strands in the theoretical literature. It is argued that insights from a Keynesian perspective are still quite relevant. The Keynesian perspective is useful not just for understanding Japan's liquidity trap but also for formulating and implementing policies that can overcome the liquidity trap and foster renewed economic growth and prosperity. Paul Krugman (1998a, b) and Ben Bernanke (2000; 2002) identify low inflation and deflation risks as the cause of a liquidity trap. Hence, they advocate a credible commitment by the central bank to sustained monetary easing as the key to reigniting inflation, creating an exit from a liquidity trap through low interest rates and quantitative easing. In contrast, for John Maynard Keynes (2007 [1936]) the possibility of a liquidity trap arises from a sharp rise in investors' liquidity preference and the fear of capital losses due to uncertainty about the direction of interest rates. His analysis calls for an integrated strategy for overcoming a liquidity trap. This strategy consists of vigorous fiscal policy and employment creation to induce a higher expected marginal efficiency of capital, while the central bank stabilizes the yield curve and reduces interest rate volatility to mitigate investors' expectations of capital loss. In light of Japan's experience, Keynes's analysis and proposal for generating effective demand might well be a more appropriate remedy for the country's liquidity trap.

Keywords: Liquidity trap; Japan; monetary policy; interest rates

JEL Classifications: E02, E40, E43, E50, E52, E58, E60

I. Introduction

Japan has experienced low economic growth and either low inflation or deflation for more than two decades. Nominal GDP has been stagnant for almost 25 years in Japan. Real GDP has been essentially flat since the mid-1990s. Slow growth in Japan resulted in the country falling further behind the US in the growth of real GDP per capita. Nominal short-term interest rates have been close to zero. Nominal long-term interest rates, as measured by the yields of Japanese government bonds (JGBs), have also been extremely low for many years, while the Bank of Japan's (BoJ) monetary policy has been highly accommodative for decades.

Japan appears to be in an economic condition where accommodative monetary policy, characterized by low nominal interest rates and an elevated balance sheet of the central

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bank, is insufficient to revive growth. Gross domestic business fixed investment has not responded favorably to low nominal interest rates. Monetary easing has been unable to overcome deflationary trends. When taken together, these characteristics are generally regarded in the economics literature as a case of a liquidity trap, originally described in Keynes's (2007 [1936]) *General Theory*.

The phenomenon of feeble economic growth and low nominal interest rates is no longer unique to Japan since the global financial crisis. Long-term interest rates in the US, the UK, and Canada have remained ultra-low by historical standards many years after the global financial crisis.

Several countries in the euro zone, such as Germany, France, Netherlands, Austria, and Finland, and a few countries outside of the euro zone, including Sweden and Switzerland, are experiencing either exceptionally low interest rates or even negative interest rates across the yield curve on government bonds. Quite recently, interest rates in Japan have also turned negative.

In light of the prevalence of feeble economic growth and low nominal interest rates in advanced capitalist economies, understanding Japan's liquidity trap can be quite useful for understanding the same phenomenon elsewhere. Some of the key questions facing economists and policymakers, both in Japan and abroad, are as follows: What are the causes of the sustained liquidity trap in Japan? Will enhanced quantitative and qualitative monetary easing (QQME) being pursued by the BoJ be sufficient to generate inflation and revive economic growth?

Besides accommodative monetary policy, what other measures, if any, can the Japanese authorities (and policymakers in other advanced countries) undertake to overcome the country's liquidity trap and achieve sustained economic growth and prosperity?

This paper attempts to address these questions by carefully examining the case of Japan's liquidity trap in light of: (i) past and recent economic developments in Japan, drawing on Akram (2014), Akram and Das (2014a, 2014b), Bernanke (2000), Hayashi and Prescott (2002), Koo (2008), Krugman (1998a, 1998b), Lam and Tokuoka (2011), Posen (2010), Sher (2014), Tokuoka (2012), and Uedo (2012); and (ii) different strands in the theoretical literature on liquidity trap and related issues, including Adam and Billi (2006), Bernanke (2000, 2002), Eggertsson (2005, 2006, 2012), Eggertsson and Krugman (2010), Eggertsson and Pugsley (2006), Eggertsson and Woodford (2003), Jung, Teranishi, and Watanabe (2005), Keynes (1930, 2007 [1936]), Kregel (1998, 2011, 2014), Krugman (1998a, 1998b), Refischenedier and Williams (2000), Uedo (2012), Wolman (2005), Woodford (2001, 2003), and Wray (2003 [1998], 2012).

Section II examines Japan's economic performance and the key characteristics of its economy since the onset of the country's economic stagnation in the mid-1990s. Section III discusses the theory of a liquidity trap and critically presents several theoretical arguments concerning a liquidity trap, contrasting Keynes's (1930, 2007 [1936]) view with that of contemporary theorists, such as Krugman (1998a, 1998b) and Bernanke (2000, 2002). Keynes believes that the risk of a liquidity trap originates from a sharp rise in investors'

liquidity amid heightened uncertainty. His analysis can be useful in understanding the case of Japan's liquidity trap.

Keynes advocates a multifaceted strategy for overcoming a liquidity trap. Keynes's strategy for overcoming a liquidity trap consists of not just low interest rates and the containment of interest rate volatility in monetary policy but also public investment and employment creation in fiscal policy and measures to boost the marginal efficiency of capital to raise business confidence.

Keynes's strategy provides a solid basis for Japanese authorities to formulate and implement measures to overcome the country's liquidity trap and stagnation. Section IV concludes.

II. Japan's economic performance and key characteristics of its economy

Japan's Economic Stagnation and the Causes of Sustained Slow Growth

Japan experienced strong private sector credit growth in the 1980s and the early 1990s (figure 1). There was a huge surge in credit to the country's corporate sector. This strong credit growth, in conjunction with speculation in real estate and financial assets, fueled the bubbles in the 1980s. Land prices and equities prices rose substantially. However, the bubble in equities ended in the early 1990s (figure 2). Residential land prices also collapsed in the early 1990s.

Figure 1: Japan experienced strong private sector credit growth in the 1980s

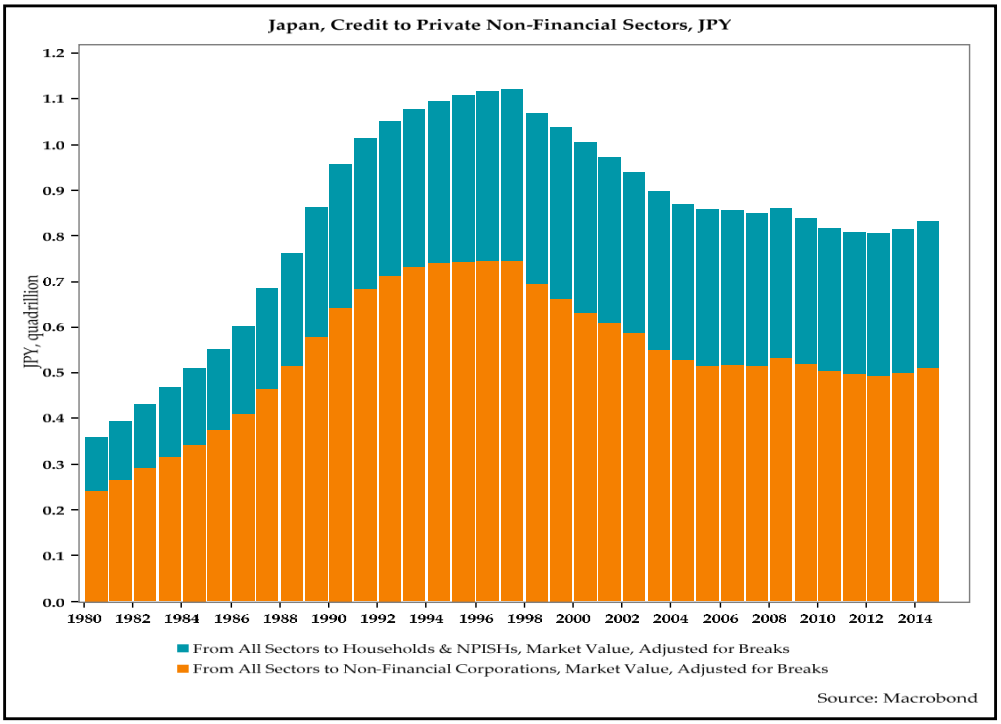
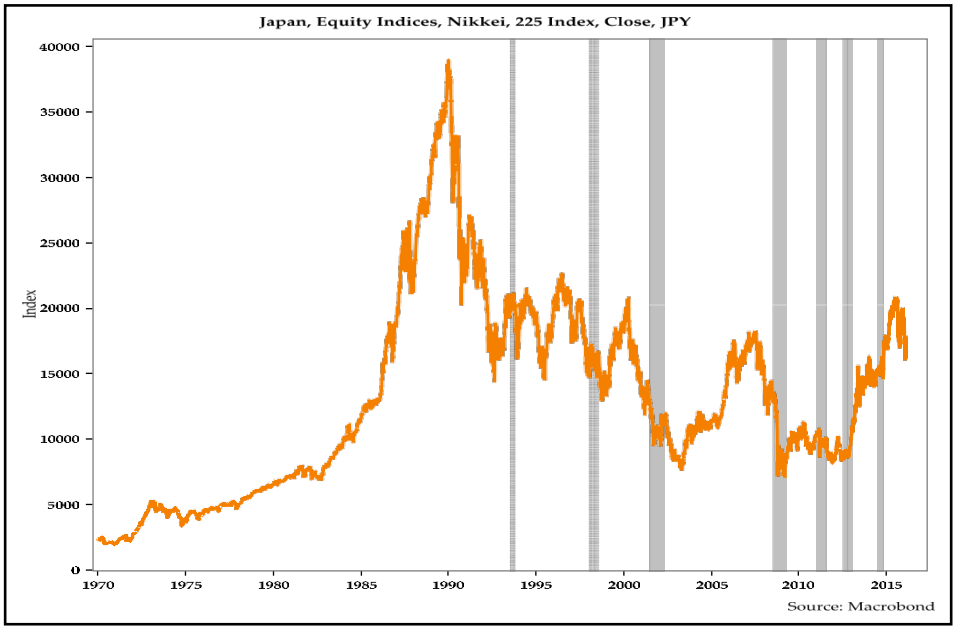


Figure 2: Japan's equity bubble burst in the early 1990s



With the bursting of the bubble, economic growth slowed down markedly. Labor productivity growth in Japan slowed noticeably since the 1990s in comparison to the strong rise in labor productivity from the early 1950s to the late 1980s. Labor productivity also slowed in Japan since the 1990s in comparison to that of most other advanced countries, including the US, during the same period. Hayashi and Prescott (2002) and Akram (2014) have documented the remarkable decline in the country's labor productivity growth. Moreover, during the same period, labor force growth in Japan was noticeably slower than in the past and also in comparison to most other advanced countries, particularly the US.

Real GDP growth has been noticeably slow since the early 1990s (figure 3). The slowdown in growth started after the bursting of the bubble, but has continued since then, exacerbated by the global financial crisis, the Tohuku earthquake, and the tax hike of 2014. This is in sharp contrast to the strong growth performance that the country experienced between the decades of the 1950s to the 1980s. Nominal GDP has been stagnant since the early 1990s (figure 4).

Figure 3: Japan's real GDP growth has been disappointing since the mid-1990s

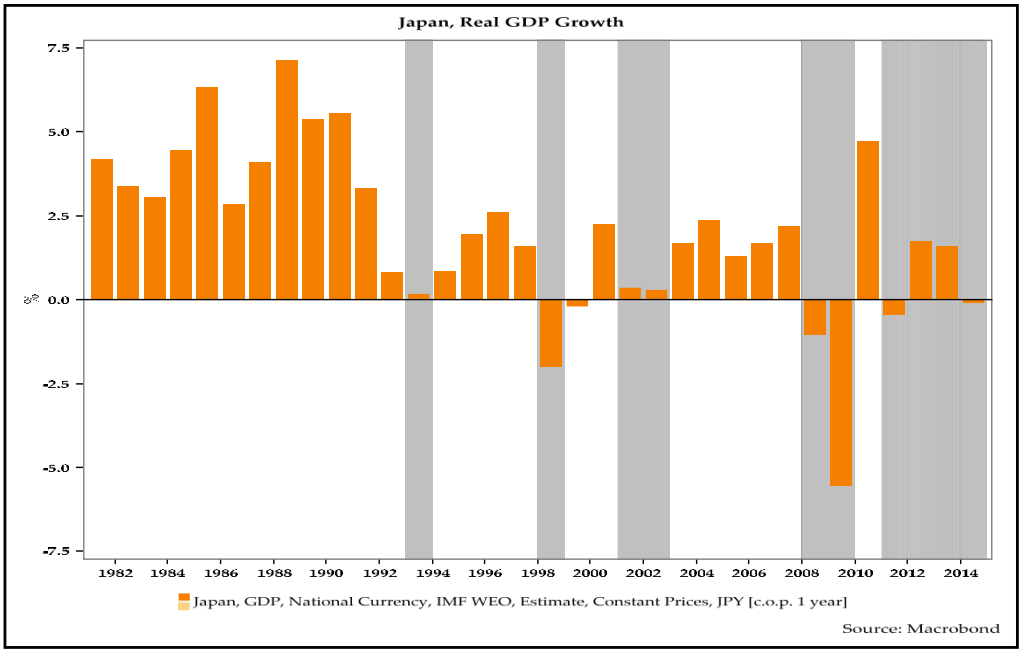
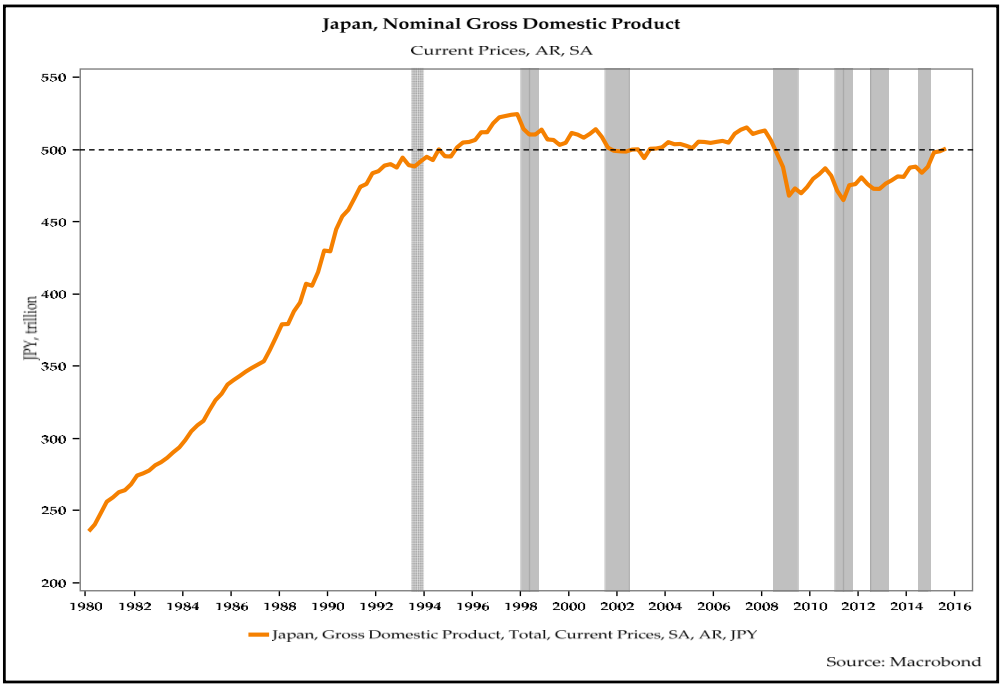


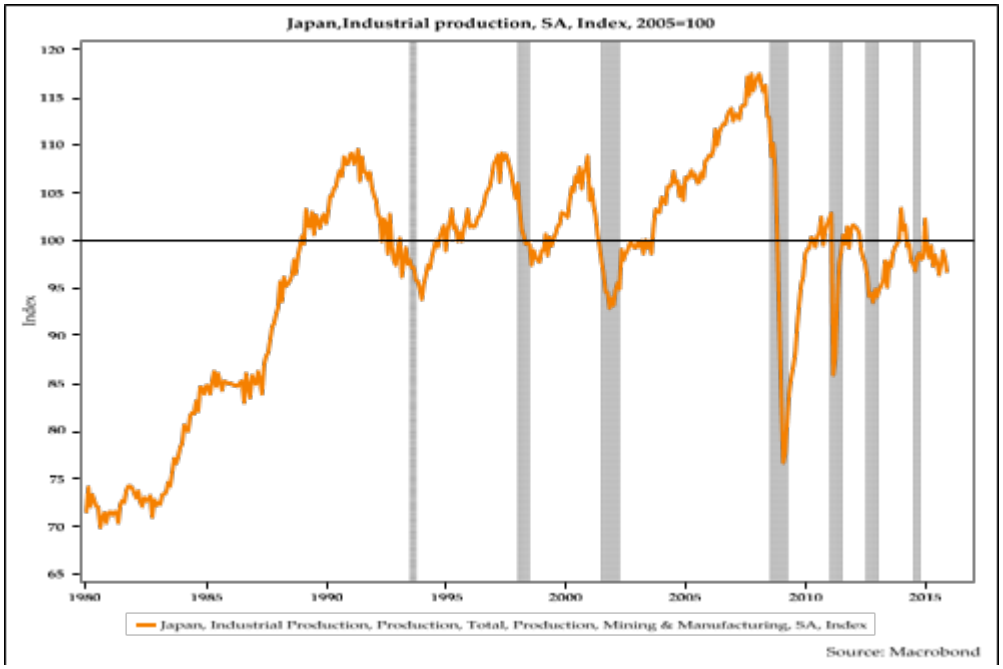
Figure 4: Nominal GDP has been stagnant since the mid-1990s



Industrial production in Japan has been remarkably weak since the mid-1990s (figure 5). Industrial production declined during the slowdowns of the 1990s and the early 2000s. After the recession of 2001, industrial production did rise moderately, but it fell sharply during the global financial crisis. The decline in industrial production in Japan was particularly sharp, as

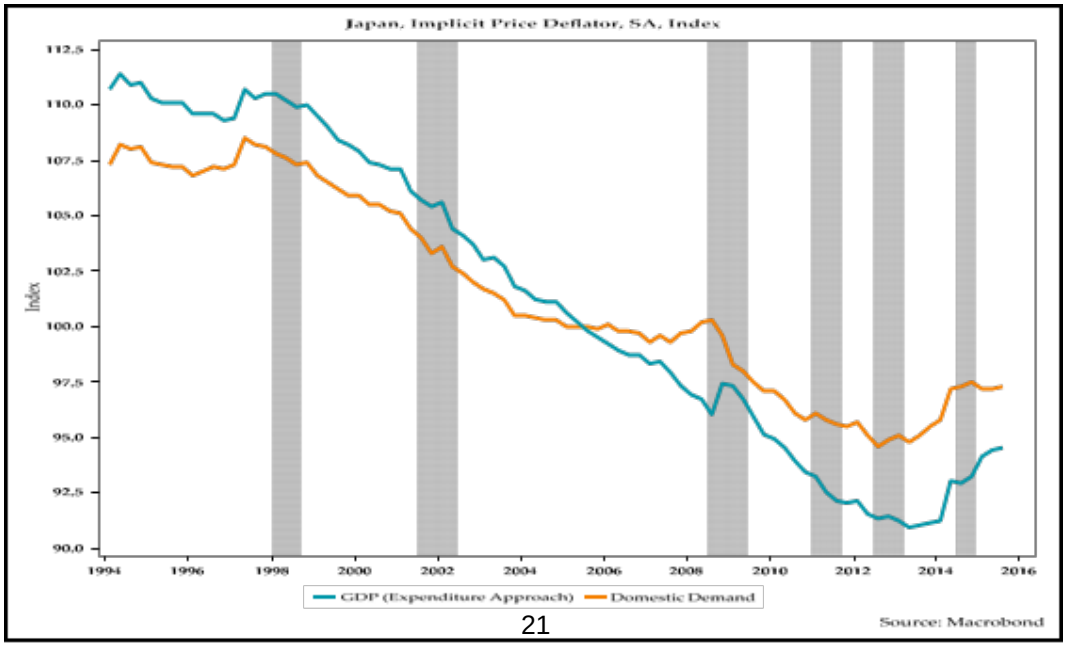
the advanced manufacturing, motor vehicle production, and the electronics industries were severely affected (Sommer 2009). In 2011, industrial production and exports were disrupted by the Tohuku earthquake and fell sharply again. Recovery in industrial production has remained weak since then.

Figure 5: Industrial production remains below its pre-crisis peak



The weakness of effective demand has resulted in persistently low inflation and deflationary trends for several decades (figure 6). As a result, the price level has declined notably since mid- 1994

Figure 6: Japan has experienced low inflation and deflation as measured by implicit price deflators for several decades



Japan's economic stagnation has put a dent in real income growth and the relative standard of living. Due to protracted economic stagnation, per capita real income growth (measured on a purchasing power parity basis) has been tepid. The gap in per capita real income between the US and Japan has increased. While in the early 1990s, Japan's per capita real income was nearly 80% of the US's per capita real income, as of 2014 it amounted to 70% (figure 7). Per capita real income in Japan was the highest in Asia in late 1980s, but it is now behind some of its Asian neighbors, including Singapore and Hong Kong (figure 8). As of 2014, its per capita real income is barely ahead of South Korea's per capita real income.

Figure 7: Per capita real income growth has slowed, resulting in a widening of the gap between Japan and the US

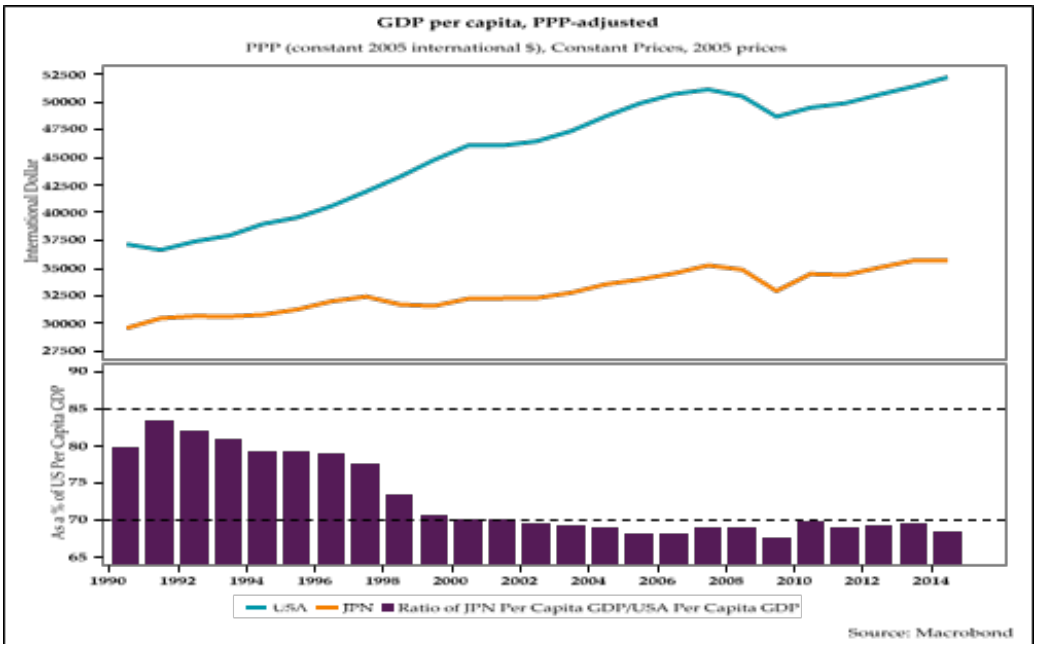
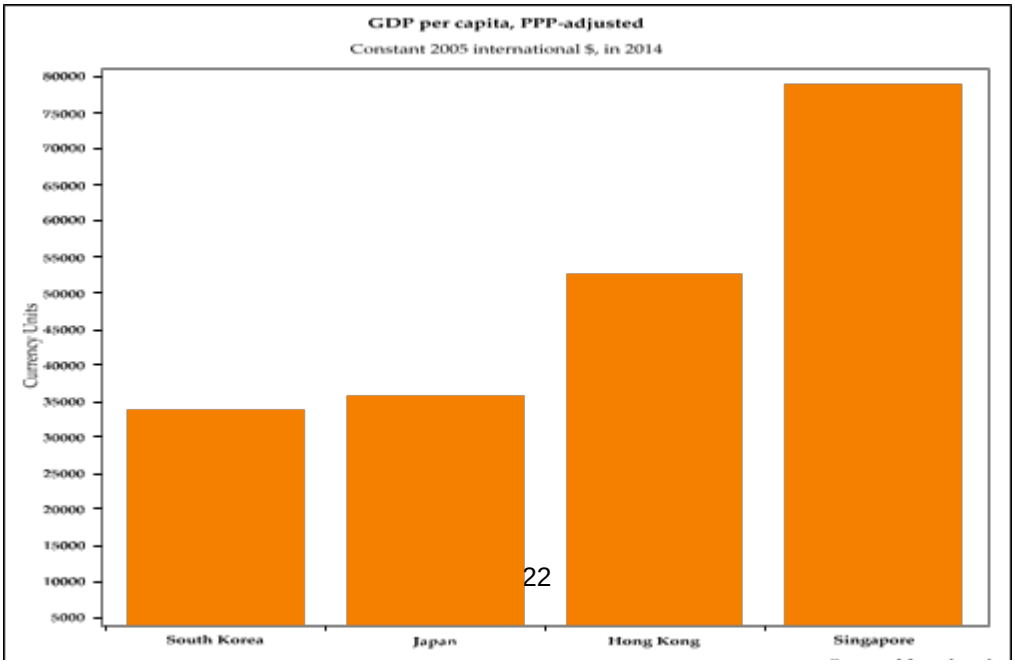
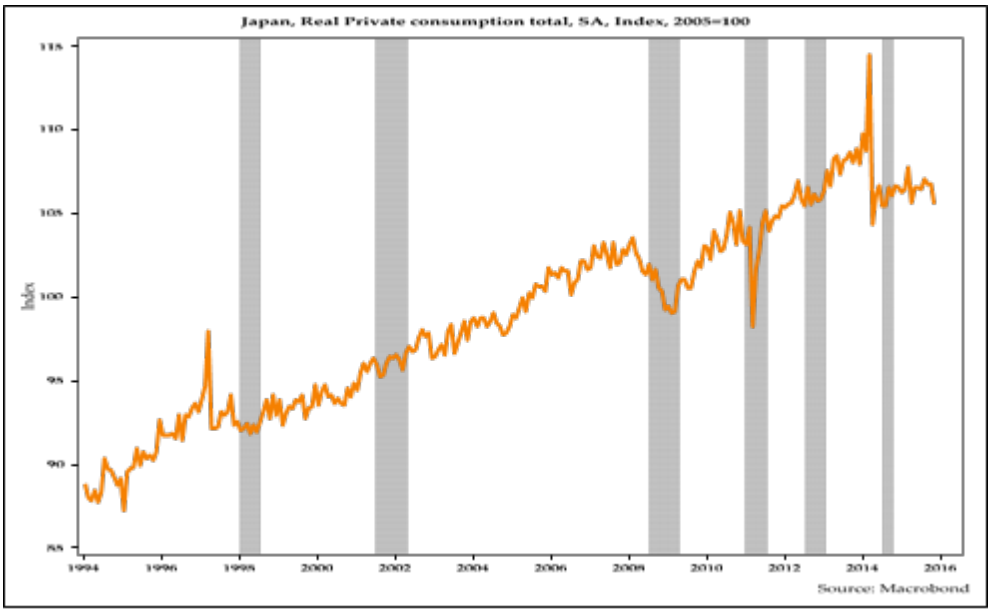


Figure 8: Per capita real income in several Asian countries exceeds that of Japan



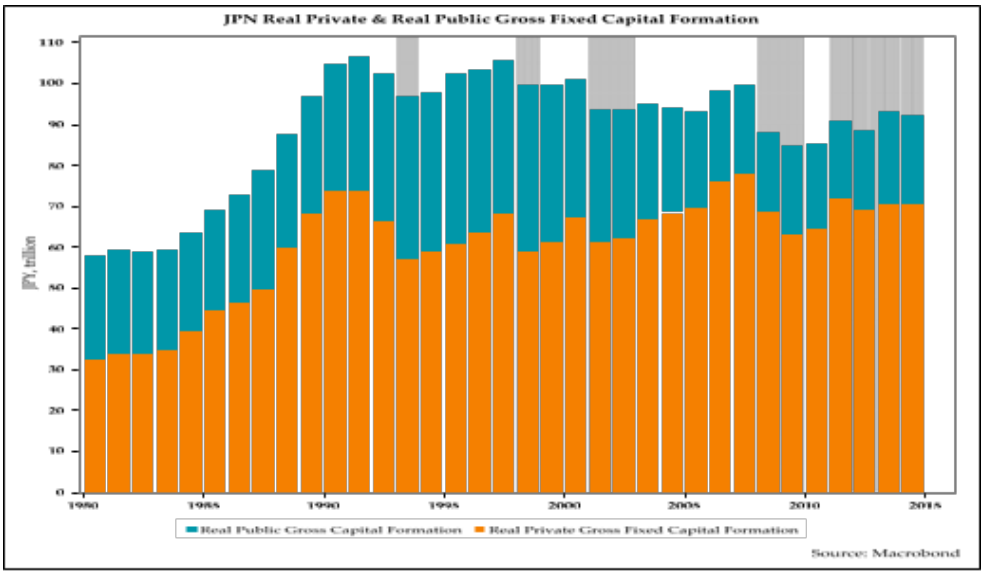
Real consumption growth has slowed down markedly due to the lack of growth in real disposable income and the feeble pace of growth in real earnings (figure 9). It was already fairly tepid since the mid-1990s, but consumption declined during the 2008 recession and again after the Tohuku earthquake. Prior to the tax hike in April 2014, consumption had spiked for several months in anticipation of higher prices, but immediately after the tax hike consumption dropped drastically. Since then it has remained quite weak

Figure 9: Real consumption has been weak since the mid-1990s



Investment spending has been stagnant since the early 1990s (figure 10). The level of private investment has been fairly flat, while the level of public investment in Japan has declined, particularly since the beginning of the century. Japanese corporations have preferred to invest overseas rather than domestically because of tepid effective demand and the high cost of production at home. They have invested in emerging Asian countries to take advantage of stronger growth, access to markets, and the lower cost of production and wages.

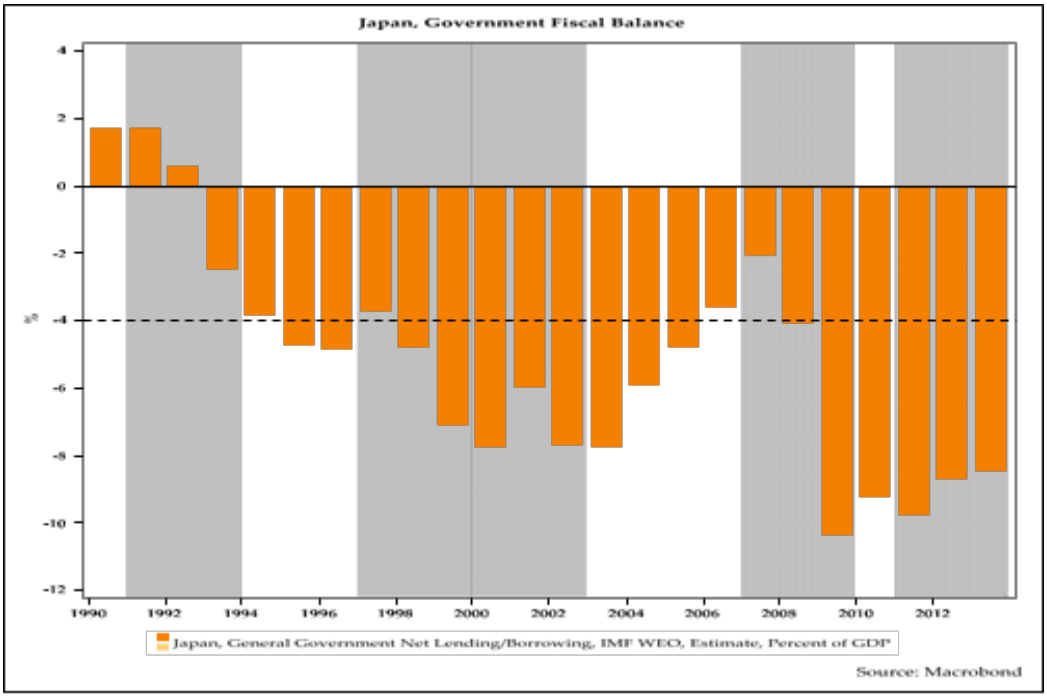
Figure 10: The level of investment has been soft, especially in the public sector



The Government of Japan has been running persistently large fiscal deficits (net borrowing) as a share of nominal GDP since the mid-1990s (figure 11). The country has had large fiscal deficits because tax revenues have been weak due to stagnant nominal GDP and stagnant real income.

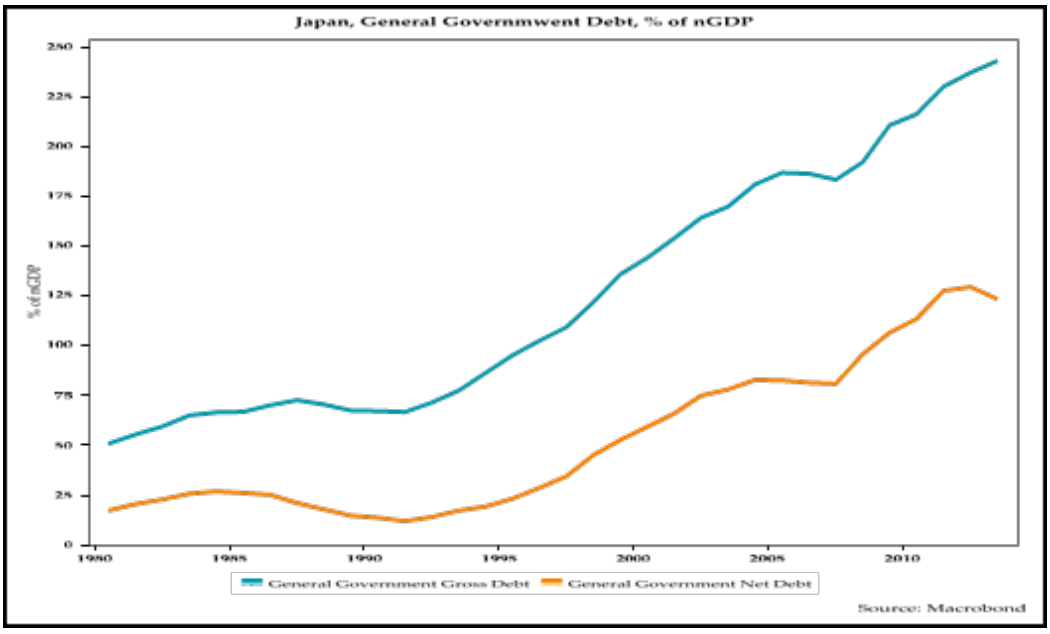
Expenditures have risen due to automatic stabilizers and increased transfers, including social security and medical expenditures related to the aging of the population. Oftentimes the Japanese authorities have increased discretionary spending in response to softening of activity to provide stimulus to the economy, while at times the authorities have raised taxes in efforts to institute fiscal discipline, but such efforts have proven to be counterproductive. In general, large fiscal deficits have stabilized Japan's economy and prevented economic contraction and crisis (Koo 2008). Government spending, taxes, and transfers have also maintained Japan's high standard of living, social stability, and prevented a sharp rise in after-tax income inequality. It has also enabled aggregate business profits to be decent and has maintained the stability of businesses' share of profits in the national income. Nevertheless, there are questions about the effectiveness and efficiency of public spending, fiscal stimulus, and transfer programs in Japan. Oftentimes public expenditures have been directed toward investments and programs that are of limited social benefit to the general public.

Figure 11: The Japanese government has been running persistently large fiscal deficits since the mid-1990s



Japan's chronic fiscal deficits have led to elevated ratios of public debt, measured as the ratio of government gross debt and government net debt to nominal GDP (figure 12). Among the major advanced countries, Japan has the highest ratio of public debt. However, the rise in the ratios of public debt has enabled the private sector in Japan to improve its balance sheet. Japanese public debt is held mostly by Japanese financial institutions.

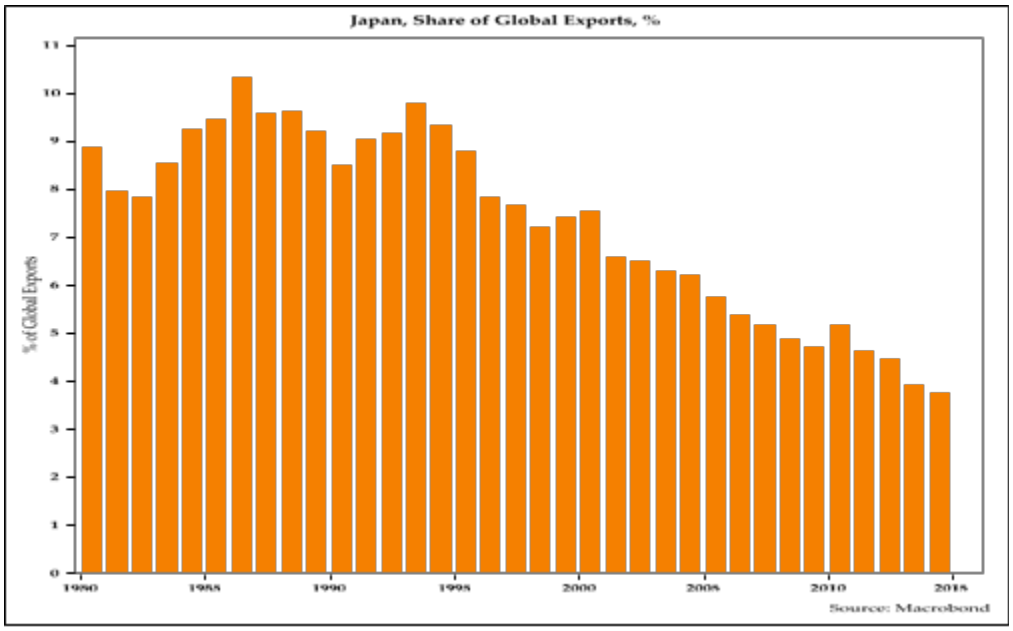
Figure 12: Chronic fiscal deficits have led to elevated ratios of public debt to nominal GDP



The country's share of global exports has declined notably since the mid-1990s (figure 13). The decline in its share of global exports is partly due to the rise of Asian emerging markets (such as China, South Korea, Hong Kong, Singapore, and Taiwan) as major manufacturing centers, as well as the loss of competitiveness of Japanese exports due to the sustained appreciation of the Japanese yen in the early 1990s, in the early 2000s, and again from mid-2000s to late 2012.

Japanese manufacturers of motor vehicles, electronics, machinery, and other goods face stiff competition from overseas manufacturers, not just in emerging Asian countries but also in other advanced countries, including Germany and the US. The Japanese yen's depreciation started in December 2012. In spite of the depreciation, Japan's global exports have been faltering. Motor vehicle exports are still lower than at their peak, but have risen a bit lately. Electronics exports have declined notably and have remained soft due to competition.

Figure 13: Japan's share of global exports has declined markedly



Employment growth in Japan has been disappointing since the mid-1990s (figure 14). Indeed there was hardly any employment growth from 1994 to 2012. Since 2013, however, the Japanese economy has increased employment. The unemployment rate in Japan had been very low until the early 1990s. During the decades of stagnation the unemployment rate rose from around 2.5% in 1994 to around 5.5% in 2002 (figure 15), but continued to decline until the global financial crisis. The unemployment rate rose sharply during the financial crisis but has steadily declined since then to around 3.5% as of mid-2015. Compared to other advanced countries, Japan's unemployment rate remained low even during the global financial crisis and recession; however, there have been substantial changes in the labor market during the years of stagnation. The labor force participation rate has declined, mainly due to the aging of the population. Japan's labor force peaked in the late 1990s and has begun to decline. The ratio of the female to male labor force participation is low in Japan

compared to other advanced countries, and has remained low. Since the late 1990s, the share of part-time employment has increased markedly, and it now constitutes nearly 30% of total employment. The bargaining position of Japanese workers has deteriorated due to the weakness of effective demand, decline in the rate of unionization, globalization, and the decline in the share of manufacturing employment. As a result, real wages have declined since the late 1990s (figure 16). In recent quarters, the aggregate of employees' nominal income (obtained by taking the product of the number of employees, times hours worked and nominal wage per hour) has been rising, but the aggregate of employees' real income (obtained by taking the product of the number of employees, times hours worked and real wage per hour) is still falling sharply. Growth in nominal wages is less than inflation, so real wages are still declining. The weakness of employees' wage income has in turn dampened effective demand.

Figure 14: Employment growth has been soft since the early 1990s until recently

Figure 15: The evolution of the unemployment rate in Japan

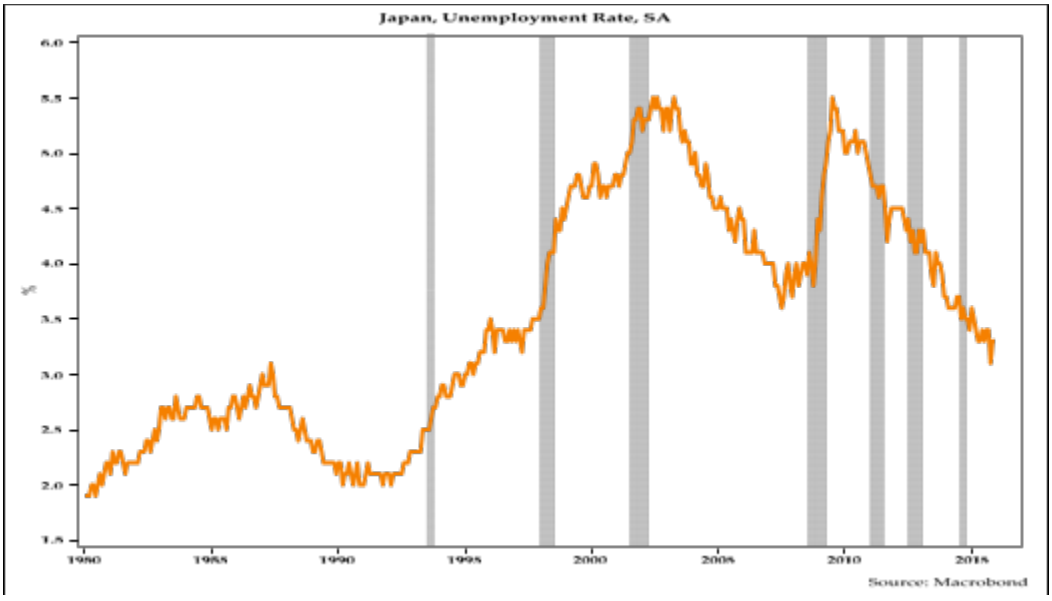
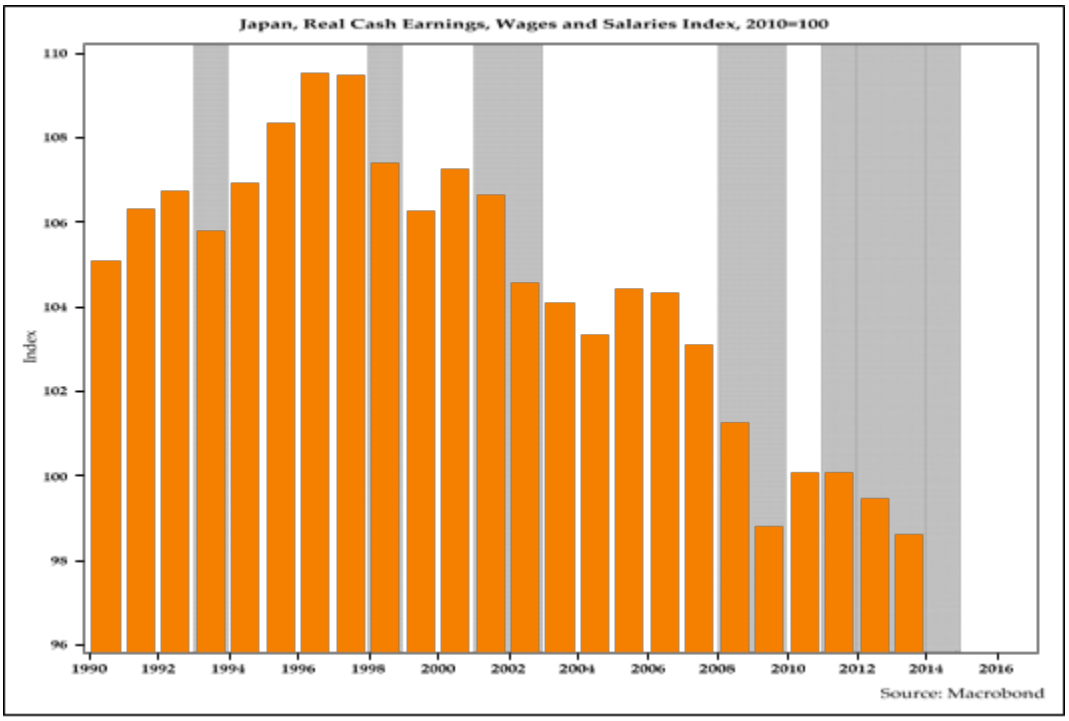


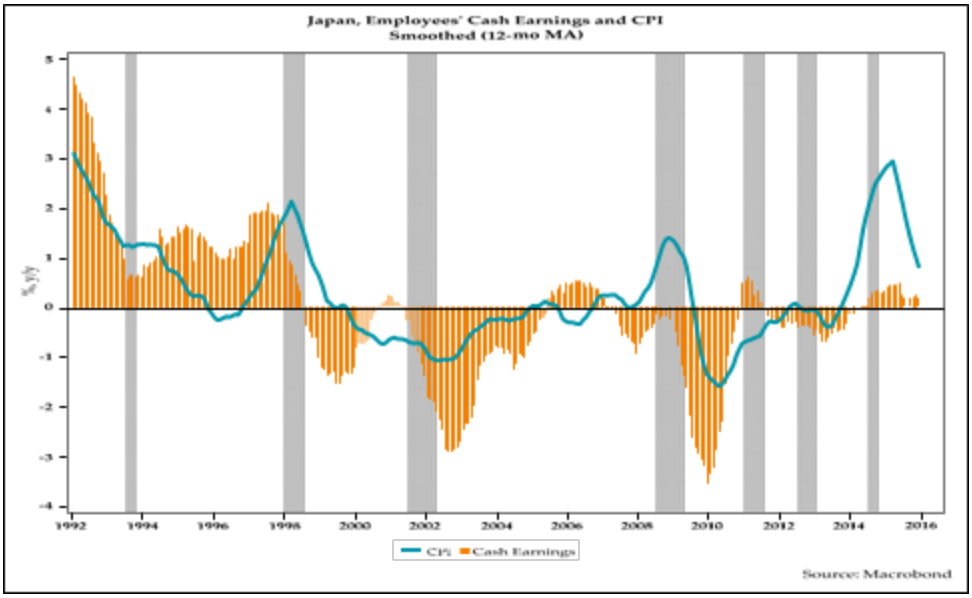
Figure 16: Real wages have declined since the late 1990s



Core consumer price index (CPI) inflation has been weak in tandem with weakness in nominal wages (figure 17). The decline in wages and the lack of wage growth in Japan have been key drivers of low inflation and deflationary trends. Core inflation had risen in 2014 but it is flat now. Price inflation on producer goods is again softening. A weaker yen (depreciation) raises import prices somewhat with lags, though the pass-through from the exchange rate to core consumer prices is limited. In Japan there has been almost no connection between the expansion of the central bank's monetary base (high-powered money) and inflation. One-time factors were primarily responsible for the rise in inflation in 2014. In particular, the increase in the consumption tax led to higher headline and core inflation last year. The combination of "Abenomics," QQME, and a tax hike (real or expected) had briefly lifted inflationary expectations. The effects of the tax hike on inflation (but not consumption) have dissipated.

Hence it is entirely conceivable that a deflationary mind-set could be re-emerging.

Figure 17: Core consumer price index inflation has been weak in tandem with weakness in nominal wages



Aggregate business profits have been fairly decent in Japan (figure 18), despite stagnant nominal GDP. Business profits' share has remained around 20% of national income (figure 19).

Government deficits have contributed to the sustaining of aggregate business profits, as Michal Kalecki (1971) held. Thanks to the restraint in nominal wages and labor costs, and continued decent profits, Japanese businesses have plenty of idle cash on hand (figure 20). Sher (2014) reports that Japanese nonfinancial firms have accumulated cash at the expense of investment and dividends and estimates that Japanese nonfinancial firms have cash holdings available for investment equal to about 5% of nominal GDP.

Figure 18: Aggregate business profits have been quite decent

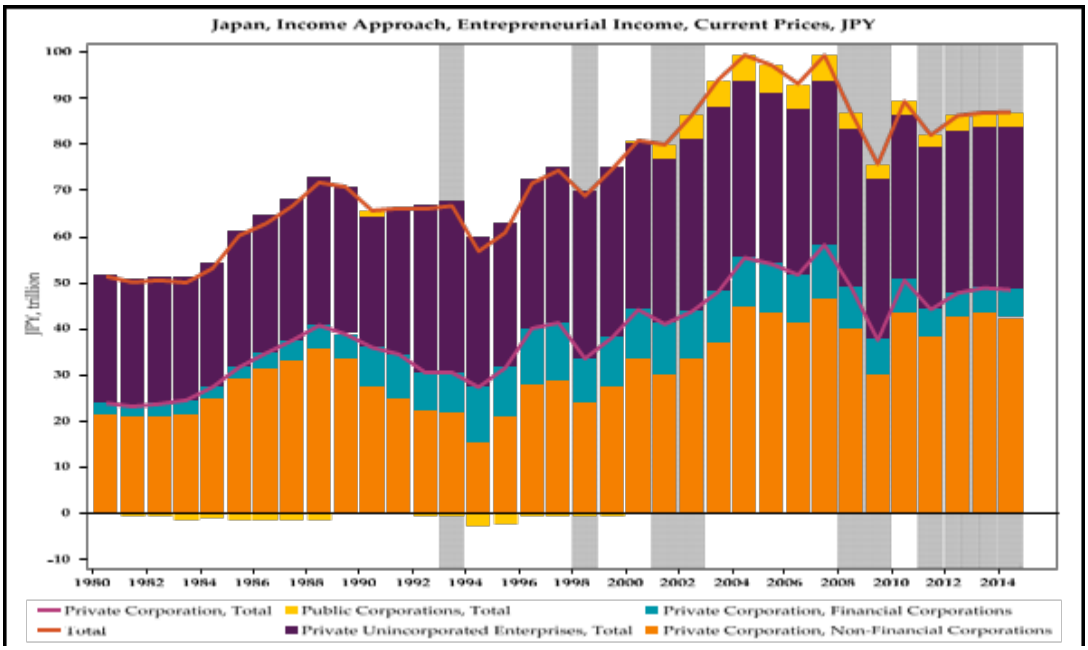


Figure 19: Business profits remain around 20% of national income

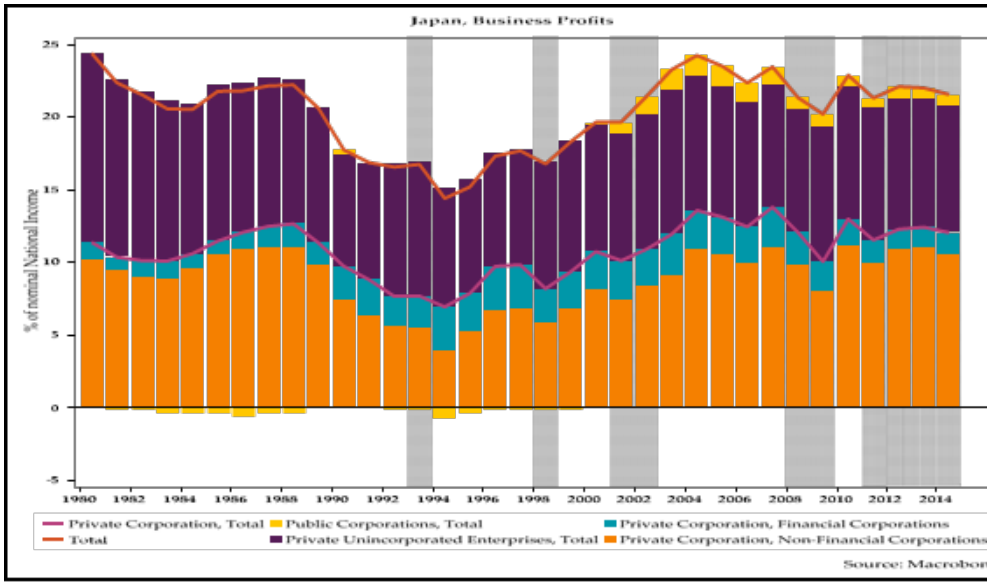
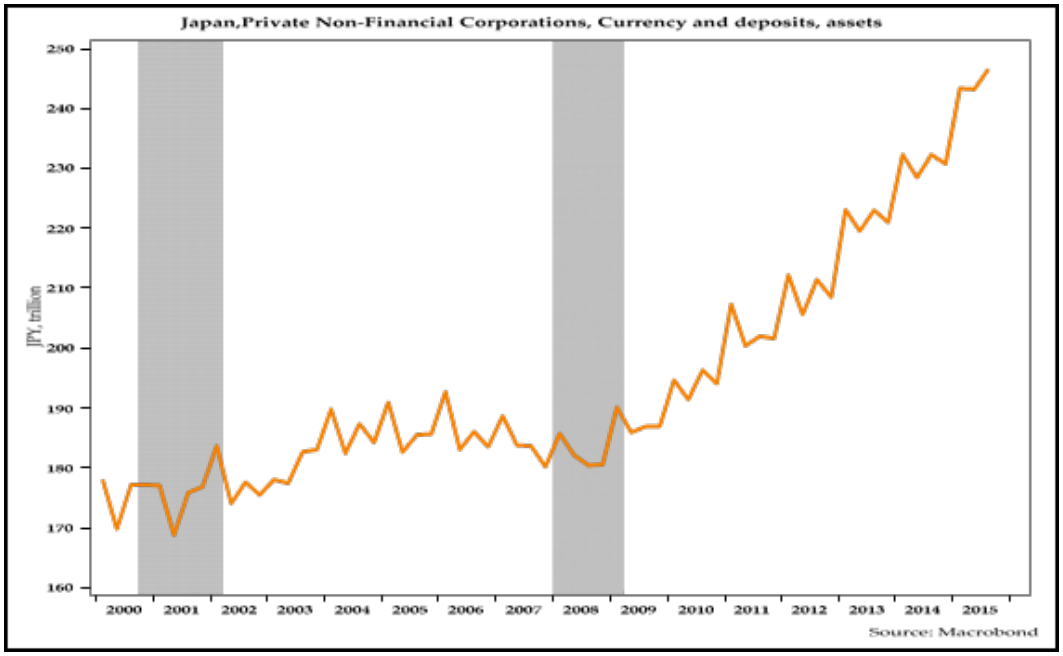


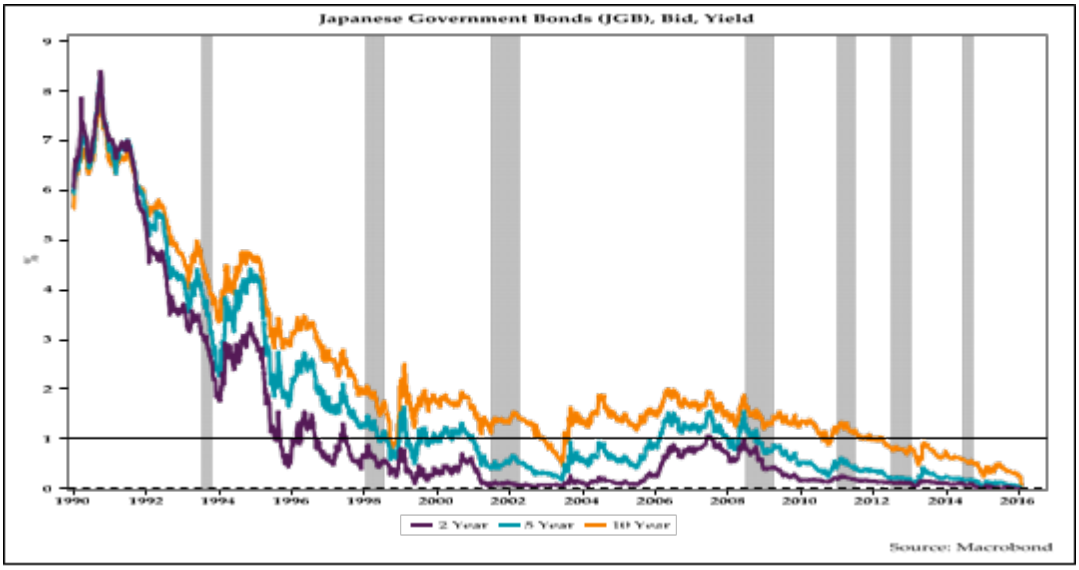
Figure 20: Japanese businesses have plenty of idle cash on hand



Despite an increase in public indebtedness and chronic fiscal deficits, the nominal yields on JGBs have declined amid economic stagnation and deflationary trends and have stayed remarkably low (figure 21). Akram (2014) and Akram and Das (2014a, 2014b) argue that low short-term interest rates, induced by the BoJ's accommodative monetary policy, have been the main reason for JGBs' low nominal yields. They note that Japan has monetary sovereignty, which gives the Government of Japan the ability to meet its debt obligations and the BoJ the operational ability to set the policy rates and expand its balance sheet as

required. Hence, the BoJ can restrain upward pressures on the JGBs' nominal yields by keeping short-term interest rates low and using other tools of monetary policy, in spite of chronic fiscal deficits and elevated ratios of public indebtedness, in contrast to the fears of Lam and Tokuoka (2011) and Tokuoka (2012) that Japan's rising public debt ratios would invariably result in a sharp rise in the nominal yields of JGBs. The governments of countries with their own sovereign currencies have no operational constraints in servicing their debt, as has been noted in Sims (2013), Woodford (2001), and Wray (2003 [1998], 2012).

Figure 21: Despite increase in public indebtedness, Japanese government bonds' nominal yields declined amid economic stagnation and deflationary trends and have stayed remarkably low since late 1990s

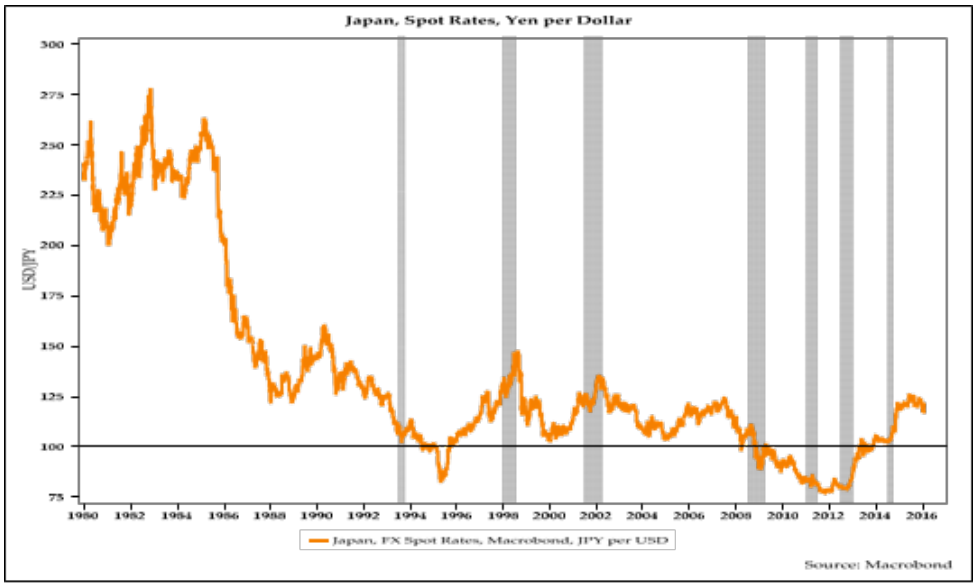


The BoJ holds a large volume of JGBs, around ¥270 trillion as of late 2015! The BoJ holds more than 25% of outstanding JGBs. Effectively the BoJ is cornering the market for JGBs, particularly since the advent of QQME! Domestic financial institutions continue to hold the bulk of JGBs.

The ratings downgrade had no effect on the nominal yields of JGBs. The near-zero policy rate implies low and close-to-zero short-term interest rates on Japanese Treasury Bills. JGBs' nominal yields are fairly closely correlated with interest rates on T-bill rates. Changes in the nominal yields of JGBs usually tie in with changes in T-bills on interest rates. With low inflation, short-term interest rates are likely to stay near zero. And long-term interest rates on JGBs are likely to remain ultra-low as long as the factors that have kept long-term interest rates low stay unchanged.

The Japanese yen has appreciated notably since the 1990s (figure 22). The yen began to appreciate after the Plaza Accord. The yen appreciated from an average of ¥200/$ in the 1980s to around ¥135/$ by 1990. The yen continued to appreciate from 1990 to 1996. It again appreciated from 1998 to mid-2012. In 2012, the yen's exchange rate averaged nearly ¥86/$. The yen began to depreciate in late 2012 and has averaged around ¥120/$ as of 2014. The protracted period of yen overvaluation had a detrimental effect on the nation's exports.

Figure 22: The evolution of the exchange rate of the Japanese yen



Japan is undergoing substantial and rapid demographic changes. Its population is declining (figure 23). Its population is rapidly aging. The share of the working-age population is declining. The size of the country's labor force has peaked and has been declining. The fertility rate is quite low. Japan is not very open to immigration of foreigners. This is reflected in the low stock of the foreign-born share of the population compared to that in other major developed countries (figure 24). The combination of a low fertility rate that is substantially below the replacement rate and a low rate of immigration is the cause of Japan's declining population.

Figure 23: Japan's population has started to decline since 2010 and is expected to shrink further in the coming decades

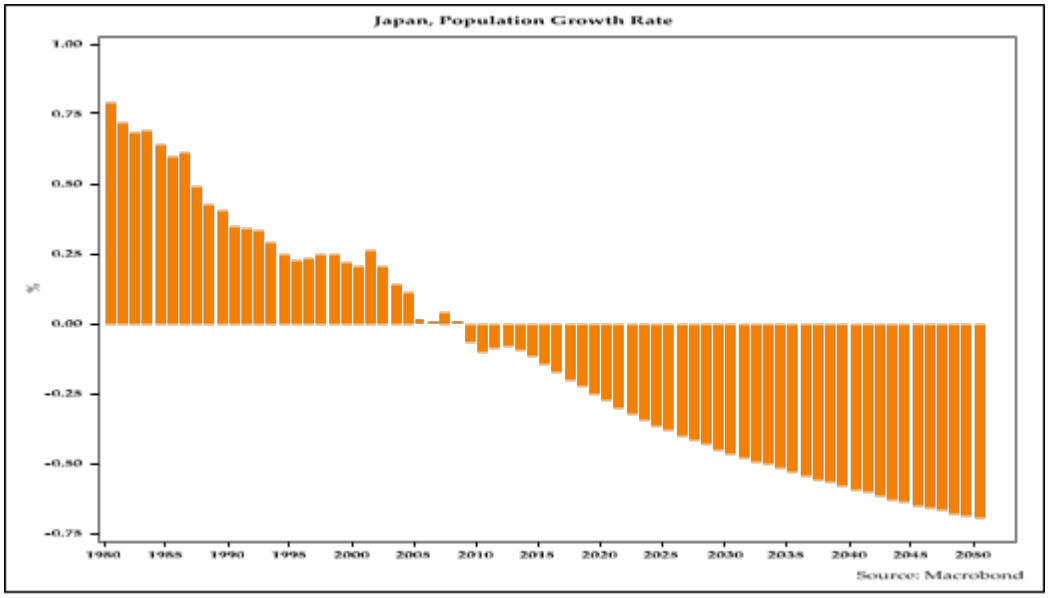
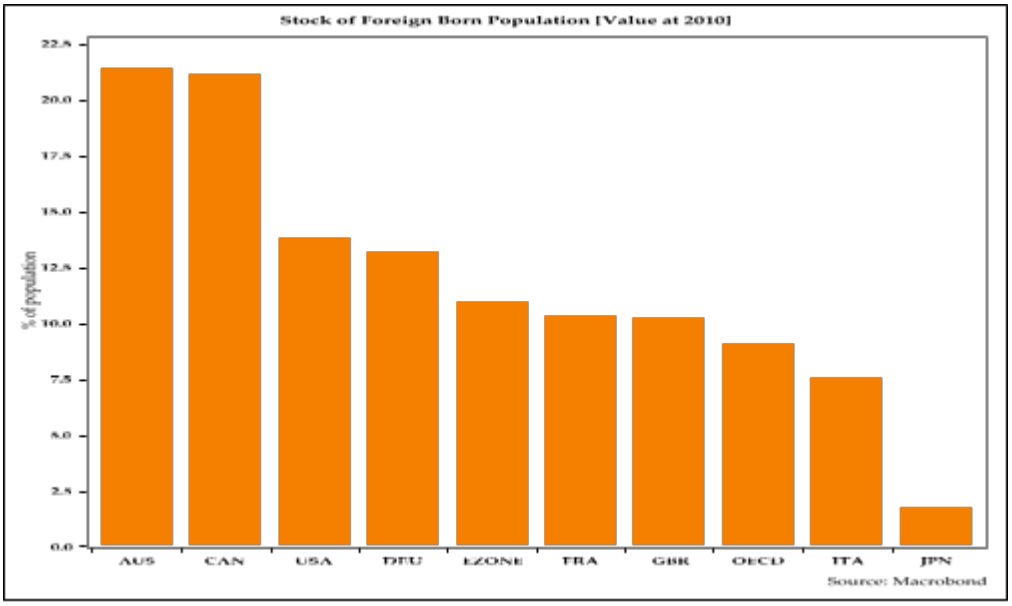


Figure 24: The stock of the foreign-born share of the population in Japan remains markedly low compared to other major developed countries



The initial, but short-lived, revival of growth under Abenomics was led primarily by a moderate fiscal stimulus; subsequently the authorities switched to a contractionary fiscal policy. Nominal bank lending growth had moderately picked up; however industrial production and service activity are still soft. Higher taxes took a toll on real private consumption. Public fixed investment moderately rose at the beginning of the Abe administration, but recovery in business fixed investment has been disappointing. Japanese firms have been reluctant to invest domestically, even though corporate Japan has a lot of cash in its coffers. Housing investment has been disappointing due to weak growth in real disposable income and Japan's decline in population. Business surveys suggest a tepid pace of expansion.

The above discussion of Japan's recent economic development and economic performance suggests the following. First, Japan's economy is stagnating amid deflationary trends though there is no financial crisis. Second, both short-term and long-term interest rates have been low due to highly accommodative monetary policy and low inflation, in spite of chronic fiscal deficits and elevated ratios of public debt. Since late January 2016, interest rates on the front end of the JGB yield curve have turned negative. Third, investment and consumer spending have remained tame and have not responded favorably to low interest rates. Fourth, the Government of Japan has provided fiscal stimulus from time to time, but the effectiveness of the fiscal spending has been fairly limited. Fifth, the Japanese yen had been overvalued for decades. Last but not least, the Japanese economy faces several structural challenges, such as low labor productivity growth, a decline in the labor force, a shrinking population, a low fertility rate, a relatively low female labor force participation rate, a reluctance to allow the immigration of foreign workers, and so forth. The protracted period of ineffective monetary policy, characterized by low nominal interest rates and stagnant fixed investment by business, implies that Japan is enmeshed in a liquidity trap amid weak effective demand.

III. Theoretical perspectives on a liquid trap

Liquidity Trap

Under standard economic theory, as articulated in the classics, an economy should not face a problem of insufficient aggregate demand. This view is regarded as Say's Law (Sowell 1972; Baumol 1977). Aggregate demand and aggregate supply will be in equilibrium. This is based on the notion that the production and sale of goods and services shall generate income that will be either consumed or saved. What is saved will be spent as investment. In essence the production of goods and services gives rise to income that is devoted to either the purchase of consumer goods and services or saving which is equal to investment spending. As a result, there is no problem when aggregate demand is less than aggregate supply.

Variants of Say's Law(s) are expressed in the classical works of Adam Smith, James Mill, David Ricardo, John Stuart Mill, and others. Thomas Robert Malthus and Karl Marx were among the early critics of Say's Law, but Keynes (2007 [1936]), in *The General Theory*, systematically extends and develops Malthus's critique of Say's Law. In Keynes's view there is the inherent problem of a modern capitalist monetary economy that can face an occasional or even chronic shortfall in aggregate demand, resulting in the level of employment persistently remaining below full employment. For Keynes, in a modern capitalist economy, agents have a liquidity preference due to fundamental uncertainty about the future with states of affairs for which probabilities cannot be properly assigned. Agents' liquidity preference is also shaped and reinforced by social and psychological factors. Agents hold money or different types of financial assets as a store of value and thus savings may not be invested in real goods and services. As a result, the economy may fail to reach full employment. Changes in interest rates may not be enough to induce sufficient investment and attain full employment.

Liquidity trap in the IS-LM framework

In discussing Japan's liquidity trap, it is useful to start with Hicks's (1937) early interpretation of Keynes as presented in the IS-LM framework. This is the standard interpretation of Keynes's work, even though it may not quite be an accurate representation of Keynes's view on the limitations of monetary policy due to a liquidity trap. Indeed, in his later works, Hicks himself recanted this interpretation of Keynes. Nevertheless it is a useful and standard toolkit for analysis.

In the IS-LM framework, in a liquidity trap, monetary policy does not work, because price level adjustments alone do not stabilize the economy at the full employment level. If the demand for money is infinitely interest elastic over a range, the LM curve becomes horizontal. Even if prices and wages are fully flexible, increasing the nominal and real money stock may not shift the LM curve, but the economy remains at an equilibrium below the full employment level. The liquidity trap prevents the interest rate from falling further below some "lower bound." Moreover if the IS curve is interest inelastic, that is, the demand for credit for investment is insensitive to changes in the interest rate, then a shift in the LM curve to the right may not be able to achieve full employment. However, under both circumstances, fiscal policy can restore full employment by shifting the IS curve to the right.

Two schools of thought on the solutions for Japan's liquidity trap

What is the way out of a liquidity trap for Japan? There are two schools of thought regarding solutions. The divergence in proposed remedies arises from the difference in the diagnosis of the cause of a liquidity trap.

The main cause of the liquidity trap, according to Krugman (1998a, 1998b), Bernanke (2000, 2002), and most mainstream economists, such as Adam and Billi (2006), Eggertsson (2005, 2006, 2012), Eggertsson and Pugsley (2006), Eggertsson and Woodford (2003), Eggertsson and Krugman (2010), Jung, Teranishi, and Watanabe (2005), Refischenedier and Williams (2000), Wolman (2005), Woodford (2001, 2003), and Uedo (2012) is that the real interest rate remains high. Even if nominal interest rates decline, if inflation does not decline or the economy experiences deflation, then real interest rates may still remain high or could even rise. This hampers business investment and spending. Hence, the solution must lie in raising inflation and expected inflation through monetary policy. Krugman (1998a, 1998b) and Bernanke (2000, 2002) emphasize accommodative monetary policy as the principal tool for overcoming a liquidity trap. Interestingly, Keynes (1930), in his *Treatise*, also suggests highly accommodative monetary policy, along the lines of a zero–interest rate policy and quantitative easing (Kregel 2014).

In contrast to modern macroeconomic analysis, for Keynes a liquidity trap originates from investors' liquidity preferences, as demonstrated in Kregel (2000). Keynes observes that when the interest rate is already quite low, investors would prefer to hold cash rather than bonds with duration risks because a small change in the interest rate would cause investors capital losses. With a low interest rate for the investors, the opportunity cost of holding money is just the loss of interest receipts from holding bonds, while the loss from holding bonds could be substantial because of potential capital losses that would occur if interest rates were to rise. Kregel (2000) shows that "Keynes's definition of the liquidity trap will occur when even investors expect interest rates to rise more than the square of the current interest rate, for they will then prefer to hold money rather than bonds." Keynes holds that "the lower the rate of interest, the more likely that liquidity trap" could occur because it may take more time for the capital loss from a higher interest rate to be offset from the gains of reinvesting at a higher interest rate (Kregel 2000). The intuition for this is that the lower the rate of interest the higher the duration of a bond. The liquidity trap arises from investors' liquidity preferences, which rise sharply if uncertainty about the future increases.

Extraordinary monetary accommodation to tackle liquidity trap

Krugman (1998a, 1998b) and Bernanke's (2000, 2002) solutions consist of making a credible commitment to a continuous increase in money supply and the expansion of the central bank's balance sheet. In this view the central banks must act credibly to raise the public's inflation expectations, mainly through increasing high-powered money with the expansion of the central bank's balance sheet. The central bank must increase inflation expectations into perpetuity. This solution implicitly assumes that monetary accommodation would eventually lead to higher expectations of inflation and induce risk taking due to the effect of an increased monetary stock on aggregate demand. In this view, the nominal interest rate should be lowered as much as possible, in order to induce investment and consumer spending. However, if the nominal interest rate cannot be lowered beyond some lower bound, then the

central bank ought to engage in the purchase of long-duration assets and thus reduce long-term interest rates. This would induce portfolio rebalancing by encouraging investors to seek higher yields in risker assets. Bernanke (2000, 2002) indicates that such accommodative policy can also induce exchange rate depreciation, which in turn may lift aggregate demand through improvement of net exports.

Krugman's (2010) key policy proposal for when the economy is diagnosed as being caught in a liquidity trap is for the central bank to credibly promise "to print more money in the future, when the zero lower bound no longer binds."

It is worth noting the solutions that Bernanke and Krugman advocate ultimately rest on the quantity theory of money. The key issue for Bernanke (2000, 2002) and Krugman (2010) is to get the central bank to credibly commit to producing inflation. They both fault the BoJ for being unable to do enough to generate inflation and reset inflationary expectations among the public and investors. In their view the BoJ had a credibility problem. Krugman (1998b) is quite explicit in stating that "if monetary expansion does not work […] it must be because the public does not expect it to be sustained." In essence, then, according to this view, the BoJ's failure to convince the public that it will undertake a sustained monetary expansion is the culprit. The Japanese economy cannot get out of a liquidity trap because the real interest rate stays high, as the central bank's failure to credibly commit to monetary expansion means that inflation and inflation expectations stay low or that deflationary pressures persist. If only the BoJ could convince the public that it is committed to maintaining monetary expansion, inflation and inflationary expectations would be set aright.

Proponents of this view believe that large-scale asset purchases can be a useful tool for lifting an economy from a depressed state and reviving growth. Whereas Arthur Pigou (1943) held that falling prices would raise the real net worth of the private sector and induce consumption, proponents of this view, such as Bernanke (2002), argue that large-scale asset purchases raise asset prices, thus lifting nominal values of financial asset from depressed prices, raising the real net worth of households, which in turn can stimulate consumption and investment spending.

A multifaceted strategy to overcome a liquidity trap and stagnation

For Keynes the solution to the problem of a liquidity trap is not solely or primarily monetary expansion in itself. He holds that the central bank may have to lower the policy rate and undertake quantitative easing through extensive open market operations. Keynes, however, is skeptical of the simplistic linkages between monetary aggregates, inflation, and nominal income as envisioned in the quantity theory. He observes that "[i]f, however, we are tempted to assert that money is the drink which stimulates the system to activity, we must remind ourselves that there may be several slips between the cup and the lip" (Keynes 2007 [1936]: 173). This view emphasizes expansionary fiscal policy and direct interventions to induce employment and investment to overcome the liquidity trap, without denying the importance of monetary policy actions.

Keynes's solution to the problem of a liquidity trap is multifaceted. It would require the central bank to act, not just to keep the policy rates and short-term interest rates low, but also to keep the long-term interest rates low as a part of a program to affect the whole complex of interest

rates and risk spreads (Kregel 2000). In this view then the central bank needs to do more than just lower the interest rates. The central bank must also reduce the volatility of interest rates and the directional uncertainty about the path of interest rates. It actions must convince the public that the potential of an upward shift in the yield curve has been minimized, and that the possibility of a sharp selloff in the government bond market has been contained. Monetary expansion per se would not do. He advocates specific policies and innovations in monetary policy, arguing that the central bank: (1) be "prepared to deal both ways on specified terms in debt of all maturities"; and (2) "in debts of varying degrees of risk" (Keynes 2007 [1936]: 205). Keynes (2007 [1936]: 206; cited in Kregel 2000) holds that "a complex offer by the central bank to buy and sell at stated prices gilt-edged bonds of all maturities, in place of the single bank rate for short-term bills, is the most important practical improvement which can be made in the technique of monetary management."

Targeting the yield curve and reducing interest rate volatility is a prerequisite for overcoming a liquidity trap. Keynes is skeptical that low interest rates by themselves would induce investment, particularly amid heighted uncertainty, where the investors' expectations of future demand have been diminished. He believes that investors may prefer to stay liquid and hold cash and cash equivalents. He notes that if the investor expects that in the future the interest rate would rise more than the square of the current interest rate, he may prefer to hold cash (Kregel 2014: 2–3). Keynes (2007 [1936]: 201; cited in Kregel 2014: 3) argues that "[u]ncertainty to future course of the rate of interest is the sole intelligible explanation of liquidity-preference L_2 which leads to the holding of cash M_2." He believes that "there is the possibility […] that, after the rate of interest has fallen to certain level, liquidity preference may become virtually absolute in the sense that almost everyone prefers cash to holding a debt which yields so low a rate of interest. In this event the monetary authority would have lost effective control over the rate of interest" (Keynes 2007 [1936]: 207; cited in Kregel 2014: 3). He is doubtful about the prospects of a low interest rate inducing investment and effective demand. He states: "Only experience, however, can show how far management of the rate of interest is capable of continuously stimulating the appropriate volume of investment. For my own part I am now skeptical of the success of a merely monetary policy directed toward influencing the rate of interest" (Keynes 2007 [1936]: 164; cited in Kregel 2014: 3).

For Keynes, the solution to depressed economic activity lies in an integrated strategy. It consists of: (1) the central bank acting to reduce interest rates and interest rate volatility; (2) appropriate programs of public investment and employment creation; and (3) other public efforts to restore business confidence. He writes: "It will require not merely passive movements of bank rates to lift us out a depression of this order, but a very active and determined policy" (Keynes 1930; cited in Kregel 2011: 9). While earlier Keynes (1930, 1932) thought that a low interest rate and tools of monetary policy alone would suffice – or at least be the primary tool – to revive economic activity, by the time he wrote the *General Theory* he was convinced that the solution would require additional proactive policies (Kregel 2011: 6), including fiscal stimulus, direct job creation, and concerted efforts at boosting business confidence. Keynes's approach also calls for raising the expected marginal efficiency of capital, which requires the restoration of business confidence through a combination of public actions to create employment and induce the private sector to initiate fixed business investment and employ workers.

Keynes's (2007 [1936]) solution emphasizes fiscal expansion and direct employment creation by the public sector and the improvement of business confidence by increasing the investors' expected marginal efficiency of capital but it does *not* neglect supportive monetary policy. In Keynes's view, in the context of a liquidity trap, fiscal expansion leads to a higher level of output with no increase or little increase in the interest rate, particularly if the central bank follows a policy of stabilizing interest rates and reducing interest rate volatility. Since interest rates are unchanged there is no (or quite limited) "crowding out" of private investment. Public-sector investment and direct public-sector employment programs can boost growth, reduce uncertainty, and restore investors' confidence.

While the classical solution to an elevated unemployment rate or sharp increase in the unemployment rate insists on wage and price flexibility, usually in the form of a downward adjustment of workers' wages, Keynes argues that increased nominal wage and price flexibility may *fail* to restore full employment or sustain growth, and indeed might be counterproductive. He writes: "There is […] no ground for the belief that a flexible wage policy is capable of maintaining continuous full employment – any more than for the belief that an open market monetary policy is capable, unaided, of achieving this result. The economic system cannot be made self-adjusting along these lines" (Keynes 2007 [1936]: 267).

The relevance of Keynes's insight to Japan's experience of stagnation

Keynes's insights about liquidity traps are quite relevant to the case of Japan. First, the BoJ's monetary policy has been quite accommodative for many years and has successfully kept long- term interest rates low but it has not been able to revive the Japanese economy. Second, fiscal deficits in Japan have been chronic but fiscal policy has not always provided stimulus. Indeed, often the authorities have undertaken contractionary fiscal policy under the rubric of restoring fiscal sustainability. During the past decades, whenever the Japanese authorities tried to raise taxes they have hampered effective demand and consumption (Koo 2008; Akram 2014). Third, the Japanese authorities have not pursued direct employment policies. The unemployment rate in Japan has been low, particularly in comparison to other advanced countries, but the labor market has seen various structural changes, such as increase in the share of part-time employment, corporate restructuring, de-unionization, the decline of manufacturing employment and globalization, and a decline in the overall size of the labor force and the labor force participation rate due to demographic changes. Fourth, business confidence has been weak, as reflected in Japanese firms' reluctance to increase domestic fixed investment. Fifth, the downward flexibility in wages and prices witnessed in Japan during the past decades has not helped overcome the weakness of the labor market or reversed the tepid pace of per capita real income growth.

Common ground

While these are two distinct approaches to the problems of a liquidity trap, it should be pointed out that these approaches are not mutually exclusive. The proponents of the first school, such as Krugman (1998a, 1998b) and Bernanke (2000, 2002), stress accommodative monetary policy, but do *not* rule out the necessity for expansionary fiscal policy. Likewise, Keynes and other proponents of the second school of thought, such as Kregel (2000, 2014), emphasize the role of fiscal policy and direct job creation. They also acknowledge that accommodative monetary policy is a vital component of a strategy to combat deficiency in

effective demand and that it is necessary to keep interest rates low and, most importantly, enforce the reduction of interest rate volatility to avoid a liquidity trap. Indeed, as Kregel (2011) shows, Keynes in his *Treatise* was an early advocate of unconventional monetary policy, arguing for extraordinary measures and highly accommodative monetary policy, including very low interest rates and large-scale asset purchases.

For his part, Krugman (2007) is skeptical that accommodative monetary policy alone can revive an economy facing a problem of an entrenched liquidity trap. Krugman (2007) writes:

> "[D]o I believe that monetary policy was helpless in the 1930s? Yes, I do. At the beginning of the Depression, expansionary monetary policy might have averted the worst. But after the banking crisis had run its course, and interest rates were almost zero, what could open-market operations have accomplished? They would simply have pushed cash into idle hoards, as happened in Japan in the late 1990s."

IV. Conclusion

Japan remains in a liquidity trap and faces deficiency in effective demand. Accommodative monetary policy action alone will not overcome this liquidity trap. Japan needs prudent, effective, and efficient fiscal policy to enhance productivity, foster real wage growth, restore export competitiveness, and support resilience in effective demand. A rise in the aggregate of employees' real income is necessary for strong and sustained economic growth in Japan. The authorities have postponed the planned tax hike from October 2015 to April 2017; however the idea of a tax hike is premature as growth is still soft. Headline and core inflation will decline notably in the coming months as the effect of the tax hike in 2014 wanes and also due to lower energy and food prices. The Bank of Japan has restored the negative policy rate and could be forced to undertake additional quantitative easing. The question of exit is not really relevant at this time. Nominal yields on JGBs will stay low due to a near-zero or negative interest rate policy, quantitative and qualitative easing, very low observed inflation, low inflationary expectations, persistent deflationary pressures, and unfavorable global economic and financial conditions that are exerting downward pressure on long-term interest rates in most advanced economies.

Modern mainstream macroeconomics has made valiant attempts to cope and come to terms with a liquidity trap and has made some advances. However, it is still entrapped by the limitations of the quantity theory of money, as is evident in the primary emphasis on monetary expansion to generate inflation in the works of Krugman (1998a, 1998b), Bernanke (2000, 2002), and the majority of contemporary macro theorists. In contrast, Keynes's (2007 [1936]) analysis in the *General Theory* still provides a solid basis for understanding many aspects of a liquidity trap. The modern Keynesian perspective builds on Keynes's foundations and may offer a richer understanding by applying it when analyzing the causes of Japan's liquidity trap and appropriate policy measures for reviewing growth. Keynesian measures of keeping interest rates low and mitigating interest rate volatility through monetary policy actions and targeting the yield curve, in tandem with countercyclical and activist fiscal policies, proactive employment policies (including direct public-sector employment and state-backed private-sector employment), and efforts to raise the expected marginal efficiency of capital would be

appropriate for Japan. Of course it is true that Japan faces not only problems of effective demand but also structural challenges primarily due to its unfavorable demographic trends and various constraints imposed by cultural, social, and geopolitical institutions and real resources. Japan's first priority, however, is to revive the country's economy through supportive fiscal and full-employment policies. Rather than pursue ill-advised programs of fiscal austerity, Japan needs to undertake appropriate structural reforms to raise labor productivity and enhance the capabilities and the standard of living of its citizens as the country prepares for its anticipated long-term demographic changes.

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Paul Romer's assault on "post-real" macroeconomics

Lars Pålsson Syll [Malmö University, Sweden]

Introduction

In a new, extremely well-written, brave, and interesting article, Paul Romer (2106a:4-5) goes to frontal attack on the theories that has put macroeconomics on a path of "intellectual regress" for three decades now:

> "Macroeconomists got comfortable with the idea that fluctuations in macroeconomic aggregates are caused by imaginary shocks, instead of actions that people take, after Kydland and Prescott (1982) launched the real business cycle (RBC) model …"
>
> "In response to the observation that the shocks are imaginary, a standard defence invokes Milton Friedman's (1953) methodological assertion from unnamed authority that 'the more significant the theory, the more unrealistic the assumptions.' More recently, 'all models are false' seems to have become the universal hand-wave for dismissing any fact that does not conform to the model that is the current favourite."
>
> "The noncommittal relationship with the truth revealed by these methodological evasions and the 'less than totally convinced …' dismissal of fact goes so far beyond post-modern irony that it deserves its own label. I suggest 'post-real.'"

There are many kinds of useless 'post-real' economics held in high regard within mainstream economics establishment today. Few – if any – are less deserved than the macroeconomic theory/method – mostly connected with Nobel laureates Finn Kydland, Robert Lucas, Edward Prescott and Thomas Sargent – called calibration.

Paul Romer and yours truly are certainly not the only ones having doubts about the scientific value of calibration. Nobel laureates Lars Peter Hansen and James J. Heckman (1996:88) writes:

> "It is only under very special circumstances that a micro parameter such as the inter-temporal elasticity of substitution or even a marginal propensity to consume out of income can be 'plugged into' a representative consumer model to produce an empirically concordant aggregate model … What credibility should we attach to numbers produced from their 'computational experiments', and why should we use their 'calibrated models' as a basis for serious quantitative policy evaluation? … There is no filing cabinet full of robust micro estimates ready to use in calibrating dynamic stochastic

> equilibrium models … The justification for what is called 'calibration' is vague and confusing."

Mathematical statistician Aris Spanos (Mayo & Spanos, 2010:240) – is no less critical:

> "Given that 'calibration' purposefully forsakes error probabilities and provides no way to assess the reliability of inference, how does one assess the adequacy of the calibrated model? …"
>
> "The idea that it should suffice that a theory 'is not obscenely at variance with the data' (Sargent, 1976, p. 233) is to disregard the work that statistical inference can perform in favor of some discretional subjective appraisal … it hardly recommends itself as an empirical methodology that lives up to the standards of scientific objectivity."

In physics it may possibly not be straining credulity too much to model processes as ergodic – where time and history do not really matter – but in social and historical sciences it is obviously ridiculous. If societies and economies were ergodic worlds, why do econometricians fervently discuss things such as structural breaks and regime shifts? That they do is an indication of the unrealisticness of treating open systems as analyzable with ergodic concepts.

The future is not reducible to a known set of prospects. It is not like sitting at the roulette table and calculating what the future outcomes of spinning the wheel will be. Reading Lucas, Sargent, Prescott, Kydland and other calibrationists one comes to think of Robert Clower's (1989:16) apt remark that

> "much economics is so far removed from anything that remotely resembles the real world that it's often difficult for economists to take their own subject seriously."

As Romer (2016a:12) says:

> "Math cannot establish the truth value of a fact. Never has. Never will."

So instead of assuming calibration and rational expectations to be right, one ought to confront the hypothesis with the available evidence. It is not enough to construct models. Anyone can construct models. To be seriously interesting, models have to come with an aim. They have to have an intended use. If the intention of calibration and rational expectations is to help us explain real economies, it has to be evaluated from that perspective. A model or hypothesis without a specific applicability is not really deserving our interest.

To say, as Edward Prescott (1977:30) that

> "one can only test if some theory, whether it incorporates rational expectations or, for that matter, irrational expectations, is or is not consistent with observations"

is not enough. Without strong evidence, all kinds of absurd claims and nonsense may pretend to be science. We have to demand more of a justification than this rather watered-down

version of "anything goes" when it comes to rationality postulates. If one proposes rational expectations one also has to support its underlying assumptions. None is given, which makes it rather puzzling how rational expectations has become the standard modeling assumption made in much of modern macroeconomics. Perhaps the reason is that economists often mistake mathematical beauty for truth.

Prescott's view is also the reason why calibration economists are not particularly interested in empirical examinations of how real choices and decisions are made in real economies. In the hands of Lucas, Prescott and Sargent, rational expectations has been transformed from an – in principle – testable hypothesis to an irrefutable proposition. Believing in a set of irrefutable propositions may be comfortable – like religious convictions or ideological dogmas – but it is not science.

So where does this all lead us? What is the trouble ahead for economics? Putting a sticky-price DSGE lipstick on the RBC pig sure won't do. Neither will – as Paul Romer (2016a:22) notices – just looking the other way and pretend it's raining:

> "The trouble is not so much that macroeconomists say things that are inconsistent with the facts. The real trouble is that other economists do not care that the macroeconomists do not care about the facts. An indifferent tolerance of obvious error is even more corrosive to science than committed advocacy of error."

Why critique in economics is so important

A part of why yours truly appreciate Romer's article, and even find it "brave," is that Romer (2016a: 21) dares to be explicit in his critique and name names:

> "Some of the economists who agree about the state of macro in private conversations will not say so in public. This is consistent with the explanation based on different prices. Yet some of them also discourage me from disagreeing openly, which calls for some other explanation."
>
> "They may feel that they will pay a price too if they have to witness the unpleasant reaction that criticism of a revered leader provokes. There is no question that the emotions are intense. After I criticized a paper by Lucas, I had a chance encounter with someone who was so angry that at first he could not speak. Eventually, he told me, 'You are killing Bob.'"
>
> "But my sense is that the problem goes even deeper that avoidance. Several economists I know seem to have assimilated a norm that the post-real macroeconomists actively promote – that it is an extremely serious violation of some honor code for anyone to criticize openly a revered authority figure – and that neither facts that are false, nor predictions that are wrong, nor models that make no sense matter enough to worry about …"
>
> "Science, and all the other research fields spawned by the enlightenment, survive by 'turning the dial to zero' on these innate moral senses. Members cultivate the conviction that nothing is sacred and that authority should

> always be challenged … By rejecting any reliance on central authority, the members of a research field can coordinate their independent efforts only by maintaining an unwavering commitment to the pursuit of truth, established imperfectly, via the rough consensus that emerges from many independent assessments of publicly disclosed facts and logic; assessments that are made by people who honor clearly stated disagreement, who accept their own fallibility, and relish the chance to subvert any claim of authority, not to mention any claim of infallibility."

Everyone knows what he says is true, but few have the courage to openly speak and write about it. The "honour code" in academia certainly needs revision.

The excessive formalization and mathematization of economics since WW II has made mainstream – neoclassical – economists more or less obsessed with formal, deductive-axiomatic models. Confronted with the critique that they do not solve real problems, they often react as Saint-Exupéry's Great Geographer, who, in response to the questions posed by The Little Prince, says that he is too occupied with his scientific work to be able to say anything about reality. Confronting economic theory's lack of relevance and ability to tackle real problems, one retreats into the wonderful world of economic models. While the economic problems in the world around us steadily increase, one is rather happily playing along with the latest toys in the mathematical toolbox.

Modern mainstream economics is sure very rigorous – but if it's rigorously wrong, who cares? Instead of making formal logical argumentation based on deductive-axiomatic models the message, we are better served by economists who more than anything else try to contribute to solving real problems. And then the motto of John Maynard Keynes is more valid than ever:

> "It is better to be vaguely right than precisely wrong."

Attempting to trivialize Romer's critique

Much discussion has been going on in the economics academia on Romer's critique. Some mainstream macroeconomists have tried to "save" what they consider advances in the macroeconomics of the last three decades from the critique. One prominent example is Simon Wren-Lewis (2016b), who argues that the critique is

> "unfair and wide of the mark in places … Paul's discussion of real effects from monetary policy, and the insistence on productivity shocks as business cycle drivers, is pretty dated … Yet it took a long time for RBC models to be replaced by New Keynesian models, and you will still see RBC models around. Elements of the New Classical counter revolution of the 1980s still persist in some places … The impression Paul Romer's article gives, might just have been true in a few years in the 1980s before New Keynesian theory arrived. Since the 1990s New Keynesian theory is now the orthodoxy, and is used by central banks around the world."

Now this rather unsuccessful attempt to disarm the real force of Romer's critique should come as no surprise for anyone who has been following Wren-Lewis' writings over the years.

In a recent paper Wren-Lewis (2016a:33-34) writes approvingly about all the "impressive" theoretical insights New Classical economics has brought to macroeconomics:

> "The theoretical insights that New Classical economists brought to the table were impressive: besides rational expectations, there was a rationalisation of permanent income and the life-cycle models using intertemporal optimisation, time inconsistency and more …"
>
> "A new revolution, that replaces current methods with older ways of doing macroeconomics, seems unlikely and I would argue is also undesirable. The discipline does not need to advance one revolution at a time …"
>
> "To understand modern academic macroeconomics, it is no longer essential that you start with The General Theory. It is far more important that you read Lucas and Sargent (1979), which is a central text in what is generally known as the New Classical Counter Revolution (NCCR). That gave birth to DSGE models and the microfoundations programme, which are central to mainstream macroeconomics today …"

There's something that just does not sit very well with this picture of modern macroeconomics.

"Read Lucas and Sargent (1979)". Yes, why not. That is exactly what Romer did!

One who has also read it is Wren-Lewis' "New Keynesian" colleague Paul Krugman (2015). And this is what he has to say on that reading experience:

> "Lucas and his school … went even further down the equilibrium rabbit hole, notably with real business cycle theory. And here is where the kind of willful obscurantism Romer is after became the norm. I wrote last year about the remarkable failure of RBC theorists ever to offer an intuitive explanation of how their models work, which I at least hinted was willful:
>
> > 'But the RBC theorists never seem to go there; it's right into calibration and statistical moments, with never a break for intuition. And because they never do the simple version, they don't realize (or at any rate don't admit to themselves) how fundamentally silly the whole thing sounds, how much it's at odds with lived experience.'"

And so has Truman Bewley (1999):

> "Lucas and Rapping (1969) claim that cyclical increases in unemployment occur when workers quit their jobs because wages or salaries fall below expectations …"
>
> "According to this explanation, when wages are unusually low, people become unemployed in order to enjoy free time, substituting leisure for income at a time when they lose the least income …"

> "According to the theory, quits into unemployment increase during recessions, whereas historically quits decrease sharply and roughly half of unremployed workers become jobless because they are laid off … During the recession I studied, people were even afraid to change jobs because new ones might prove unstable and lead to unemployment …"
>
> "If wages and salaries hardly ever fall, the intertemporal substitution theory is widely applicable only if the unemployed prefer jobless leisure to continued employment at their old pay. However, the attitude and circumstances of the unemployed are not consistent with their having made this choice …"
>
> "In real business cycle theory, unemployment is interpreted as leisure optimally selected by workers, as in the Lucas-Rapping model. It has proved difficult to construct business cycle models consistent with this assumption and with real wage fluctuations as small as they are in reality, relative to fluctuations in employment."

This is, of course, only what you would expect of New Classical Chicago economists.

So, what's the problem?

The problem is that sadly enough this rather extraterrestial view of unemployment is actually shared by Wren-Lewis and other so called 'New Keynesians' — a school whose microfounded dynamic stochastic general equilibrium models cannot even incorporate such a basic fact of reality as involuntary unemployment!

To Wren-Lewis is seems as though the "New Keynesian" acceptance of rational expectations, representative agents and microfounded DSGE models is something more or less self-evidently good. Not all economists (yours truly included) share that view. One of those economists, Sebastian Dullien (2011:181) writes:

> "While one can understand that some of the elements in DSGE models seem to appeal to Keynesians at first sight, after closer examination, these models are in fundamental contradiction to Post-Keynesian and even traditional Keynesian thinking. The DSGE model is a model in which output is determined in the labour market as in New Classical models and in which aggregate demand plays only a very secondary role, even in the short run."
>
> "In addition, given the fundamental philosophical problems presented for the use of DSGE models for policy simulation, namely the fact that a number of parameters used have completely implausible magnitudes and that the degree of freedom for different parameters is so large that DSGE models with fundamentally different parametrization (and therefore different policy conclusions) equally well produce time series which fit the real-world data, it is also very hard to understand why DSGE models have reached such a prominence in economic science in general."

Neither New Classical nor "New Keynesian" microfounded DSGE macro models have helped us foresee, understand or craft solutions to the problems of today's economies.

Wren-Lewis ultimately falls back on the same kind of models that he criticize, and it would sure be interesting to once hear him explain *how* silly assumptions like "hyperrationality" and "representative agents" help him work out the fundamentals of a truly relevant macroeconomic analysis.

In a recent paper on modern macroeconomics, another "New Keynesian" macroeconomist, Greg Mankiw (2006:42-43), writes:

> "The real world of macroeconomic policymaking can be disheartening for those of us who have spent most of our careers in academia. The sad truth is that the macroeconomic research of the past three decades has had only minor impact on the practical analysis of monetary or fiscal policy. The explanation is not that economists in the policy arena are ignorant of recent developments. Quite the contrary: The staff of the Federal Reserve includes some of the best young Ph.D.s, and the Council of Economic Advisers under both Democratic and Republican administrations draws talent from the nation's top research universities. The fact that modern macroeconomic research is not widely used in practical policymaking is prima facie evidence that it is of little use for this purpose. The research may have been successful as a matter of science, but it has not contributed significantly to macroeconomic engineering."

So, then what is the *raison d'être* of macroeconomics, if it has nothing to say about the real world and the economic problems out there?

If macoeconomic models – no matter of what ilk – assume representative actors, rational expectations, market clearing and equilibrium, and we know that real people and markets cannot be expected to obey these assumptions, the warrants for supposing that conclusions or hypothesis of causally relevant mechanisms or regularities can be bridged, are obviously non-justifiable. Macroeconomic theorists – regardless of being "'New Monetarist", "New Classical" or "New Keynesian" – ought to do some ontological reflection and heed Keynes' (2012 (1936):297) warnings on using thought-models in economics:

> "The object of our analysis is, not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organized and orderly method of thinking out particular problems; and, after we have reached a provisional conclusion by isolating the complicating factors one by one, we then have to go back on ourselves and allow, as well as we can, for the probable interactions of the factors amongst themselves. This is the nature of economic thinking. Any other way of applying our formal principles of thought (without which, however, we shall be lost in the wood) will lead us into error."

Wren-Lewis ought to be more critical of the present state of macroeconomics – including "New Keynesian" macroeconomics – than he is. Trying to represent real-world target systems with models flagrantly at odds with reality is futile. And if those models are New Classical or "New Keynesian" makes very little difference.

Fortunately – when you've got tired of the kind of macroeconomic apologetics produced by "New Keynesian" macroeconomists like Wren-Lewis, Mankiw, and Krugman, there still are

some real Keynesian macroeconomists to read. One of them – Axel Leijonhufvud (2008:5) -- writes:

> "For many years now, the main alternative to Real Business Cycle Theory has been a somewhat loose cluster of models given the label of *New Keynesian theory*. New Keynesians adhere on the whole to the same DSGE modeling technology as RBC macroeconomists but differ in the extent to which they emphasise inflexibilities of prices or other contract terms as sources of short term adjustment problems in the economy. The 'New Keynesian' label refers back to the 'rigid wages' brand of Keynesian theory of 40 or 50 years ago. Except for this stress on inflexibilities this brand of contemporary macroeconomic theory has basically nothing Keynesian about it …"

> "I conclude that dynamic stochastic general equilibrium theory has shown itself an intellectually bankrupt enterprise. But this does not mean that we should revert to the old Keynesian theory that preceded it (or adopt the New Keynesian theory that has tried to compete with it). What we need to learn from Keynes … are about how to view our responsibilities and how to approach our subject."

No matter how brilliantly silly "New Keynesian" DSGE models central banks, Wren-Lewis, and his mainstream colleagues come up with, they do not help us working with the fundamental issues of modern economies. Using that kind of models only confirm Robert Gordon's (1976) dictum that today,

> "rigor competes with relevance in macroeconomic and monetary theory, and in some lines of development macro and monetary theorists, like many of their colleagues in micro theory, seem to consider relevance to be more or less irrelevant."

Romer follows up his critique

Romer (2016b) has himself commented on the critique he has got from other mainstreamers:

> "The one reaction that puzzles me goes something like this: 'Romer's critique of RBC models is dated; we've known all along that those models make no sense.'"

> "If we know that the RBC model makes no sense, why was it left as the core of the DSGE model? Those phlogiston shocks are still there. Now they are mixed together with a bunch of other made-up shocks."

> "Moreover, I see no reason to be confident about what we will learn if some econometrician adds sticky prices and then runs a horse to see if the shocks are more or less important than the sticky prices. The essence of the identification problem is that the data do not tell you who wins this kind of race. The econometrician picks the winner."

Those of us in the economics community who have been impolite enough to dare questioning the preferred methods and models applied in macroeconomics are as a rule met with disapproval. Although people seem to get very agitated and upset by the critique, defenders of "received theory" always say that the critique is "nothing new," that they have always been "well aware" of the problems, and so on, and so on.

But the rhetorical swindle that New Classical and "New Keynesian" macroeconomics have tried to impose upon us with their microfounded calibrations and DSGE models, has not gone unnoticed until Paul Romer came along. Thirty years before Paul Romer, James Tobin – in (Klamer (1984:110-111) – explained why real business cycle theory and microfounded DSGE models are such a total waste of time.

> "They try to explain business cycles solely as problems of information, such as asymmetries and imperfections in the information agents have. Those assumptions are just as arbitrary as the institutional rigidities and inertia they find objectionable in other theories of business fluctuations … I try to point out how incapable the new equilibrium business cycles models are of explaining the most obvious observed facts of cyclical fluctuations … I don't think that models so far from realistic description should be taken seriously as a guide to policy … I don't think that there is a way to write down any model which at one hand respects the possible diversity of agents in taste, circumstances, and so on, and at the other hand also grounds behavior rigorously in utility maximization and which has any substantive content to it."

And more recently, Rober Solow (2008:243-249) had this to say on "modern" macroeconomics:

> "I think that Professors Lucas and Sargent really seem to be serious in what they say, and in turn they have a proposal for constructive research that I find hard to talk about sympathetically. They call it equilibrium business cycle theory, and they say very firmly that it is based on two terribly important postulates – optimizing behavior and perpetual market clearing. When you read closely, they seem to regard the postulate of optimizing behavior as self-evident and the postulate of market-clearing behavior as essentially meaningless. I think they are too optimistic, since the one that they think is self-evident I regard as meaningless and the one that they think is meaningless, I regard as false. The assumption that everyone optimizes implies only weak and uninteresting consistency conditions on their behavior. Anything useful has to come from knowing what they optimize, and what constraints they perceive. Lucas and Sargent's casual assumptions have no special claim to attention …"
>
> "It is plain as the nose on my face that the labor market and many markets for produced goods do not clear in any meaningful sense. Professors Lucas and Sargent say after all there is no evidence that labor markets do not clear, just the unemployment survey. That seems to me to be evidence. Suppose an unemployed worker says to you 'Yes, I would be glad to take a job like the one I have already proved I can do because I had it six months ago or three or four months ago. And I will be glad to work at exactly the same wage that is being paid to those exactly like myself who used to be working at that job

> and happen to be lucky enough still to be working at it.' Then I'm inclined to label that a case of excess supply of labor and I'm not inclined to make up an elaborate story of search or misinformation or anything of the sort. By the way I find the misinformation story another gross implausibility. I would like to see direct evidence that the unemployed are more misinformed than the employed, as I presume would have to be the case if everybody is on his or her supply curve of employment … Now you could ask, why do not prices and wages erode and crumble under those circumstances? Why doesn't the unemployed worker who told me 'Yes, I would like to work, at the going wage, at the old job that my brother-in-law or my brother-in-law's brother-in-law is still holding', why doesn't that person offer to work at that job for less? Indeed why doesn't the employer try to encourage wage reduction? That doesn't happen either … Those are questions that I think an adult person might spend a lifetime studying. They are important and serious questions, but the notion that the excess supply is not there strikes me as utterly implausible."

The purported strength of New Classical and 'New Keynesian' macroeconomics is that they have firm anchorage in preference-based microeconomics, and especially the decisions taken by inter-temporal utility maximizing "forward-loooking" individuals.

To some of us, however, this has come at too high a price. The almost quasi-religious insistence that macroeconomics has to have microfoundations – without ever presenting neither ontological nor epistemological justifications for this claim – has put a blind eye to the weakness of the whole enterprise of trying to depict a complex economy based on an all-embracing representative actor equipped with superhuman knowledge, forecasting abilities and forward-looking rational expectations.

That anyone should take that kind of ludicrous stuff seriously is totally and unbelievably ridiculous. Or as Solow – in Klamer (1984:146) – has it:

> "Suppose someone sits down where you are sitting right now and announces to me that he is Napoleon Bonaparte. The last thing I want to do with him is to get involved in a technical discussion of cavalry tactics at the battle of Austerlitz. If I do that, I'm getting tacitly drawn into the game that he is Napoleon. Now, Bob Lucas and Tom Sargent like nothing better than to get drawn into technical discussions, because then you have tacitly gone along with their fundamental assumptions; your attention is attracted away from the basic weakness of the whole story. Since I find that fundamental framework ludicrous, I respond by treating it as ludicrous – that is, by laughing at it – so as not to fall into the trap of taking it seriously and passing on to matters of technique."

> "on ourselves the same high standards we had criticized the Keynesians for failing to live up to. But after about five years of doing likelihood ratio tests on rational expectations models, I recall Bob Lucas and Ed Prescott both telling me that those tests were rejecting too many good models. The idea of calibration is to ignore some of the probabilistic implications of your model but to retain others. Somehow, calibration was intended as a balanced response to professing that your model, although not correct, is still worthy as a vehicle for quantitative policy analysis…"

Conclusion

It is – sad to say – a fact that within mainstream economics internal validity is everything and external validity and truth nothing. Why anyone should be interested in that kind of theories and models – as long as mainstream economists do not come up with any export licenses for their theories and models to the real world in which we live – is beyond comprehension. Stupid models are of no or little help in understanding the real world.

In Chicago economics one is cultivating the view that scientific theories has nothing to do with truth. Constructing theories and building models is not even considered an activity with the intent of approximating truth. For New Classical Chicago economists like Lucas and Sargent it is only an endeavour to organize their thoughts in a "useful" manner.

What a handy view of science!

What Sargent and other defenders of scientific storytelling "forgets" is that potential explanatory power achieved in thought experimental models is not enough for attaining real explanations. Model explanations are at best conjectures, and whether they do or do not explain things in the real world is something we have to test. As Romer has argued forcefully in his latest articles – to just *believe* that you understand or explain things better with thought experiments is not enough! Without a warranted export certificate to the real world, model explanations are pretty worthless. Proving things in "post-real" macroeconomic models is not enough. Truth is an important concept in real science.

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Another reason why a steady-state economy will not be a capitalist economy

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The best known advocate of a steady-state economy, Herman Daly (2008), believes that such an economy could still be a capitalist economy. Richard Smith (2010) argues that a capitalist economy must by nature be a growth economy, but Daly and similar theorists see it as a matter of choice. As Smith says, according to Daly and others, "… growth is seen to be entirely subjective, optional, not built into capitalist economies. So it can be dispensed with, exorcised, and capitalism can carry on in something like 'stasis'." Similarly Tim Jackson has a vision of a steady-state economy that is a "flourishing capitalism", although functioning "… at a less frantic pace…".

Smith's case that a steady-state economy cannot be a capitalist economy focuses on the nature of the market system. Smith discusses Daly's enthusiastic acceptance of the market, stating that Daly's vision of a Steady-State Economy is based "…on impeccably respectable premises: private property, the free market, opposition to welfare bureaucracies and centralized control". Smith insists that as long as the economy is driven by market forces it will have a growth imperative. "'Grow or die' is a law of survival in the marketplace. …the growth imperative is a virtual a law of nature, built into any conceivable capitalism. Corporations have no choice but to seek to grow."

This line of argument, centring on the intrinsic nature of a market system, is persuasive, but although Smith's commentary was made two years after the article he discusses it does not deal with the counter-argument Daly raised briefly in his 2008 statement. This is the possibility that technical advance will enable increasing dollar value to be got out of a stable amount of material and ecological inputs to the economy, thereby making it possible for sales and GDP to go on increasing. Daly says, "… the value of total production may still increase without growth in physical throughput – as a result of qualitative development. Investment in quality improvement may yield a value increase out of which interest could be paid."

Daly's use of the term "qualitative" here seems to stand for basically a "tech-fix" claim; i.e., that as time goes by technical advance will improve the efficiency of resource use and reduce environmental impacts. This will enable more product, or better or higher quality/value items, to be derived from a stable flow of physical and biological resources, thereby allowing sales and GDP to go on increasing even though it is a steady-state economy with respect to ecological sustainability.

This is the issue that the following critique addresses. It will be argued that the main problem in Daly's position is to do with the *scope* for growth that technical advance is likely to make possible.

Daly does recognise that this issue of magnitude is crucial, although he does not explore it. He says, "…the productivity of capital would surely be less … sectors of the economy

generally thought to be more qualitative, such as information technology, turn out on closer inspection to have a substantial physical base…" The central point made via the extensive evidence quoted below is that this scope is very likely to be so extremely limited as to ensure that the economy would cease to be capitalist.

The central "decoupling" claim

The essential issue here is the widely assumed "decoupling" claim; i.e., that economic growth can be separated from growth in inputs to the economy, thereby enabling continued increase in production, consumption, economic turnover and "living standards" without running into serious resource and environmental problems. This assumption is built into the general "Tech-fix" view. The most enthusiastic elaboration of this is to be found in the recent emergence of Edomodernism". (See Blomqvist, et al., 2015.)

The term "relative decoupling" refers to growth in need for inputs that is less or slower than growth in GDP but still positive, while "absolute decoupling" refers to growth of GDP with no increase in inputs, or a fall. Believers in Tech-fix tend not to realise that if global resource demands and ecological impacts are to be brought down to sustainable levels there must be enormous and extremely implausible absolute decoupling. This is the first of the two main points detailed below. The second is that all the evidence found in this review contradicts the notion that significant decoupling is occurring, and no evidence has been found to support it.

How much decoupling would be needed?

This question requires brief attention to the general nature and magnitude of the limits to growth problem. The 10-15% of the world's people living in regions such as North America, Australia and Europe have per capita levels of resource use that are around 20 times the average for the poorest half of people. How likely is it that all the 9.7 billion people expected by 2050 could rise to the present rich world level of resource use?

If they did live as rich world people do then world annual resource production and consumption, and ecological damage, would be approaching 6 times as great as at present. Yet present resource use and environmental impacts are far beyond sustainable levels.

The World Wildlife Fund's "Footprint" analysis (WWF, 2014) yields the estimate that it takes about 8 ha of productive land to provide water, energy settlement area and food for one person living in Australia. So if 9 billion people were to live as we do we would need about 72 billion ha of productive land. But *that is about 9 times all the available productive land on the planet.*

However the foregoing argument has only been that *the present* levels of production and consumption are quite unsustainable. Yet we are determined to increase present living standards and levels of output and consumption, as much as possible and without any end in sight. In other words, the supreme national goal is economic growth. Few seem to grasp the implications.

If rich countries have a 3% p.a. increase in economic activity until 2050 then their output, resource use and environmental impact will be approaching four times as great as it is now, and doubling every 23 years thereafter. If by 2050 all the expected 9.7 billion people expected to be living on earth had risen to the "living standards" we in rich countries would then have given 3% economic

growth, then total world output, resource, use and environmental impact would be approaching *15 times* as great as they are now.

According to the WWF's Footprint index (2014) sustainable levels have already been exceeded by 50%. This indicates that the above 1/15 reduction factor is too low and that if 9.7 billion were to live sustainably on the levels of consumption rich countries expect in 2050 then per capita impacts would have to be reduced to 1/23 of their present rich world levels.

These multiples should be the focal point in discussions of sustainability. Grasping the magnitude of the present overshoot is the crucial beginning point for the analysis of the global situation and the nature of a sustainable and just alternative society.

The evidence on decoupling

If resource use was to be reduced to 1/15th (or 1/23rd) of present levels by 2050, the annual reduction rate would have to be over 9% p.a. (or 14% p.a.) The amount used would have to halve every approximately 4.5 years (or 3 years.) These would be extraordinarily rapid rates of *absolute* decoupling. That is materials and energy use would have to be falling at three or four times the typical rate of increase in GDP. Does the historical and present decoupling achievement suggest that these kinds of rates could be achieved?

Notes on about 30 studies and estimates of decoupling rates for the economy in general, and for specific industries and resource uses, are available at The Simpler Way (TSW): *Decoupling: The issue and evidence*. These all document very low or negligible rates at best, and some that are negative. Consider the following examples drawn from that collection.

Wiedmann et al. (2014) show that when materials embodied in imports are taken into account rich countries have not improved their resource productivity in recent years. They say "…for the past two decades global amounts of iron ore and bauxite extractions have risen faster than global GDP." "… resource productivity…has fallen in developed nations." "There has been no improvement whatsoever with respect to improving the economic efficiency of metal ore use."

In another study Wiedmann et al. (2015) report on an input-output study of 186 nations. They find that a 10% increase in GDP is accompanied by a 6% increase in materials use. The study takes into account "upstream" materials use, i.e., in production and transport and infrastructures needed to produce materials. This use is large… 40% of global raw materials extracted goes into producing goods to be exported. i.e., far more than the 10 Gt of goods traded.

Their main finding is that, "No decoupling has taken place over the past two decades for this group of developed countries. …pressure on natural resources does not relent as most of the human population becomes wealthier."

Giljum et al. (2014, p. 324) report only a 0.9% p.a. improvement in the dollar value extracted from the world use of each unit of minerals between 1980 and 2009, and no improvement over the 10 years before the GFC. "…not even a relative decoupling was achieved on the global level". They note that the figures would have been worse had the production of much rich world consumption not been outsourced to the Third World. Their Fig. 2, shows that over

the period 1980 to 2009 the rate at which the world decoupled materials use from GDP growth was only one third of that which would have achieved an "absolute" decoupling, i.e., growth of GDP without any increase in materials use.

Diederan's account (2009) of the productivity of minerals discovery effort is even more pessimistic. Between 1980 and 2008 the annual major deposit discovery rate fell from 13 to less than 1, while discovery expenditure went from about $1.5 billion p.a. to $7 billion p.a., meaning the productivity of expenditure fell by a factor that is in the vicinity of around 100, which is an annual decline of around 40% p.a. Recent petroleum figures are similar; in the last decade or so discovery expenditure more or less trebled but the discovery rate has not increased.

A study by Schandl et al. (2015) contained the following statements, "there is a very high coupling of energy use to economic growth, meaning that an increase in GDP drives a proportional increase in energy use." (They say the EIA, 2012, agrees.) "Our results show that while relative decoupling can be achieved in some scenarios, none would lead to an absolute reduction in energy or materials footprint." In all three of their scenarios "energy use continues to be strongly coupled with economic activity..."

The Australian Bureau of Agricultural Economics (ABARE, 2008) reports that the energy efficiency of the nation's energy-intensive industries is likely to improve by only 0.5% p.a. in future, and of non-energy-intensive industries by 0.2% p.a. This means they expect that it would take 140 years for the energy efficiency of the intensive industries to double the amount of value they derive from a unit of energy.

Alexander (2014) concludes his review of decoupling with respect to environmental impacts by saying, "decades of extraordinary technological development have resulted in increased, not reduced, environmental impacts". Smil (2014) concludes that even in the richest countries absolute dematerialization is not taking place.

The FAO reports a case where decoupling has been negative, i.e., growth has been accompanied by disproportionate increase in input. Cereal production since 1960 has multiplied by 3.4, but nitrogen application multiplied by 8.3 (FAOSTAT Database, Undated, Fig 2.9.) Similarly, Alvarez found that for Europe, Spain and the US GDP increased 74% in 20 years, but materials use actually increased 85% (Latouche, 2014).

The IEA (2008) finds that there was little change in energy use per unit produced for cement production (p 34.) The index for paper improved from 80 to 92 (Fig 3.5 p. 32), and aluminium went from c.16 kWh/kg to 15 over the period, but the future potential for further reduction was said to be limited. There was little improvement for cars, and slow improvement for electricity production.

Tverberg (2015) says,

> "In recent years, we have heard statements indicating that it is possible to decouple GDP growth from energy growth. I have been looking at the relationship between world GDP and world energy use and am becoming increasingly skeptical that such a decoupling is really possible."

Tverberg's plot for the growth of energy and GWP shows parallel paths, with energy a little lower. That is, energy is not shown to fall away much from the GDP growth line.

> "Prior to 2000, world real GDP (based on USDA Economic Research Institute data) was indeed growing faster than energy use, as measured by BP Statistical Data. Between 1980 and 2000, world real GDP growth averaged a little under 3% per year, and world energy growth averaged a little under 2% per year, so GDP growth increased about 1% more per year than energy use. However since 2000 energy use has grown approximately as fast as world real GDP – increases for both have averaged about 2.5% per year growth."

Figure 10a for energy intensities for the world, shows little improvement since 1980. Fig 11 shows a drop from index 258 to 225, and a flat trend since 2000.

Krausmann et al. (2009) say that most of the global reduction in the conventional measure of material intensity was due to the declining intensity of biomass use, while the intensity of minerals use actually increased. Energy intensity declined by 0.68% per year, and materials intensity by 1% per year. (p. 10.) That is, energy needed per unit of GDP would take 106 years to halve.

Australian petroleum products consumption increased from 27,902 million litres in 1970 to 52,095 Ml in 2010, an approximately 1.75% p.a. exponential rate of growth. In the same period GDP increased at 2.5%-3% p.a. (Again around the 0.6 ratio.) At this rate by 2050 petroleum consumption would be about 87% higher than now.

The energy needed to produce 1 kg of steel in the US fell 13% between 2000 and 2014, i.e., at an average 0.9% p.a., meaning that it would take more than 80 years to halve (World Steel Association, 2016). At 3% p.a. growth economic output would be about 12 times as large by then, so total steel use could be expected to be in the vicinity of six times as large as at present.

Similar conclusions re stagnant or declining materials use productivity etc. are arrived at by Aadrianse, (1997), Dettrich et al., (2014), Schutz, Bringezu and Moll, (2004), Warr, (2004), Berndt, (1990), Schandl and West, (2012).

The significance of EROI

This is one of the most important issues relevant to the tech-fix and decoupling claims. The Energy Return On Invested (EROI) energy for overall energy production/supply is falling. The world EROI for the production of oil and gas has declined from 30:1 in 1995 to about 18:1 in 2006 (Hall, Lambert, and Balogh, 2014; see also Nafez, 2016; Murphy, 2010). Values for the new fossil fuel sources such as via fracking are low. For tar sands and oil shale they are around 4 and 7. Values for renewables are also low; wind is best with an estimate around 18, biomass ethanol is c. 4 at best and biomass diesel about 2. The figure for PV is controversial, usually claimed to be 8 but some argue 2-3 (Prieto and Hall, 2013; Palmer, 2013; Weisbach et al., 2013). The decline in the general EROI figure represents a "negative decoupling" for energy over time, i.e., technical advance has not been able to prevent the amount of energy produced per unit of effort from *decreasing*.

A caution re the "energy intensity" measure

The above figures might seem to be contradicted by the often quoted "energy intensity" index. This typically shows that the amount of energy used in rich world economies per unit of GDP has been in decline, suggesting that decupling is occurring. However this is misleading as there two important factors that these figures do not take into account.

The index does not include the large and increasing amounts of energy and materials imported into a country in the form of produced goods as energy intensive operations such as manufacturing is shifted to the Third World. With respect to materials they only refer to what is now labelled "Domestic Materials Consumption" whereas what matters is the "Total Materials Consumption" or "Material Footprint" of a nation which are indices including materials used to produce imports (for instance, Wiedmann, et al., 2015). Thus Cloete (2015) says,

> "it … appears that the outsourcing of energy intensive labour to developing nations (and buying back the goods with dollars created out of thin air) is the primary cause of US energy intensity reductions."

Secondly, over recent decades there has been considerable "fuel switching", i.e., moving to forms of energy which are of "higher quality" and enable more work per unit. For instance a unit of energy in the form of gas enables more value to be created than a unit in the form of coal, because gas is more easily transported, switched on and off, or transferred from one function to another. This enables more productive work to take place per MJ. Cleveland et al. (1984) and Kaufmann (2004) document the trend and argue that its effect is considerable.

A caution re the GDP measure

Another factor tending to make the decoupling achievement look better than it is involves the changing constituents of GDP. Over recent decades there has been a marked increase in the proportion of rich nation GDP that is made up of "financial" services. In some years this sector has made about 40% of corporate profits. However much of the relevant "production" in this sector takes the form of nothing more than key strokes moving electrons around. A great deal of it is wild speculation, providing risky loans and making computer driven micro-second switches in "investments". Apart from the negligible or negative social value these operations often create, they deliver large increases in income to banks, screen jockeys, speculators, consultants and fund managers, and these add into GDP figures. Thus the numerator in indices of productivity and decoupling is significantly inflated helping to improve those indices when in fact there has been little or no improvement in the efficiency with which anything of social value is being produced.

When output per worker in the production of substantial goods and services such as food and vehicles, or aged care, is considered quite different conclusions are arrived at. For instance Kowalski (2011) reports that between 1960 and 2010 world cereal production increased 250%, but nitrogen fertilizer use in cereal production increased 750%. This aligns with the above evidence on steeply falling productivity of various inputs for ores and energy. It is therefore important to keep in mind that when analysing productivity, the "energy intensity" of an economy, and decoupling indices which involve the GDP will be significantly misleading.

To summarise

The above evidence indicates that very little relative decoupling is being achieved let alone absolute decoupling. In a number of cases the best estimated decoupling rates indicate that as GDP rises 1% materials or energy used rise 0.6%. This would mean that by 2050 normal 3% p.a. GDP growth would have multiplied it by more than 3, and that materials use would be 1.8 times as large as it is now. This is obviously far from keeping materials demand from increasing as GDP increases, let alone dramatically reducing it as is needed.

In other words, *none of the evidence quoted above or in the longer collection provides significant support for the decoupling thesis or the general tech fix faith with respect to demand for energy, materials or environmental impact.*

This would seem to be the main factor responsible for the poor performance of "productivity" indices in recent years. The measure commonly taken regards labour and capital as the crucial factors but it is now being realised that the role of energy inputs has been overlooked. For instance over the last half century agricultural productivity measured in terms of yields per ha or per worker have risen dramatically, but these have been mostly due to even greater increases in the amount of energy being poured into food supply, on the farm, in the production of machinery, in the transport, pesticide, fertilizer, irrigation, packaging and marketing sectors, and in getting the food from the supermarket to the kitchen, and then dealing with food wastes and packaging. Less than 2% of the US workforce is now on farms, but agriculture accounts for around 17% of all energy used (not including several of the factors listed above.) Similarly the "Green Revolution" has depended largely on ways that involve greater energy use.

Ayres, et al. (2013), Ayres, Ayres and Warr (2002) and Ayres and Vouroudis (2013) are among those beginning to stress the significance of energy in productivity, and pointing to the likelihood of increased energy problems in future and thus further decline in productivity. Murillo-Zamorano, (2005, p. 72) says "…our results show a clear relationship between energy consumption and productivity growth." Berndt (1990) finds that technical advance accounts for only half the efficiency gains in US electricity generation.

These findings mean that it is not even possible to attribute to sheer technical advance most of the generally slight improvements in productivity that were being achieved before the recent down turn, because many or most were due to increased energy inputs.

Implications for a steady-state economy

If there is negligible decoupling and if productivity gains are slight and due largely to greater use of energy, this means that over time technical advance is not getting significantly more dollar value out of a given amount of material and energy inputs. But Daly's case that a steady-state economy can remain capitalist depends entirely on the assumption that there is considerable scope for technical advance to enable productivity gains and decoupling, and for this to continue indefinitely. If the foregoing numbers are more or less sound, the scope is very low, and likely to diminish. Daly does not seem to grasp how severely this would limit the opportunities for capital investment.

Consider the volume of production, business turnover and capital investment that would be involved in a steady-state economy functioning on something like 10% of the present GDP of a rich world economy. The amount of factories and infrastructures needed would be about 10% of the present amount, and the only outlets for capital investment would be a) in maintenance of the amount, that is in dealing with depreciation or switching to a different mix, and b) taking advantage of those very limited technical advances enabling more value to be got out of the stable and hugely reduced volume of material and energy inputs.

Well-designed plant in an economy acutely conscious of resource scarcity might average a 75 year lifetime (e.g., small and large buildings made from earth can last hundreds of years). In a severely constrained energy situation it is likely that the presently very low and probably deteriorating productivity figures would remain around negligible at best. It is not plausible that these conditions could support a capitalist class of any significance, because the scope for deriving income from the investment of capital would be a very small fraction of the present amount. Capital could in principle still be privately owned, yielding a very small income to a very small capitalist class, but it is not plausible that a society sensible enough to embrace a steady-state economy would tolerate this.

A steady-state economy is not enough

It should be evident from the above discussion that it is not sufficient merely to take a steady-state economy as the goal. When the seriousness of the limits to growth is understood, as the above multiples make clear, it is obvious that a sustainable and just society must have embraced large scale *de-growth*. That is, it must be based on per capita resource use rates that are a small fraction of those typical of rich countries today; it must in other words be some kind of Simpler Way. (For the detail see *TSW: The Alternative*.)

Only if the basic settlement form is a small scale, highly self-sufficient, self governing and primarily collectivist local economy, can the resource and ecological effects be dramatically reduced. The main concern of The Simpler Way project is to show that this vision is workable, easily achieved if it is opted for, the only way to defuse global problems, and capable of greatly improving the quality of life even of people living in the richest countries.

The chances of it being achieved are at present negligible, but that is not central here; the question is given the global predicament does any other option make sense.

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Using regression analysis to predict countries' economic growth: illusion and fact in education policy[1]

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Abstract
Regression models employed to help understand, predict, and enhance national economic growth have increasingly come to rely on quality of education as an important variable. Such models, however, often make a number of untenable assumptions not congruent with reality. A case in point is the recent book by E. Hanushek and L. Woessmann, *Universal Basic Skills: What Countries Stand to Gain.* Unpacking the notion of educational quality – which the book argues is totally captured by PISA and TIMSS scores in math and science – this paper critiques regression models that assume a particular PISA threshold score as quality and stable and linear national development over 80 years, regardless of great variability in countries' economic production systems, histories, physical resources, and social contexts. Hanushek and Woessmann argue that quality of education makes a substantial contribution to economic growth and that quality contributes 6.3 times more than quantity (i.e., secondary school enrollment). However, the narrow definition of quality and the disregard for complexity in explaining social and economic conditions seriously diminish the validity of the findings. The emphasis on education to the exclusion of other forces in society serves to detract attention from deeper policy measures and makes the book less a valid academic study than an effort to manipulate the soft power of OECD to convince governments of the usefulness of international student testing.

Introduction

The introduction of the "knowledge society" has increased global attention to education and with it a greater concern for quality and an appeal to governments to develop education systems that promote cognitive achievement rather than rely solely on expanding access to schooling. This development has been supported in recent years by several economists who have found that quality of schooling is related to economic growth (Barro, 2001; Sahlgren, 2014; Barrow & Lee, 2015), and some even argue (Hanushek & Kimko, 2000; Hanushek & Woessmann, 2007; Hanushek & Woessmann, 2015) that quality is much more important that quantity in predicting a country's wealth.

This claim, however, is not uncontested. Breton (2011) observes that a major flaw in the optimistic calculation by Hanushek and Woessmann is that they rely on the cognitive skills of students measured at a later period than when workers were productive in the labor force. Other criticism has been expressed by Ramirez et al. (cited in Kamens, 2015), who found that recent analyses of the impact of test scores on economic growth show that the impact was substantial only when countries such as Singapore, Hong Kong, Taiwan, and South Korea were included in the study. Kamens (2015) correlational analysis focusing on 1990 growth found little support for ths relationship between test scores and GNP per capita, which led him to assert that globalization had introduced new dynamics in the production structure of many

[1] Paper was presented at the annual CIES conference, Vancouver, 7-10 March 2015. I benefited greatly from the comments and suggestions offered by Theodore Breton, James Cobbe, Steven J. Klees, and Judith Torney-Purta.

countries. No strong effects of test scores on economic growth were found by Levin and Kelley (1994), who considered that the absence of complementary inputs to the economy in the regression models was a major cause for the lack of substantial effect linked to test scores. In a similar study, Lee and Barrow (1997) found that cognitive skills affected economic growth, but only when such skills related to reading, not when they concerned math and science. Glewwe, Maiga, and Zheng's analysis focusing on sub-Saharan countries (2007) raised methodological concerns, arguing that it is easy to misspecify variables in regression models dealing with diverse cultural contexts and that since individuals usually work for several decades after their formal education, the impact of education alone may not be easy to isolate from other concurrent developments over such long periods.

Despite controversy in the academic world, among key international agencies there is a strong consensus that quality (as measured by standardized testing) is highly related to economic growth (usually measured in terms of GDP). This concern with "quality" has been reinforced by two simultaneous developments: the abundance of international test data and advances in computational science. The measurement of student achievement is often being taken as the only indication of cognitive development and thus as a proxy for quality of education. International student test data has been available since 1960 with IEA studies, but in recent decades more countries are participating and several regional and global tests such as SECQMEC, TIMSS, PIAAC, and PISA have become popular and/or have been mandated by some agencies.[2] The ease with which complex statistical models on which such test results can be run makes the computation of various forms of regression analysis accessible through a relatively modest personal computer and thus econometric modeling has become easy and inexpensive to perform.

This paper takes as its main reference the 2015 book produced by E. Hanushek and Ludger Woessmann, entitled *Universal Basic Skills: What Countries Stand to Gain*. Hanushek and Woessmann (H&W hereafter) make strong claims about the highly positive role of knowledge in the creation of national wealth. This paper's objectives are thus: (1) to examine this claim as operationalized in the model proposed by H&W, (2) to probe the model's analytical strength, and (3) to examine its potential for generalization to low-income countries.

Theories underlying the critical role of knowledge and skills

The assertion that knowledge and skills serve as a major predictor of GNP growth is based on two theoretical premises: (1) the quality of knowledge is the principal determinant of wealth generation; (2) a country's economic output is determined primarily by internal/endogenous factors. The first premise, though quite appealing, is insensitive to well-demonstrated factors of production, which identify physical capital, land, and labor (which includes the knowledge of workers) as combined elements, acting in strong interaction. The second premise blends neoclassical theory and endogenous growth theory; the former holds that economic growth is determined primarily by capital intensive production, which leads to higher worker productivity; the latter holds that national investments in human capital and innovation are the main causes behind economic growth.

[2] The international testing regime is expanding to include the testing of teachers, as embodied in TALIS, a survey organized by OECD.

Endogenous growth theory is based on investment in human capital (knowledge and skills) to foster innovation. Essential to endogenous growth theory is the adoption of domestic policies that embrace openness, competition, and innovation, as these are expected to promote economic growth. However, the pervasive impacts of current globalization trends oblige us to consider new economic complexities, particularly the enormous impact of trade and the prices of commodities on economic activity. Advances in the understanding of economic growth are also recognizing the importance of non-economic factors; among them, notably, the characteristics and stability of institutions guiding social action. Natural endowments (particularly minerals) are also important, especially in an export-led economy.

Few scholars would deny the role of human capital as a key ingredient to countries' economic wellbeing, bringing higher productivity and faster and presumably more useful innovations leading to technological advancement. Since human capital is comprised of knowledge and skills, it is increasingly recognized that education makes a contribution not only through years of schooling attainment but mainly through what is learned in school – i.e., the quality of schooling.

But, what is education quality? This is a complex concept that includes the learned knowledge and skills that are essential to a given society. While economists might wish to reduce quality to the acquisition of knowledge and skills needed for future workers, other social scientists direct their attention toward the knowledge and skills needed to produce and sustain a society that is both democratic and inclusive, one that promotes positive transformations in gender, race, and ethnic relations. Measures of quality are necessarily proxies, such as student/teacher ratio, length of school term, teacher salaries. Increasingly, in many dominant analyses, the one proxy for education quality, which ignores the effect of family characteristics, has become student performance in international tests; moreover, this measure is being further narrowed to include performance in only three academic domains: reading, math, and science. International testing programs introduce distortions of their own, one of the most salient being student motivation to perform well in those tests. While such motivation might be strong in countries that aggressively seek to present an advanced national face, other countries might view these international tests as relatively useless, nationally embarrassing, and/or expensive exercises, which might not promote student motivation to perform well.

The H&W model

Regression models in general seek to capture complex realities through a small set of variables and simplified assumptions about our social world. Being parsimonious, models necessarily exclude other important variables that may impact long-term economic growth (Sahlgren, 2014, p. 19; see also Glewwe, Maiga, & Zheng, 2014). Often, lack of conceptual clarity is present in regression models. Thus, the studies on which they are based may cite relevant pieces of the literature but do not explain the logic for inclusion or exclusion of certain variables in the model. Moreover, as a growing number of economists continue to acknowledge (e.g., Levin, 1994; Glewwe et al., 2007; Klees, 2016), omitting a variable that has a true causal effect and is correlated with other variables retained in the regression will change the estimates on those other variables. This is known to all empirical economists but they ignore this basic issue and tend to overinterpret their econometric results.

The H&W model is both innovative and categorical in its assertions. Their projections assume endogenous growth, in which increases in human capital (i.e., a better educated workforce) are the main determinant of economic growth. Productivity of individuals is key and somehow their increased productivity will lead to a more organized society in which national economic output will rapidly augment over time. The model is based on implicit and explicit assumptions about how the economy works and how key variables can be measured.

Explicit assumptions made by H&W are that national growth will occur *linearly* from 2015 to 2095, workers will remain in the labor force an average of 40 years, the growth rate of the economy will be about 1.98%, and future gains in GDP are discounted for evaluation purposes at the rate of 3% (Hanushek & Woessmann, 2015). The authors hold these assumptions to be reasonable, but it could be argued, on the contrary, that these assumptions are overly optimistic by today's realities. In fact, Krueger and Lindahl (2000) have observed that the assumption of linearity in most models of macro-economic growth is often rejected by the empirical data.

The key independent variable in the model used by H&W – the set of knowledge and skills embodied in individuals – is assumed to be measured in valid and reliable form by international tests. Specifically, it is implicitly assumed that PISA tests are able to measure cognitive achievement across nations, thus providing a variable that operates with force regardless of differences in culture and history – and as noted above, regardless of students' motivation to perform well on the test.

Since today there is a widespread recognition that economic, social, and political institutions shape a country's economic outcomes, H&W incorporate two variables they consider crucial measures of the institutional context of countries. These are "openness of the economy to international trade" and "security of property rights." It should be remarked that by selecting these two "institutions," H&W accord attention and value to these institutions over other possible institutions and other possible sets of variables. This is an example of how you can incorporate in a regression function variables of your own political preference rather than proven theoretical value. The variables dealing with openness to trade and security of property rights are directly connected to neoliberal theories in which the role of international business entrepreneurs is seen as paramount to economic growth. Other economists observe that life is more complicated today. Romer, for instance, citing the effects of globalizing forces, finds that "people with human capital migrate from places where it is scarce to places where it is abundant" (1994, p. 19). In Romer's view, therefore, migration would be a crucial variable to incorporate in models where knowledge is being considered. Kamens (2015) also express concerns about the role of globalization, holding that the process of production have changed under globalization so that what matters is not only cognitive skills of workers but also the country's ability to attract investors and the investors' own efforts to discover new markets and cheaper sources of labor, react quickly to international conditions, and, when needed, withdraw abruptly from certain markets. The economy also needs to be able to absorb people with high cognitive skills; thus, the capacity to use educated talent depends on access to capital and financial markets in the external environment (Kamens, 2015). Other economists have advanced models in which they control for "institutional effects" that are more expansive than those considered by H&W. These include such issues as enrollment shares of independent schools, existence of exit exams, centralization in decision-making and choice, and the decentralization and autonomy of schools. None of this is considered pertinent in the H&W model. The fact that key variables sensitive to the current world are not taken into account in the H&W model renders it unrealistic.

Operationalizing the H&W model

The regression model used by H&W is parsimonious and simple. The dependent variable is GDP growth projected for 80 years (estimated GDP by 2095), subject to the assumptions about economic performance cited above. Since the unit of analysis is the country, and a small number of cases are available, the regression has only four independent variables: GDP in 2015, national performance in international tests, the country's openness to trade, and the country's protection of property. By most analytical standards, this is a reductionist view of reality.

In the introduction to the H&W book, written by Andreas Schleicher, director of PISA at OECD and Qian Tang, current UNESCO assistant-director general for education, lofty claims are made for PISA, which is said to measure "not only whether students have learned what they were taught, but also assesses whether students can creatively and critically use what they know" (Schleicher & Tang, 2015, p. 9).

H&W would ideally have liked to rely only on PISA tests, but its global administration in 2012 yielded only 65 cases. They therefore added 11 other nations which had data from another test: TIMSS, 2011. Since the TIMSS data does not cover reading, the authors decided to construct the key independent variable—cognitive achievement—by taking into account only performance in math and science. Reading, which in most understandings of the curriculum is a vital subject, was thus summarily eliminated. The official justification presented by H&W is that they measured mathematics and science because these "can be measured reliably and consistently across countries and cultures" (p. 12).

H&W assert that cognitive achievement or quality should have a minimum threshold. Selected as such was Level 1 of PISA, or a score of 420 points in this test. This decision, they argue, was based on the need for individuals to have "modern functional literacy," which was defined as "not just the ability to read simple words," but "the capacity to understand, use and reflect critically on written information, the capacity to reason mathematically and use mathematical concepts, procedures and tools to explain and predict situations, and the capacity to think scientifically and draw evidence-based conclusions" (p. 21).

Findings

To assess the impact of students' cognitive skills on economic growth, H&W ran simulation model under three scenarios: one in which countries focused only on the expansion of the secondary school system (full participation by all, but at current basic skills), another in which countries centered on the students' skills (secondary schools at current enrollment rates attain a minimum of 420 PISA points), and a third scenario combining both schooling quantity and student capability variables (i.e., full secondary school enrollment and a minimum of 420 PISA points is attained by all).

Assuming an endogenous growth model, H&W find that combining full participation in secondary school and achievement of a minimum level of skills (all students achieve a minimum of 420 PISA points),would make a sizable contribution to economic growth: in lower-middle income countries (N=8) the GDP would grow 27.9% per year, in upper-middle income countries (N=23) 15.6% per year, while in high income OECD countries (N=31) the GDP would grow 3.5% year (p. 66). In additional regressions, H&W show that GDP growth due to

achievement of minimum skills far exceeds that due to the quantity of schooling. Not surprising, the combined scenario – schooling quantity and minimum skills – offers the largest GDP gains. H&W thus find that among lower-middle income countries, economic growth due to universal secondary enrollment at current levels of school quality would yield a growth of 206% in their GPD (over an 80-year period), while growth due to universal secondary school enrollment jointly with universal attainment of 420 PISA points would yield an increase of 1,300% of the GDP over the same period. In other words, school quality would increase the GDP 6.3 times more than school quantity (pp. 15 and 69).

But, are these gains real? Explanatory narratives based on such small number of countries should be very cautious about making predictions. A Harvard economist, Barro (c. 2000, p. 5), warns, "My view is that it is impossible to use the experience of one or a few countries to get an accurate empirical assessment of long-term growth effects from legal and educational institutions, size of government, monetary and fiscal policies, and other variables."

Further, the countries in their sample comprise a set of very disparate economies. H&W note that the 76 countries in the sample account for 61% of the world GDP (H&W, 2015, p. 36). The high percentage suggests a balanced representation of countries; but such is not the case. According to Hanushek (2015), all countries that participate in PISA are among the best regional performers, so most of the countries in the sample are upper-middle income (members of OECD), with only eight of the 76 classified as lower-middle income and none as low-income. High-income countries in the H&W book are further classified as OECD or non-OECD. The classification of countries based solely on levels of income casts doubts on the validity of this conceptualization. "Lower-middle income" comprises countries as diverse as Ghana, Honduras, Ukraine, and Viet Nam. The "upper-middle income" countries present a more uneven mix with enormous diversity in size, history, and economic structures, such as Montenegro, Thailand, Turkey, and Costa Rica. The "high-income non-OECD" countries also forms a disparate group; it includes mostly oil producing countries such as Oman, Bahrain, Qatar, and UAE but also city-states such as Singapore and Hong Kong and a super power such as the Russian Federation. Greece, also among the sampled countries, now faces an extremely volatile economic situation and its financial governance has been a major source of concern to its European partners. Some countries in the sample are absolute monarchies; others have more democratic forms of government. Is it possible to erase past history, political systems, economic structures, cultural norms under a single variable: level of GDP? And not control for these other factors as independent variables?

I would argue that this procedure is not adequate. The countries in the sample are much more diverse than their GDP. The oil-producing countries draw their wealth primarily from exports in which the knowledge composition of their inhabitants plays a minor role in revenue generation. Although both are OECD members, the US economy is 60 times the size of Czechoslovakia's. Some of the countries have experienced stable regimes (e.g., Australia, Morocco); others have not (e.g., Honduras, Ukraine). In all, the countries in the sample are highly heterogeneous in terms of economic productivity, stability of and respect for institutions, the training and prestige of civil service, among many other factors of importance. When focus is placed on certain countries, the model does not fit. Such is the case of the United States – a major economic power – that has relatively low PISA scores and relatively high growth rates (H&W, 2008). It has also been observed that among the PISA higher-scoring countries, student scores are not related to economic growth rates (Breton, 2015a). Economists who are familiar with estimates of economic returns – which derive from particular forms of earning functions – warn us that such estimates vary widely, depending on the data

sets used, the assumptions made, and the estimation techniques (Dickson & Harmon, 2011). Further, they observe that "a single rate of return may not be very informative if returns to education differ by education level or differ across populations (including the social strata)" (Dickson & Harmon, 2011, p. 1118). None of these nuances appear in H&W's book. H&W claim their projections are "robust" because they include "institutional measures related to the quality of the underlying economic environment" (H&W, 2015, p. 68). But as seen above, the two referenced institutional measures seem quite arbitrary as they address only market forces in very particular ways.

And, can we generalize to other countries? It is an established principle of the social sciences that we can generalize *only* from the sample to the population. Much of the value of the H&W book is being presented in the form of policy recommendations for *poor* countries to follow. This is implicit as the book is produced under the auspices of OECD and with the endorsement of UNESCO and – less formally – of the World Bank. But, can one extrapolate to situations where causal mechanisms may be different? The extrapolation proposed by H&W assumes great stability over time, with no ceiling effects. Does this assumption apply to all countries, regardless of their economic composition, level of industrial development, or production base? It should be noted that since the future is projected solely on assumptions rather than on empirical facts surrounding the sample, the generalization proposed by H&W contains yet another source of error: time. Can we safely make assumptions about the dynamics we will undergo over the next 15 years? One observation we could make is that perhaps the study has too much to say about too few countries classified by level of GDP. At best, then, the results presented in the H&W book should be described as merely suggestive.

The authors are aware that charges of reverse causation (e.g., income growth may cause increased investments in education [Glewwe, Maiga, & Zheng, 2007]) could be raised against the proposed model. They argue that this has been controlled. But for this to be controlled, regressions in which cognitive achievement is now placed as the dependent variable would have to be run – and the results shown. Which they are not. Breton (2011) found that across countries schooling attainment (quantity) explains a greater share of income variation than average test scores. This critique is conveniently disregarded in H&W's subsequent work. Using a more complete model, Breton (2015a) subsequently found that the average test scores could not explain economic growth in countries that had more than 8 years of schooling or countries that had average test scores over 470.

Unsurprisingly, H&W find that the institutional factors they selected contribute to economic growth. They find that on average having an open economy makes a contribution of 1.61 percentage points while having protection against expropriation contributes 0.95 percentage points to the annual GDP (Figure 5.5., H&W, 2015, p. 70). The selection of those two "institutions," however, drowns out the voices of institutions that have significant impact on people's ability to work, produce, and contribute to the economy. This is an example of how scholarship mixes with political beliefs, when researchers can add to a regression function their own variables of convenience.

Conclusions

Despite statistical sophistication, regression analysis cannot escape criteria for determining (a) the appropriateness of the proposed model and (b) the validity of generalizing from it. Models should have a sound theoretical framework, with a well-justified set of variables.

Models are parsimonious efforts to capture reality, which all scientific efforts seek to do by identifying fundamental factors. But sometimes we can stretch this procedure beyond reason. Political and religious contexts that deeply affect some countries cannot be just pushed aside. A similar argument could be made for the economic context. Stefan Dercon (2015), an Oxford University professor and the current DFID chief economist, challenges the view that sees education as the most important sector. He has plainly stated that the argument that education may cause economic growth is flawed as it appears that the supply (of jobs by industrial and commercial firms) creates demand (for jobs) rather than the demand (for jobs) creates supply.

The classification of countries by level of GDP is oblivious to how this GDP is generated. It is bizarre thus to consider Singapore (extremely high in technological manufacture) similar to some Middle East countries (whose revenues derive mostly from the export of a single natural resource). The surgical precision of regression coefficients can thus be very misleading. One *should* be able to generalize because we make advancements in knowledge when we can apply what we have learned in a particular circumstance to other circumstances. But to extrapolate outside the boundaries of the original study requires an extraordinary amount of additional information.

The book by H&W brings some positive points for education. The book's advocacy of the importance of education in fostering economic wellbeing is very much welcomed. Positive also is the authors' demonstration of a strong association between education and GDP growth, which leads them to assert that "arguments against school improvement based on limited funds are indeed short-sighted" (H&W, 2015, p. 82). The preface to the book by OECD and UNESCO leaders makes a strong case for working with teachers: "Nowhere does the quality of a school system exceed the quality of its teachers" (Schleicher & Tang, 2015, p. 13).

On the negative side, while the authors say that both quality and quantity of education are important, their bias for quality shows repeatedly. But quality for them has an intriguing emphasis as it is not connected to greater investment in teachers or the conditions under which teaching takes place. They have made categorical assertions in this regard in a previous work published by the World Bank in 2007 (*Education Quality and Economic Growth*) where they state, for instance, that "Many policies involve substantial flows of resources—direct spending, changes in teacher salaries, reductions in class size, and the like—made within the context of current school organization. The empirical evidence documents the difficulties with such policies. Simply providing more resources gives little assurance that student performance will improve significantly" (p. 15). While they acknowledge that educational systems need to improve, they also go on to argue that there is "no relationship between spending and student performance" (p. 10), a remark that emerges as an invitation not to invest more in education.

H&W offer a very optimistic yet purposefully naïve model of real life events and processes. Analytically, placing education over everything does not make sense. Their model implies that investment in health and social security are less important. But why so much weight on education? A cynical perspective would say that education centers attention on domestic factors and chooses to ignore external dynamics. By denying the role of international economic and political forces, the authors create a world in which self-contained and sovereign nations are the primary agents of their destiny. No need, then, to revisit the current

international order and its complexities and the inequalities it generates. So, I would assert H&W's optimism has a political nature underlying its concentration only on education.

Their book, sponsored and published by OECD, in the end argues for the need for constant "performance measures" and "accurate assessment of performance by international standards" (H&W, 2015, p. 83). This then amounts to a strong endorsement for the use and expansion of international tests, particularly PISA—the test OECD administers throughout the world. And as a claim to continue to equate student test performance with school quality. It certainly would favor OECD to promote and disseminate studies that rely on PISA as a measure of education quality, thus further legitimating testing as a measure of educational quality. At the same time, it must be recognized that OECD has become a institution whose "educational policy work is widely used by national governments to guide their reform agendas" (Rizvi & Lingard, 2006, p. 248), an observation shared by Andere (2015), who holds that PISA has become the "guiding document of choice among many national governments for design and implementation of policy change." H&W's book is printed with a colorful cover and is replete with figures and tables; moreover, it is is accessible free of charge through the Internet. This, plus the explicit endorsement of UNESCO and the implicit endorsement of the World Bank, make the book an instance of soft power being presented as valid academic research.

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Can a country really go broke?Deconstructing Saudi Arabia's macroeconomic crisis

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"The Stone Age came to an end not for a lack of stones and the oil age will end, but not for a lack of oil" (Sheik Ahmed Zaki Yamani, former Saudi oil minister).[1]

Abstract
It would be no exaggeration to say that the Kingdom of Saudi Arabia is reeling from a macroeconomic crisis, triggered by a collapse in oil prices since June 2014. After a period of approximately twenty months, the popular media began predicting something even more cataclysmic; bankruptcy. But can a country actually go broke? In this paper we attempt to answer this seemingly simple question by deconstructing the essence of the Saudi Arabian economy and its dependence on US$s to fund its budgeted expenditures. We do so from a heterodox macroeconomic perspective. Specifically, a T-account analysis and stock-consistent accounting approach. The Saudi Arabian economy is relatively unique. Our analysis reveals the limitations Saudi Arabia confronts in terms of the scope for conventional macroeconomic fiscal, monetary and trade policies. Its situation is precarious, not only economically but politically. A heavy dependency on oil prices within the context of current institutions and commitment to maintaining a monetary standard are creating problems that may require profound changes. Saudi Arabia is not a 'modern money' economy. Under its current configuration it is possible for Saudi Arabia to become 'bankrupt' in US$ terms, particularly if oil prices do not recover significantly. The looming uncertainty over future oil prices constitute challenging times for a country like Saudi Arabia that is witnessing turmoil on multiple fronts.

Key words: fiscal policy, monetary policy, oil shock, Saudi Arabia, sectoral financial balances

JEL classification: E52, E62, H62

1. Introduction

"Saudi Arabia *may go broke*[2] before the US oil industry buckles"(Pritchard, 2015).

An economy plunging into economic crisis with high inflation or declining GDP is something economists have grown accustomed to grapple with. But a country going broke? Is that really possible? When oil prices tumbled by over 70 percent between June 2014 and the beginning of the 2016, the popular media argued vociferously that Saudi Arabia, a major oil exporter, and monoexporter in particular, might indeed become insolvent. Here are a few headlines (emphasis added) that followed in quick succession after an International Monetary Fund (IMF) report was released in October 2015;

"IMF: Saudi Arabia *running on empty* in five years" (Ali, 2015).

[1] Quoted in Frankel (2012).
[2] Italics my own for emphasis.

> "IMF: Saudi Arabia is in danger of *running out of money* within five year" (Goldhill, 2015).
>
> "IMF predicts Saudi Arabia will *become bankrupt* shortly"(Matsangu, 2015).

These sensational predictions appeared towards the end of 2015; over the next few months oil prices would fall by more than 20 percent from around US$ 50/barrel to sub-30 levels in January 2016. And the fears only got even more definitive;

> "Welcome to AUSTERITY Saudi Arabia: Crashing oil prices sends economy into meltdown"(Clements, 2016).

While oil prices saw a mild recovery by June 2016, it plummeted by about 25 per cent (Carlson 2016) in a short period of just over a month, followed by a sharp recovery by over 6% in a single day (The Week 2016). This volatility indicates uncertainty for future scenarios for oil exporting countries, particularly oil monoexporters (The Week 2016b). In this paper we study the dismal state of affairs from a heterodox macroeconomics perspective to deconstruct the predicament of Saudi Arabia in the context of the recent oil shock. At the same time, we provide a sharper picture of the policy options open to it if the crisis of low oil prices were to continue.

This is an important exercise. Being at the epicentre of a sensitive region, the oil crisis in Saudi Arabia could have grave repercussions economically, politically and socially not just in the Middle East but globally. Unlike other more conventional macroeconomic stability crises such as those experienced in Japan or Greece, the Saudi Arabian crisis when seen in the context of the ongoing civil wars in the region as well as the simmering Iran-Saudi conflict, could turn out to be cataclysmic. In such a situation, sensationalism does not help – a more dispassionate macroeconomic analysis of the Saudi Arabian economy is critical. This is not to say that there is no imminent crisis; to the contrary, the situation may be more precarious than we may apprehend from newspaper headlines. And this is simply because Saudi Arabia does not have the fiscal and monetary policy instruments one typcially observes applied in recent crises: austerity, negative interest rates, quantitative easing etc. In a race against time, perhaps the best hope for Saudi Arabia lies in a reversal of the oil price trend, and soon.

2. Archetype of the Saudi Arabian economy

Saudi Arabia is a high income country with a GDP per capita in PPP terms of more than US$ 50,000 while being ranked 39th on the Human Development Index (HDI) with an absolute score of 0.837. The total population of Saudi Arabia is about 28 million of which some 30 percent are expatriates. Although expatriate workers are rewarded with high wages and allowances, as well as a tax-free income, they receive no unemployment benefits, which are available only to Saudi citizens. Apart from a direct unemployment benefit of Euro 370/month, citizens are also provided education allowances, health benefits and housing (Kukemelk, 2011). The Saudi Arabian economy is driven by oil; while oil exports constitute 90% of total exports[3], the petroleum sector accounts for almost half of Saudi Arabia's GDP and contributes to 80% of the government's budget from where benefits and allowances to

[3] In years when oil prices are high, like in 2012 and 2013, the ratio of oil to total exports increase, and vice-versa.

citizens are doled out. With such a massive dependence on oil exports, it is obvious why the oil-price crash which began in June 2014 and continues unrelentingly ever since can destabilize the Saudi Arabian economy from its very core; the word "meltdown" therefore being quite appropriate.

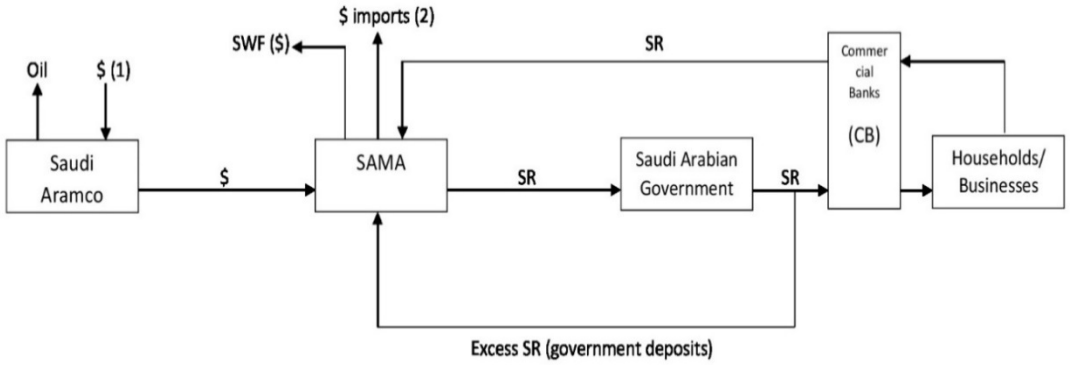
What makes monoexporters like Saudi Arabia quite unique in terms of macroeconomic theory is the fact that foreign exchange earnings from oil exports actually "fund" the government's budget. While this may seem rather intuitive, it will not so be so obvious to some economists. The argument being put forth here can be understood by posing a couple of questions; how do countries which have no major current account surpluses fund their domestic budgets? Are government budgets usually funded by dollars? Do governments even need revenues, let alone dollars, before they spend? Answers to these questions provide clues in identifying the predicament of (oil) monoexporters and the options open to them if the present crisis of low oil prices were to continue over a longer period of time.

Figure 1 illustrates the flow of US dollars ($) and Saudi riyals (SR) through the economy. The figure being schematic, only major components in the sequence are included. The process begins with export of oil by Saudi Aramco, Saudi Arabia's national petroleum and natural gas producer. A portion of its $-revenues is transferred to the Saudi Arabian Monetary Agency (SAMA), the country's central bank. The SR equivalent of the $-amount is then transferred by SAMA into the Government's account (Ministry of Finance or the Treasury) held at the central bank, which can be used for its budgetary expenditures. This step actually describes the funding process, i.e. how $s enter the government's budget as "revenues". Limiting SR spending to $ revenues is equivalent to state (or reserve) money being backed fully (100 percent) by foreign exchange reserves.[4] Although this condition may be relaxed in economic downturns when $-revenues plummet, it ensures that excessive spending does not take place when $-revenues are abundant. Moreover, since SAMA allows full convertibility of $s to SR (Al-Jasser and Banafe, nd, p. 260) at a fixed exchange rate of 3.75 SR per $[5] it is important to ensure balance between issue of SR and $-reserves.

Continuing with Figure 1, when the government spends, SR in its account flows to households and businesses (HH/B) through commercial banks (CB). Through these transactions, SR reserve money or reserves will be transferred from SAMA to commercial banks. However, a significant portion of household consumption and business investment are for imported goods. When imports are made by the domestic private sector, SR reserves will flow back from commercial banks back to SAMA in exchange for $s while at the same time reducing deposits held by HH/B. In other words, the reserves injected into commercial banks on account of spending by the government are now returned to SAMA to procure $s for imports. Tax collections being low in Saudi Arabia, these reserves remain in the banking system. We will return to the implications of this feature later in the paper. The difference between (1) and (2) as marked in Figure 1 is the current account $-surplus on the balance of payments – which is then used for investments in a Sovereign Wealth Fund (SWF). The difference between (3) and (4) in the figure are SR balances (usually surplus) of the government held at SAMA as "Government Deposits".

[4] Currency (notes and coins) in Saudi Arabia are backed fully by gold reserves.
[5] The Saudi Arabian monetary system can be categorized as a $-exchange standard.

Figure 1: Flow of $ and SR through the Saudi Arabian economy



Two specific comments are worth mentioning here; first, unlike Saudi Arabia, domestic currencies of (economically speaking) "sovereign" nations of the world are neither backed by precious metals and/or a foreign currency. A sovereign government does not need to deposit $ in its account with the central bank for procuring funds (currency and/or reserve money) to spend – it can "borrow" money from the central bank against issue of government securities. The danger, however, for Saudi Arabia is its high marginal propensity to import at almost 20 percent of GDP and 50 percent of oil revenues. Unrestrained government expenditure could put pressure on the SR to depreciate. To maintain its currency peg, the SAMA would have to deplete its $ reserves; an unsustainable option in the longer term. Hence, by restricting the overall size of the government budget, the possibility of excessive imports is avoided. In this way, a "shortage" of $s cannot arise in Saudi Arabia since issue of SR is constrained by $s received by the government primarily from oil revenues. This brings us to the second point; the possibility of an excess supply that can put pressure on SR to appreciate is also circumvented by SAMA's willingness to hold $ at the going exchange rate and invest it in foreign assets through a sovereign wealth fund (SWF). Obviously, if an SWF did not exist, the forex market would be flooded with excess $ that could have caused the SR to appreciate. Through the SWF, Saudi Arabia, like many other major oil exporters, also believed that it had effectively circumvented the Dutch Disease. Overall, a fixed exchange rate system and capital account convertibility have ensured confidence and stability of SR.

3. T-accounts analysis of the oil crisis

Macroeconomists are usually averse to accounting, preferring models that establish causality to the simple logic of debit and credit. The implications of macroeconomic policies are also often put to empirical tests using sophisticated econometric methods while no attempt is made to analyse the repercussions on various agents in the economy from an accounting standpoint. Not only does the accounting approach help the economist to track financial flows through the economy but they reveal the financial position of each agent (sector) at the end of a transaction sequence in terms of changes in their assets and liabilities. This has important implications for financial stability as well as in revealing the sequential impact of shocks through:

> "explicit modelling of the financial sector as distinct from the real economy, so allowing for independent growth and contraction effects from finance on the

> economy … [and] accounting identities (not the equilibrium concept) as determinants of model outcomes in response to shocks in the environment or in policy" (Bezemer, 2010).

Table 1 presents T-accounts of monetary flows of $s and SR through the (hypothetical) Saudi Arabian economy. Once again we are considering only the major components of overall flows for illustrative purposes, namely primarily oil revenues, government spending out of these revenues and imports by HH/B. The values chosen are arbitrary too and not based on actual data. Credit money created by the banking system is also ignored and so too are indigenous production and consumption transactions.

The inflow of money into the economy begins with a receipt of $s 1000 as foreign exchange (FE) from export of oil by Saudi Aramco. The company's bank receives cash of $1000 from the bank of Saudi Aramco's customer, while at the same time it carries the company's deposit account on its books. The sequence of transactions (with hypothetical values) that follow have been described in Table 1 along with corresponding entries in the book of accounts.

The "flow" of money from transactions yields a final "stock" position in assets and liabilities as shown in Table 2. The initial inflow of $1000 from Saudi Aramco to the Saudi government ultimately results in an increase in HH/B net worth of SR 1875 and government deposit of SR 750 while at the same time allowing SAMA to increase its asset accumulation in an SWF to the tune of $ 700 (= SR 2625).

A careful examination of the hypothetical T-accounts yields some interesting insights into the nature of the Saudi macroeconomy. For all practical purposes Saudi Arabia's currency could have been $s, which flow through the economy, and with the excess mopped up into a SWF. But there is one option which opens up from the flow of SR; HH/B accumulate[6] net financial assets in riyals (in our example, SR 1875) while the $-SWF is actually controlled by the government/SAMA. Moreover, the massive inflow of $s from oil revenues could have caused the riyal to appreciate, which is now maintained at a fixed rate by adjusting $-inflow and outflow via the budget. One additional comment is warranted here; as can be seen from Table 2, it is (theoretically) possible with full convertibility for HH/B to convert all their SR financial assets into $s. However, in this single-period example, even if this extreme possibility were to occur the government would be able to honour its commitment of converting SR into $s at a fixed exchange rate, although it would result in a lesser amount leftover for investment in SWF.

[6] In reality, financial assets are held not just by HH/B but by the entire domestic private sector including commercial banks and financial institutions.

Table 1: Economy-wide transaction sequence using hypothetical values, pre-oil shock
[Note: for each entity, assets are on the left-hand and liabilities on the right-hand column.]

Saudi Aramco		Saudi Aramco's Bank		SAMA		Government		Commercial Bank (CB)		Household/Business (HH/B)		Description
Deposit + $1000	Net Worth (NW) +$1000	Cash (FE) +$ 1000	Aramco Deposit +$1000									Saudi Aramco deposits cheque with its bank
Deposit -$1000	NW -$1000	Cash (FE) -$1000	Aramco Deposit -$1000	Cash (FE) +$1000								Saudi Aramco issues cheque in favour of government; $ transferred from Aramco's bank to SAMA.
					Government Deposit +SR 3750	Deposit at SAMA +SR 3750						SAMA credits Government a/c with corresponding SR @ $1=SR 3.75
					Government Deposit -SR 3000	Deposit at SAMA -SR 3000			HH/B Deposit +SR 3000	Deposit at Bank +SR 3000		Government spends SR 3500 on HH/B who deposit SR in CB
					Reserves of CB with SAMA + SR 3000			Reserves with SAMA +SR 3000				Reserves transferred from SAMA to CB
									HH/B Deposit -SR 1125		Deposits at Bank -SR 1125	Spending by HH/B of SR 1125 (= $300) on imports
					Reserves of HH/B with SAMA -SR 1125 (=$ 300)			Reserves to SAMA -SR 1125 (= $ 300)				Reserves going back to SAMA for buying $
				Outflow of $ 300 for imports								

Table 2: "Stock" position using hypothetical values of individual entities, pre-oil shock

SAMA			
Foreign exchange $ 700 2625 ($1000 -$300) invested in SWF	SR	Government Deposits (SR 3745 – SR 3500)	SR 750
		Reserves of banks with SAMA (SR 3000 – SR 1125)	SR 1875

Saudi Government			
Deposits with SAMA 750	SR		

CB			
Reserves with SAMA 1875	SR	HH/B Deposit accounts 1875	SR

HH/B			
Deposits at banks 1875	SR	NW 1875	SR

4. The impact of the oil crisis on Saudi Arabia

The oil price crash has contagious repercussions on balance sheets; beginning with Saudi Aramco and eventually moving through to HH/B. Table 3 explains the consequence of such an exogenous shock on the (hypothetical) Saudi Arabian economy constructed in Table 1 and 2. A not-so-unimaginable fall in oil price first reduces the oil revenues of Saudi Aramco from $1000 to just $100. On transfer of SR 375 (= $ 100) to SAMA, it gets credited to account of the government, which now has total deposits of SR 1125 (= SR 750 from pre-crisis period + SR 375). However, if it chooses not to cut expenses of SR 3000, then the consequent impact on balance sheets can be seen in Table 4 and 5 for both periods together and independently for the post-crisis period respectively.

In this illustrative example the fall in oil revenues is accompanied by a fiscal deficit of SR 2625 (SR 375 – SR 3000) and a current account deficit of $ 200 ($ 100 – $ 300). Obviously in this case SAMA has abrogated its commitment to back the issue of SR with $ revenues. The danger of this is seen in Table 4; not only can imports exhaust $-reserves if the situation continues over a longer period of time but more perilous is the fact that if HH/B decide to convert their total financial assets into $s it would leave $-reserves at zero. Saudi Arabia would then be at the verge of "bankruptcy" as it would have no $s left. Fortunately, this is not the real picture. Over the years, Saudi Arabia has accumulated $ reserves and this cannot be exhausted by a fiscal deficit and current account deficit of just one year. Nonetheless, one thing is clear – a fiscal deficit and current account deficit cannot be sustained indefinitely either. From what seemed a comfortable position in Table 2, the current account deficit along with a fiscal deficit has turned the situation into a precarious one. At some point of time, Saudi Arabia could reach the predicament illustrated in Table 4.

Table 3: Economy-wide transaction sequence using hypothetical values, post-oil shock
[Note: for each entity, assets are on the left-hand and liabilities on the right-hand column.]

Saudi Aramco		Saudi Aramco's Bank		SAMA		Government		Commercial Bank (CB)		Households/Businesses (HH/B)		Description
Deposit + $100	NW +$100	Cash (FE) +$ 100	Aramco Deposit +$100		Cash (FE) +$100							Aramco deposits cheque with its bank
Deposit -$100	NW -$100	Cash (FE) -$100	Aramco Deposit -$100									Aramco issues cheque in favour of SAMA; $ transferred from Aramco's bank to SAMA.
				Government Deposit +SR 375		Deposit at SAMA +SR 375						SAMA credits government a/c with oil revenues of only $100 with corresponding SR @ $1 = SR 3.75
				Government Deposit -SR 3000		Deposit at SAMA -SR 3000		HH/B Deposit +SR 3000		Deposit at Bank +SR 3000		Government spends SR 3000 on HH/B who deposit SR in CB
				Reserves of HH/B with SAMA + SR 3000			Reserves with SAMA +SR 3000					Reserves transferred from SAMA to CB
								HH/B Deposit -SR 1125		Deposits at Bank -SR 1125		Spending by HH/B of SR 1125 (= $300) on imports
				Reserves of HH/B with SAMA -SR 1125 (=$300)			Reserves to SAMA -SR 1125 (= $300)					Reserves going back to SAMA for buying $
					Outflow of $300 for imports							

Table 4: Consolidated "stock" position using hypothetical values of individual entities, pre- and post-oil shock

SAMA			
Foreign exchange $ 500 1875 ($700 + $ 100 – $300) invested in SWF	SR	Government Deposits (SR 750 + SR 375 – SR 3000)	– SR 1875
		Reserves of banks with SAMA (SR 1875 + SR 3000 – SR 1125)	SR 3750

Saudi Government			
Deposits with SAMA 1875	– SR		

CB			
Reserves with SAMA 3750	SR	HH/B Deposit accounts	SR 3750

HH/B			
Deposits at banks 3750	SR	NW 3750	SR

Do the changes ascertained above correspond to the actual situation developing in Saudi Arabia over the last few years, in particular, post-crisis? Table 6 presents facts and figures pertaining to the Saudi Arabian economy drawn from a recent IMF Report (IMF, 2015, pp. 39-42). There is both a decline in SAMA's foreign assets as well government deposits with the latter turning negative as discerned in Table 3 and 4. The $s available in the SWF fell considerably in 2015 by about 8%, to a point currently sufficient to cover just about 3 years of imports (IMF, 2015, p. 42).

Table 5: "Stock" position of individual entities using hypothetical values, post-oil shock period only

SAMA			
Foreign exchange – $ 200 750 (+ $ 100 – $ 300) Drawn from SWF	– SR	Government Deposits (+ SR 375 – SR 3000)	– SR 2625
		Reserves of banks with SAMA (SR 3000 – SR 1125)	SR 1875

Saudi Government			
Deposits with SAMA 2625	– SR		

HH/B Banks			
Reserves with SAMA 1875	SR	HH/B Deposit accounts 1875	SR

HH/B			
Deposits at banks 1875	SR	NW 1875	SR

What is however most critical, but not captured by the IMF (2015) data, is the stock of financial asset accumulation by the domestic private sector (BB/H) in SR. What if domestic private sector consisting of households and businesses as well as commercial banks and financial institutions choose to convert their financial assets held in riyals into dollars? We have already mentioned the dire consequence of this possibility in our hypothetical example and Table 6 does show some increase in $ outflows on the capital account although it has not reached alarming proportions so far. As elaborated later in the paper, such an event would require a fundamental change in the present rules of the game; either the Saudi government suspends full convertibility on the capital account and/or the fixed exchange rate peg of $ 1 = SR 3.75 would have to be revoked. But can Saudi Arabia afford such an adjustment in a politically charged landscape?

Once the intricacies of stock-flow consistency are recognized from T-accounts it can put into the more holistic sectoral financial balances (SFB) model that presents a vivid picture of the possible direction in which the economy could move. Most importantly, these options maintain the stock-flow consistency that we have highlighted in the previous sections.

Table 6: Changes in key parameters for the Saudi Arabian economy from actual data (in billions)

Item description	**2012**	**2013**	**2014**	**2015**
Increase in deposits at SAMA	SR 329	SR 125	-SR 81	-SR 354[#]
Increase in total assets of the government	SR 330	SR 162	-SR 96	x
Current account balance	$ 165	$ 136	$ 81	-SR 155
Portfolio Investments (outflow)	$ 3.2	$ 7	$ 28	x
Other investments (outflow)	$ 11	$ 54	$ 33	x
SAMA's total net foreign assets	$ 648	$ 717	$ 724	$ 661*

Source: IMF (2015) Tables 2 (p. 40) and Table 4(p. 42)

[#] https://www.mof.gov.sa/English/DownloadsCenter/Budget/Ministry's%20of%20 Finance%20statment%20about%20the%20national%20budget%20for%202016.pdf

*http://www.sovereignwealthcenter.com/fund/39/Saudi-Arabian-Monetary-AgencyInvestment-Portfolio.html#.VrQyj7J97md

5. From T-accounts to Sectoral Financial Balances (SFB)

The SFB model developed by the post-Keynesian economist, Wynne Godley, builds on the double entry accounting axiom that every debit has a corresponding credit or for every asset there must be a corresponding liability. These fundamental accounting axioms must hold true – an identity or a truism. If we divide an economy into three sectors namely the private domestic sector, the domestic government sector and external (consisting of both private and government) sector then net financial asset accumulation across these sectors must sum to zero. Therefore,

$$(T - G) + (S - I) + (M - X) = 0 \qquad (1)$$

where G = government expenditure, T = tax revenues, S = private sector savings, I = private sector investment, M = imports and X = exports[7]. Note that a current account surplus (deficit) where $X - M > 0$ ($X - M < 0$) implies outflow (inflow) of capital from (into) the domestic economy and accumulation of liabilities (assets) by foreigners. Rewriting (1) we get:

$$(S - I) = (G - T) + (X - M) \qquad (2)$$

Equation (2) establishes that net asset accumulation of the private sector must entail a corresponding accumulation of liabilities by at least one of the two sectors; the government and/or the foreign sector.

This equation can be mapped on to a 4-quadrant (Q-1 to Q-4) graph as in Figure 2. The line SI_0 drawn at an angle of 45^o through the origin is a set of points where $(S - I) = 0$. Consider point A on the SI line; if $(S - I) = 0$ then from (2), $(X - M) = -(G - T) = (T - G)$ or a fiscal surplus. If $(S - I) = 0$, a positive current account balance must then be equal to a fiscal surplus; given that the domestic private sector is neither accumulating assets not liabilities, if foreigners are accumulating net financial liabilities then the domestic government must be accumulating an equal amount of financial assets.

Now consider a point such as B where in absolute terms $(X - M) > -(G - T)$. Therefore,

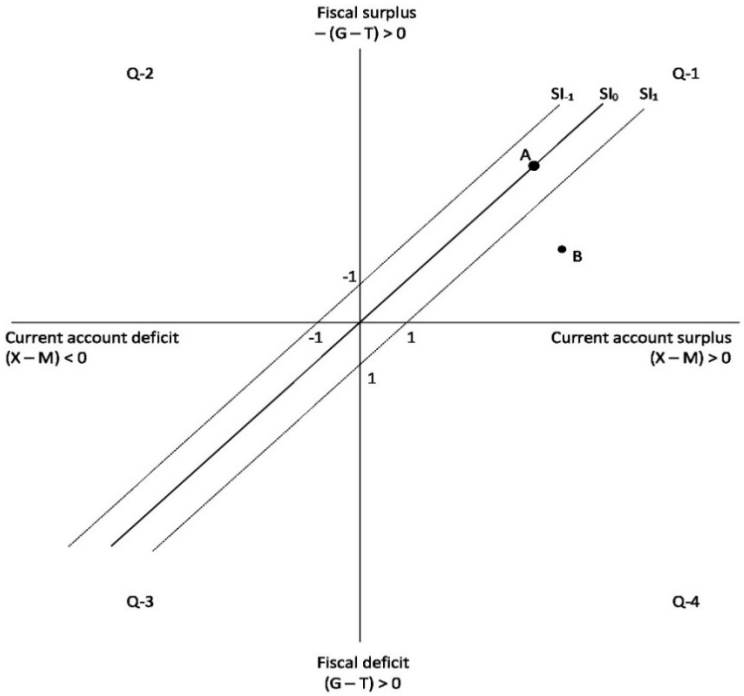
$$(X - M) - [-(G - T)] > 0 \text{ or}$$

$$(X - M) + (G - T) > 0$$

From (2) we therefore have $(S - I) > 0$ at point B. In general all points to the right (left) of the SI line are points where $S - I > 0$ ($S - I < 0$), i.e. the domestic private sector is accumulating a positive quantity of net financial assets (liabilities). Each of the dashed lines parallel to the SI line are possible combinations of fiscal and current account balances that yield a certain level of net financial asset accumulation by the domestic private sector; for example SI_1 yields one percent net financial asset accumulation, while points on SI_{-1} imply a one percent net financial accumulation of liabilities by the domestic private sector.

[7] Though we usually speak of imports and exports, these include goods, services as well as non-tradable items on the current account.

Figure 2: The SFB template



The (hypothetical) Saudi Arabian example illustrates how T-accounts are linked to the SFB model. From Tables 2 and 5, i.e. for each period independently, we have:

	(S – I)	=	(G – T)	+	(X – M)
Pre-crisis:	+ SR 1875	=	– SR 750	+	+ $ 700 (= SR 2625)
Post-crisis:	+ SR 1875	=	+ SR 2625	+	– $ 200 (= – SR 750)

A limitation of the SFB equation is that it does not establish cause and effect. However, since it is an identity that must hold true, desired or exogenously induced changes in a sector's financial balances will have cyclical repercussions on the economy; the feedback to the equation working through changes in income.

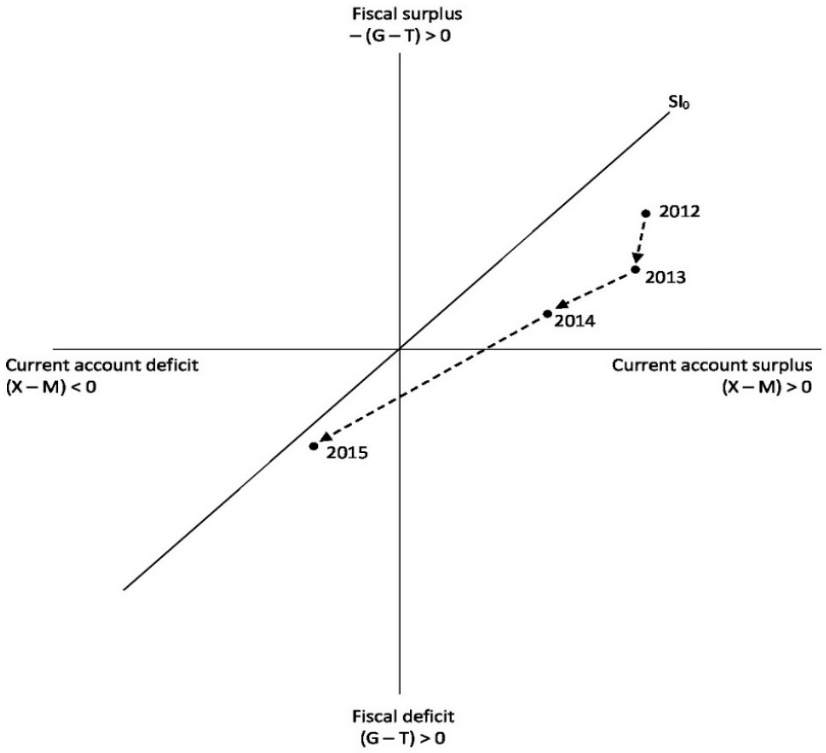
Table 7: SFB equation values as percentage of GDP for Saudi Arabia from actual data

Year	(S – I)	(G – T)	(X – M)	GDP growth rate
2012	10.4	-12	22.4	9.6
2013	12.4	-5.8	18.2	1.4
2014	7.5	3.4	10.9	0.2
2015*	6.7	13	-6.3	-13.35

Sources: IMF (2015), Table 1 & 3. *Data for 2015 is from Kingdom of Saudi Arabia Ministry (2016).

In Table 7 the components of the SFB equation are listed along with GDP growth rate from the IMF (2015) study for Saudi Arabia and the Saudi government's budget report (Kingdom of Saudi Arabia, 2016). Here, based on the T-account analysis and (2) above, we can deduce the value of net financial accumulation of the domestic private sector (S – I) from the values of (G – T) and (X – M). The trend in SFB from Figure 3 is disconcerting; the domestic private sector net financial asset accumulation is on the decline and is being sustained only through increase in fiscal deficits. As the current account balance turns negative and grows as a direct consequence of the oil shock, for the domestic private sector to have net financial asset accumulation, the government must run a larger fiscal deficit. There is no option. If fiscal surpluses are maintained the private sector will end up accumulating net financial liabilities, which are claims (assets) either of the foreign sector and/or the domestic government on the domestic private sector. Although such accumulation of debt may be possible for a limited period of time, a linear build-up is unsustainable as it would have to settle claims of a sector external to itself within a finite time horizon.

Figure 3: Saudi Arabia's changing SFB



(Figure not to scale)

While the government has been able to maintain positive net financial accumulation in the private sector with an increase in the fiscal deficit there are extraordinary challenges in using fiscal policy in the Saudi Arabian context.

6. Fiscal policy constraints in Saudi Arabia

The speed and intensity of the oil crash has forced the Saudi Arabian government to run a massive fiscal deficit of some 13 percent of GDP in 2015 (Table 7) after a series of budget surpluses in oil prices in the first half the decade. Although it is often claimed that "fiscal policy

is the primary macroeconomic management tool" (Al-Darwish *et al*, 2015, p. 2) for Saudi Arabia, it is important to understand that its fiscal policy is inextricably linked to the current account on the balance of payments (BoP), capital account convertibility and fixed exchange rate system – the trilemma, which is usually related to the lack of independence in monetary policy in such contexts, also confines fiscal policy. Saudi Arabia is not a "modern money" economy and does not have the same fiscal space as (or economically speaking), a sovereign economy has.

Given that SR are fully backed by $s, all else constant, a reduction in the current account surplus should translate into lower injections of SR into the economy. However, as seen in Table 3 and 5, the government could actually abrogate on this condition and decide to run a fiscal deficit by running up its liabilities with SAMA while at the same time running down its $ balances in the SWF to fund imports. If this policy is pursued over a longer period of time without a revival of oil prices and/or other exports, the economy would eventually run out of $s. The only other possibility is to constrain imports; unfortunately, given fixed exchange rates, imports would decline only through a lower fiscal deficits and contraction of GDP. We can only conjecture on the disquieting ramifications of this wilting of the Saudi Arabian economy.

The T-account analysis presented above also reveals another precarious possibility that Saudi Arabia has to contend with – convertibility of SR assets into $s. The domestic private sector can claim that their accumulated stock of financial assets (of SR 3750 as in Table 4) be converted into $s.

Both the above situations point towards a solution; repealing capital account convertibility and/or the fixed exchange rate standard. Instead of GDP contractions forcing a reduction in imports, the SR could go into free fall and depreciation of SR could do the job. But at what cost? A devaluation of SR would impact the cost of imports and with 80 percent of food imported, inflation could have serious repercussions on the standard of living. Moreover, devaluation or the possibility of depreciation of SR could induce capital flight, making it necessary to impose restrictions on capital account convertibility. With these measures, Saudi Arabia would be in a position to reclaim its fiscal space. However, more than economics, it is the political consequences of such a drastic step that makes it an unlikely choice for the government. Still there are ominous signs that Saudi Arabia may have to ultimately revoke the peg:

> "Will Saudi Arabia now abandon its dollar peg?" (Ellyatt, 2015).
>
> "Pressure Grows on Saudi Arabia to Ditch Dollar Peg" (Stubbington and Lohade, 2016).
>
> "Will Oil Slump Force Saudi Arabia to Abandon Riyal's Dollar Peg?" (Nereim, 2016).

The possible revocation of the dollar peg is already impacting the SR-$ forward market; one report in late December 2015 claimed that "12-month forward contracts on the Saudi Riyal reached 730 basis points over recent days. This is the highest level reached since the worst days of last oil crisis witnessed in February 1999" (FX Street, 2016). The Wall Street Journal also reported early this year that "forward contracts surge to 16-year high this week seen as sign of increasing strain on the peg" (Stubbington and Lohade, 2016). The threat of capital

flight is also looming over Saudi Arabia. Net capital outflows are presently at 8 percent of GDP but there is a clear and present danger that "capital flight will accelerate" (Evans-Pritchard, 2015).

With these emerging pressures, rather than increasing fiscal deficits, the Saudi Arabian government has been coerced to turn to "austerity" and "fiscal consolidation" instead. Although there may be several variants on how to reign in the fiscal deficit, austerity essentially comes to either raising revenues and/or cutting expenditures. Ideally for Saudi Arabia the increased revenues should come from larger current account surpluses but when this is not possible then, as can be seen in Table 1 and 3 above, a reduced fiscal deficit (lower net expenditure) would decrease the quantum of net financial asset accumulation of HH/B (more generally, the domestic private sector) for any given level of domestic consumption expenditure and imports. This can also be understood from (2) and Figure 3 where given that Saudi Arabia is currently facing a current account deficit and fiscal deficit, i.e. $(X - M) < 0$ and $(G - T) > 0$ respectively, then

$$(G - T) < |(X- M)| \text{ implies } (S - I) < 0,$$

where $|(X- M)|$ is the absolute value of the current account balance.

Net accumulation of financial liabilities by the domestic private sector is economically unsustainable over a longer period of time. At some time it is likely to result in deleveraging and a balance sheet recession. Nonetheless, in the shorter run, such austerity measures would not only dampen demand for imports but moreover the reduction in accumulated financial assets of the private sector might help in reducing available funds that could take to capital flight. In spite of these benefits, the formidable challenge for the Saudi Arabian government both in raising domestic revenues and in cutting expenditures is political, not economic.

Recommendations of a typical neoliberal model of austerity – balanced budgets with structural reforms – are pouring in from all quarters, notably the IMF, reiterated in the popular media. Revenues could be increased through taxes on property, corporate sector profits and even personal income taxes. Privatization of state-owned companies could be another way of bringing in cash (and some $ too); there is a buzz that the government "is even considering listing shares in its ginormous state-owned oil company, Saudi Aramco, in a bid to raise funds" (Barnato, 2016). But more than raising revenues for the government, taxes act as a useful drain of reserves from the system. In the case of Saudi Arabia such a drain could check imports[8] and ease the pressure on the burgeoning current account deficit.

On the expenditure front, the budget document for 2016 (Kingdom of Saudi Arabia, 2016) lists out several spheres in which drastic cuts, rationalization and optimization measures are proposed so that the fiscal deficit does not go out of control. However, as seen in so many countries across the world, austerity would leave less disposable income in the hands of the private sector, causing a contraction in GDP and employment. At a point of time when youth employment is at a threatening 30 percent and some 3 million jobs will need to be created by 2020 (Huileng, 2016), the warnings of an Arab Spring revolt in Saudi Arabia cannot be taken lightly. As heterodox economists have argued, austerity and mass employment creation are

[8] Especially imports of luxury goods.

not complementary and the exigency of the situation in the Middle East makes matters even worse.

To add to Saudi Arabia's predicament are regional conflicts, which likely make it impossible for the government to slash major expenditures.

> "The increase in spending has mainly resulted from the additional salaries for civil and military Saudi employees, beneficiaries of social security and retirees – as per the supreme Royal Decrees issued during the current fiscal year – which amounted to SR 88 billion, representing 77 percent of the increase in total expenditure in addition to what has been spent on military and security projects which amounted to SR 20 billion, which is equivalent to 17 percent of the increase, and SR 7 billion spent on various other projects" (Kingdom of Saudi Arabia, 2016, p. 2).

We can only wait and watch to see the fiscal response of the government in the days to come. But as put by one commentator, "time is a luxury that Saudi Arabia can no longer take for granted" (Al-Khatteeb, 2015).

7. Saudi Arabia's trade policy challenges

Given its political realties perhaps the "best" option for Saudi Arabia is to raise non-oil exports and curb imports. But here the larger global economic environment will make it harder for Saudi Arabia to do so. Although a recent report by McKinsey (2015) proposes that with some $ 4 trillion investments, Saudi exports could pull it out of its present predicament, the hypothesis seems over optimistic. Almost 62 percent of non-oil exports in 2014 were from petrochemical exports. To make matters worse;

> "Saudi Arabia has lost twice. It lost the support provided to these products for the purpose of export (there is no published data from a reliable source regarding the size of that support), and it lost 17.16% of the revenue because of the lower prices of petrochemical exports" (Ben Rubien, 2015).

Moreover, the reliance on the non-oil domestic private sector to accommodate the growing numbers of unemployed seems tenuous given that in the last 18 months, the manufacturing PMI[9] has fallen from almost 62 in June 2014 to less than 54 in January 2016; "the lowest reading in survey history, due to slower expansions in output, new orders."[10] The continuing decline in oil prices and overall commodity price slump on account of China's slowdown has resulted in low levels of capacity utilization; for instance, in the chemical industry it is presently around 80 percent (ICIS Chemical Business).

On the import front, a slowdown in government expenditure and GDP growth will reduce the demand for foreign goods. Amongst its major imports are vehicles, machines, engines and pumps as well as electronic equipment. While these are likely to show a downward trend, defence imports are rising. Saudi Arabia is now the world's largest importer of arms, reflecting on its security concerns. While food does not account for a major portion of its

[9] PMI refers to Purchasing Managers' Index
[10] http://www.tradingeconomics.com/saudi-arabia/manufacturing-pmi

overall imports, Saudi Arabia still imports about 80 percent of its food requirements (Sharif, 2014). What is worrisome for Saudi Arabia is that a fall in imports will be induced not by a depreciation of exchange rates but by a contraction in GDP; a vicious circle of falling exports, GDP and imports.

8. Limitations of monetary policy in Saudi Arabia

Before we delve into monetary policy in Saudi Arabia, a brief note on money is necessary. Endogenous money theory has long argued that central banks are not in a position to control money supply (McLeay *et al*, 2014). Instead, by setting an interest rate target and maintaining it through sale and purchase of bills and bonds, they influence the level of aggregate consumption and investment demand in the economy so as to keep inflation in check. State money or reserves are created by government expenditure thereby increasing the quantum of reserves in the banking system. Given a certain level of demand for reserves, this additional infusion of liquidity would usually lead to a fall in overnight interest rates in interbank money markets. To raise interest rates back to the target rate, central banks engage in the sale of bills and bonds that suck out excessive liquidity in money markets. The sale of bonds is therefore seen as a monetary policy instrument and not a tool of fiscal policy to raise funds for the government.

In the case of Saudi Arabia, it is obvious that given a fixed exchange rate system along with full convertibility, Saudi Arabia has acceded to the well-known "trilemma" or "impossible trinity" in economics. The option that it has chosen to relinquish is "independent" or "sovereign" monetary policy. What this specifically implies is that SAMA's target interest rate is set not with the objective of maintaining low and stable inflation and/or full employment in Saudi Arabia but instead to ensure that there is no build-up of pressure on the SR-$ exchange rate. To do so, the interest rates in Saudi Arabia must track the Feds Fund rate or else given full capital account convertibility of SR, capital flows would disrupt economic stability.

The challenge, however, arises from the fact that "large external surpluses and fiscal spending fuel a liquidity surplus in the banking system" (Al-Darwish *et al*, 2015, p. 41). Tables 1 and 2 clearly reveal the process by which this happens; government spending infusing reserves into the system. With low taxes these reserves remain within the banking system which by itself would drive interbank rates down to zero, thereby incentivizing borrowing and capital outflows from Saudi Arabia. To prevent these outflows, SAMA's monetary policy is essentially "liquidity management" which effectively "curbed excessive money supply growth, drained liquidity from the system and made it more difficult for speculators to acquire the riyals they wanted." (Al-Hamidy and Banafe, nd, p. 304).

The primary tool for such liquidity management is now short-term treasury bills called SAMA Bills. Reverse repo rates have also been consistently set above the Feds Fund rate. From time-to-time, SAMA also used minimum reserve requirements to reduce surplus reserves with banks. The issue of longer term public debt has been kept to a minimum in Saudi Arabia, making it seem as if government spending is "funded" by oil revenues rather than public debt. In 2014 public debt stood at just 1.6 percent of GDP.[11] With the drastic fall in $ revenues along with a large fiscal deficit in 2015 the concern over excess reserves within the banking

[11] http://www.tradingeconomics.com/saudi-arabia/government-debt-to-gdp

system is now a major cause of concern, which is exacerbated by pressure on SR to depreciate and the threat of capital flight. It is therefore not surprising that immediately after the Fed increased interest rates, SAMA increased reverse repo rates (and not repo rates) by 25 basis points to 0.75 percent so that capital outflows are prevented. In this way, rather than responding to the slow growth and high unemployment domestically, Saudi Arabia's monetary policy is subservient to its goal of exchange rate stability. Bond sales have also increased; public debt currently stands at 5.8 percent of GDP and a significant increase since 2014 levels. More than "funding" of its expenditure, it is actually imperative that SAMA drains excess reserves with banks and curbs speculation given the declining $-reserves available with the country.

It is important to highlight the critical role that independent monetary policy could play in tackling the oil crisis. Norway, another major oil exporter has lowered interest rates significantly over the last year so as to depreciate the Norwegian krone and bring about an adjustment in its current account. This option is closed to Saudi Arabia. But even if it were to be opened up, the question is whether it would suffice in raising Saudi Arabia's rather limited range of exports and more problematically, whether contraction in imports and inflation (due to depreciation of SR) triggers off an unmanageable social and political fallout.

9. Conclusion

The paper concludes on a note of predictive ambiguity as well as cautionary pessimism on what lies ahead for the Kingdom of Saudi Arabia. A lot depends on its power to influence global oil prices and strategy to do so. It is becoming increasingly clear that Saudi Arabia is turning away from OPEC and the historical approach of propping up oil prices by restricting output. Instead, Saudi is producing at record high levels with the hope that lower oil prices will drive U.S. shale oil producers out of the industry (Manners, 2016). While Saudi can sustain these low prices given its low costs of extraction and massive $-reserves, bankrupt shale oil producers will be forced out of existence (Cunningham, 2016). This strategy has already paid dividends; oil prices have seen a rise since early 2016 partly due to demand growth but also partly due to decreased supply (Bomey, 2016). But will this trend continue? Will U.S. shale oil producers return? Will the buoyant demand endure? There are no definitive answers.

We can draw one unequivocal conclusion from our analysis – if the oil price recovery is weak over the next few years, something will have to give way in Saudi Arabia. Perhaps the most likely will be the present fixed exchange rate system and full convertibility of the riyal. But with the low complexity and low elasticity of Saudi Arabian exports, it is unlikely that a lower value of the SR will suffice to ensure a current account surplus. On the other hand, import contraction is more likely but this will have implications on security, long term investment and growth as well as inflation (particularly food inflation). If Saudi Arabia chooses not to tamper with its monetary standard, then the only option for it would be severe austerity. But once again the political fallout of such a measure could be grave, perhaps even forcing Saudi Arabia to turn to the World Bank and IMF for structural adjustment support.

Finally, to answer the question raised in the title of the paper – it is possible that Saudi Arabia could go broke in terms of dollars. Although it could never go broke in terms of riyals, without a strong indigenous economy, Saudi Arabia may find its present predicament undermining the very core of its existence.

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Reconsideration of the Prebisch-Singer Hypothesis

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Abstract
In this paper, the long-term price developments as well as the primary commodity terms of trade of the most important primary commodities are presented, together with the underlying reasons for these trends. It is discussed if the observed trends can provide a confirmation of the Prebisch-Singer Hypothesis. Thereafter, the terms of trade of selected EU member countries are shown and the presumption is made, that the idea of the Prebisch-Singer Hypothesis can be used for the explanation of the diverging terms of trade development of industrialized countries with different export structures. A possible cause lies in the differing specialization in specific export sectors of these countries and the corresponding price developments of the exported goods.

Keywords: international trade, terms of trade, commodity prices

JEL code: F1

The Prebisch-Singer hypothesis assumes a long run decline in the terms of trade of countries that depend on exports of primary commodities (see Prebisch, 1950; Singer, 1950).
The terms of trade of a given nation are defined as the ratio of their average index of export prices relative to their average index of import prices:

$$\text{Terms of trade} = \frac{Average\ index\ of\ export\ prices}{Average\ index\ of\ import\ prices}$$

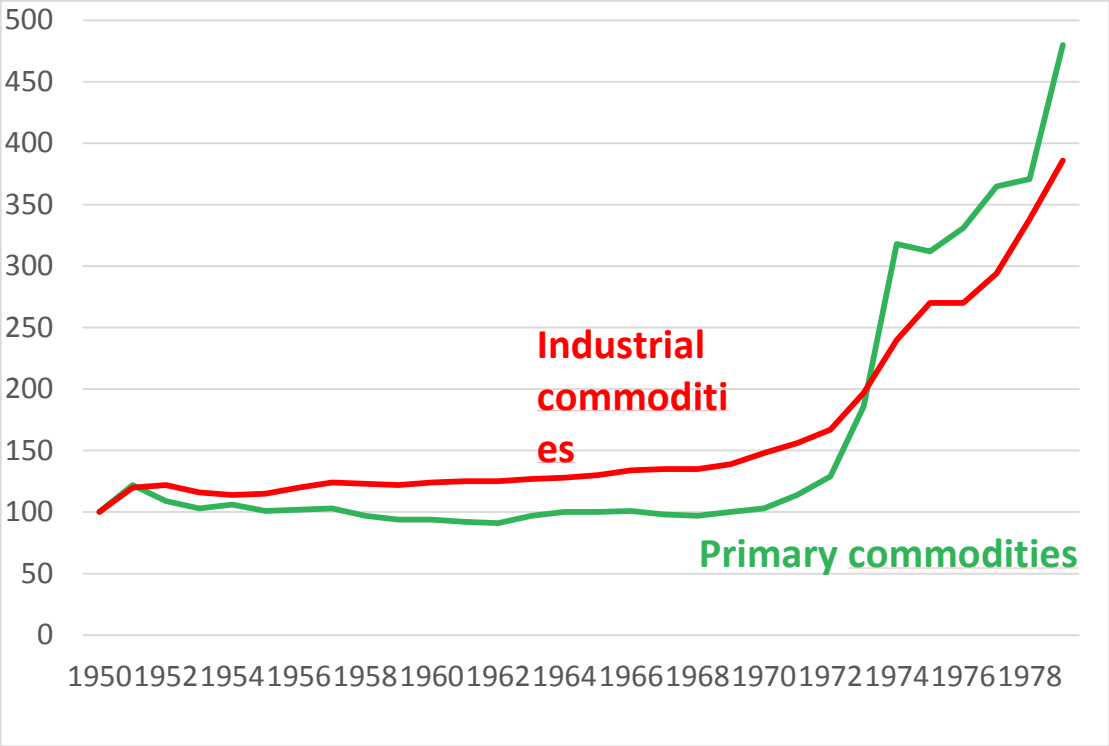
(United Nations, 2012, p. 47). In the calculations, representative baskets are used, based on the most popular exports and imports of a given country.

Usually every country is interested in an improvement of their terms of trade since an increase means that, for a given quantity of exports, the country is now able to obtain a bigger quantity of imports. Terms of trade tell us about the domestic exports that are needed to secure the same level of imports.

A main reason for a long run decline in the terms of trade of countries that depend on exports of primary commodities is that the hypothesis presumes a widening gap in the long term price development of primary products and manufactured goods. The research findings of Baffes/Dennis (2013), Ocampo/Parra (2004) and Grilli/Yang (1988), among others, provide support for the Prebisch-Singer Hypothesis. Many economists tried to explain the unfavorable world price development of primary commodities with the insufficient world demand for these types of goods (see Nurkse, 1961, p. 294-295). Other economists point to the fact that, for primary commodities, the price elasticity of demand is usually greater than the price elasticity of supply (see Mankiw, 2014, p. 91; see Porter, 1980, p. 19). The price of primary commodities is to a large extent determined by demand. For manufactured products however, there is usually a higher price elasticity of supply than of demand. Therefore, supply is highly relevant for the determination of prices of manufactured goods.

Figure 1 illustrates the long term trend in the prices of primary and industrial commodities in the years 1950-1979

Figure 1: Price Indices of primary commodities and industrial commodities (1950=100)



Source: Own calculations based on: United Nations 1958: Monthly Bulletin of Statistics, No. 12, special table, p. XIII; 1966, No. 12, p. XV; 1972, No. 12, p. XVII; 1975, No. 12, p. XIX; 1976, No. 12, XXIV; 1980, No. 12, p. XIII.

In figure 1, it can be observed that in the years 1950 to 1970, there had been a long-term downward trend in the price index of primary commodities compared to the price index of industrial products. In the development of the price indices an opening of the scissors is visible. This can be interpreted as a confirmation of the Prebisch-Singer Hypothesis. After a long-run decline of the primary commodity price index, beginning in the 1950s, there had been significant changes in the years 73-74 (see fig. 1, tab. 1). During this period, the growth pace of prices of raw materials and food had been higher than the growth rate of finished products. Reasons for these price changes were, among others, the collapse of agricultural production (drought periods) in many areas of the world, the devaluation of the dollar in 1971 and the war in the Middle East in the fall of 1973 and the subsequent oil embargo by OPEC. The prices of all primary commodities increased drastically, especially oil prices, and peaked in the beginning of 1974. Subsequently, the situation calmed down (see fig. 1). During the second oil crisis in 1979/80, oil prices had increased again for a short time period. The fear of a physical shortage in supply on the world market pushed the oil price to record levels above 40 USD per barrel. At the end of the 1980s the oil price dropped again (see Mineralölwirtschaftsverband e.V., 2001 p. 15).

Prebisch and Singer imply that commodity prices and manufacturers` prices have diverging evolutions in the long run. The relation of these two product sectors is reflected in the so-called primary commodity terms of trade (see Ocampo/Parra, 2004, p. 1, 18):

Primary commodity terms of trade (i.e. ”real“ price of a commodity) =

$$\frac{\textit{Primary commodity price index}}{\textit{Manufacturers` price index}}$$

(Ocampo/Parra, 2004, p. 1, 18; World Bank Group, 2015, p. 12).

The primary commodity terms of trade index depicts the price trend of primary commodities related to the price trend of manufactured goods. The World Bank uses the term “real“ price of a commodity, which is calculated as the nominal price of a commodity divided by the Manufacturers’ Unit Value (MUV) (see World Bank Group, 2015, p. 12). Different categories of commodities can be made in order to analyze the price development of selected product groups or even individual products. Usually, primary commodities are divided into the following groups: Food, agricultural resources, mineral resources and energy.

Table 1 and figure 2 show the trends of primary commodity terms of trade in the years 1950 to 1979 for the above-mentioned groups. They are calculated on the basis of world price indices, which are also listed in table 1. The price indices of primary commodities are divided by the relevant price indices of industry goods.

The unfavorable development in the world price indices of primary commodities relative to the price index of industrial products in the years 1950-70, previously shown in figure 1 and table 1, is expressed by the downward trend of primary commodity terms of trade for those years, which can be seen in figure 2.

Table 1: Price indices and primary commodity terms of trade

	Price indices						*Primary commodity terms of trade*				
Year	All primary commodities	Food	Agricultural raw materials	All mineral commodities	Energy	Industrial goods	All primary	Food	Agricult. raw materials	All mineral comm.	Energy
A	B	C	D	E	F	G	H=B/G	I=C/G	J=D/G	K=E/G	L=F/G
1950	100	100	100	100	100	100	100	100	100	100	100
1951	122	113	138	115	104	120	102	94	115	96	87
1952	109	112	102	119	107	122	89	92	84	98	88
1953	103	111	92	111	108	116	89	96	79	96	93
1954	106	118	92	110	111	114	83	104	81	96	97
1955	101	105	94	112	111	115	88	91	82	97	97
1956	102	104	93	116	115	120	85	87	78	97	96
1957	103	106	92	121	121	124	83	85	74	98	98
1958	97	103	81	117	118	123	79	84	66	95	96
1959	94	96	85	110	109	122	77	79	70	90	89
1960	94	94	78	109	108	124	76	76	63	88	87
1961	92	110	83	108	107	125	74	88	66	86	86
1962	91	110	80	108	107	125	73	88	64	86	86
1963	97	106	83	108	108	127	76	83	65	85	85
1964	100	112	85	110	108	128	78	88	66	86	84
1965	100	110	86	112	109	130	77	85	66	86	84
1966	101	112	87	112	109	134	75	84	65	84	81
1967	98	111	80	111	109	135	73	82	59	82	81
1968	97	107	79	110	108	135	72	79	59	81	80
1969	100	111	84	112	108	139	72	80	60	81	78
1970	103	117	83	117	112	148	70	79	56	79	76
1971	114	124	87	139	140	156	73	79	56	89	90
1972	129	142	102	153	157	167	77	85	61	92	94
1973	186	204	163	202	212	197	94	104	83	103	108
1974	318	270	187	551	647	240	133	113	78	230	270
1975	312	255	163	576	659	270	116	94	60	213	244
1976	331	268	183	605	699	270	122	99	68	224	259
1977	365	306	202	657	751	294	124	104	69	223	255
1978	371	309	215	662	778	338	110	91	64	196	230
1979	480	347	259	927	1074	386	124	90	67	240	278

Source: Own calculations based on data from United Nations 1958, No. 12, special table, p. XIII; 1966, No. 12, special table p. XV; 1972, No. 12, special table, p. XVII; 1975 No. 12, special table, p. XIX; 1976, No. 12, special table, p. XXIV; 1980, No. 12, special table, p. XIII, XXVI.

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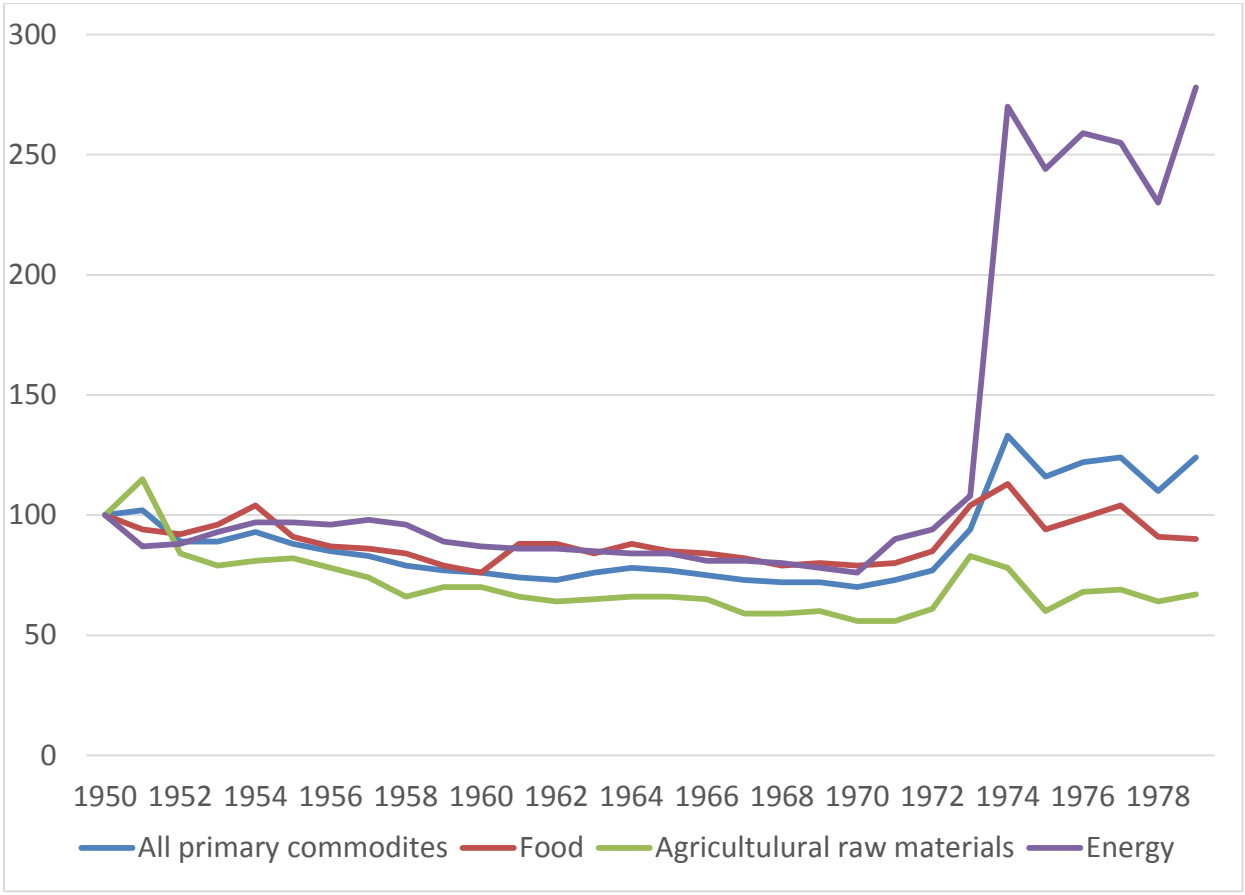
Figure 2: Primary commodity terms of trade (1950=100)

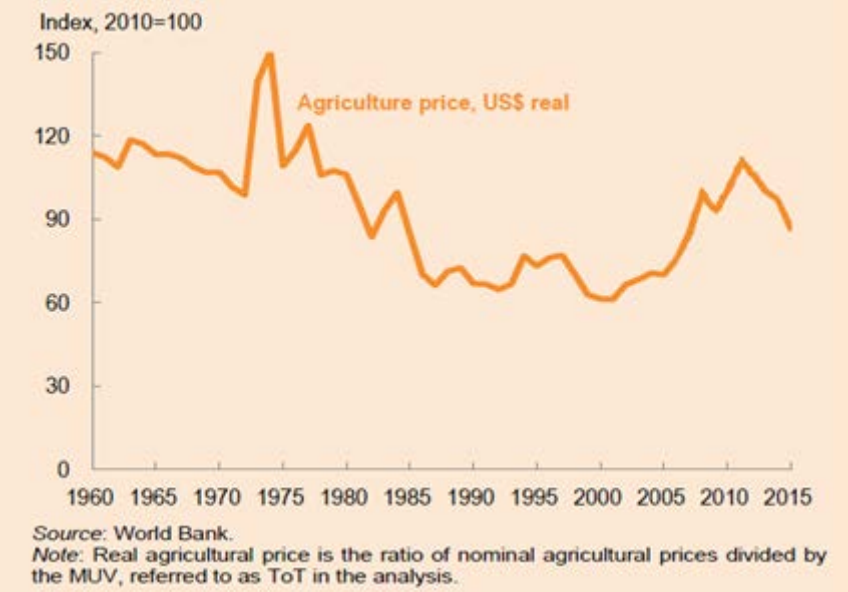


Source: Own calculations based on: United Nation: Monthly Bulletin of Statistics, 1958, No. 12, special table, p. XIII; 1966, No. 12, special table p. XV; 1972, No. 12, special table, p. XVII; 1975, No. 12, special table, p. XIX; 1976, No. 12, special table, p. XXIV; 1980, No. 12, special table, p. XIII, XXVI.

There are also differences between the falling tendencies of the various primary commodity terms of trade that are shown in figure 2. Among the privileged groups of primary commodities had been food and energy. The agricultural terms of trade had shown the strongest downward trend. In fact, a gap between agricultural raw materials terms of trade and the other groups in the primary commodity terms of trade can be seen. This means that countries exporting mainly agricultural raw materials tend to have less benefit from international trade than countries that export goods with a more advantageous price development.

A very clear downward trend of the agricultural terms of trade during the second half of the 20th century, defined as the nominal agricultural price index divided by the manufacturers' unit value (MUV), is visible in figure 3.

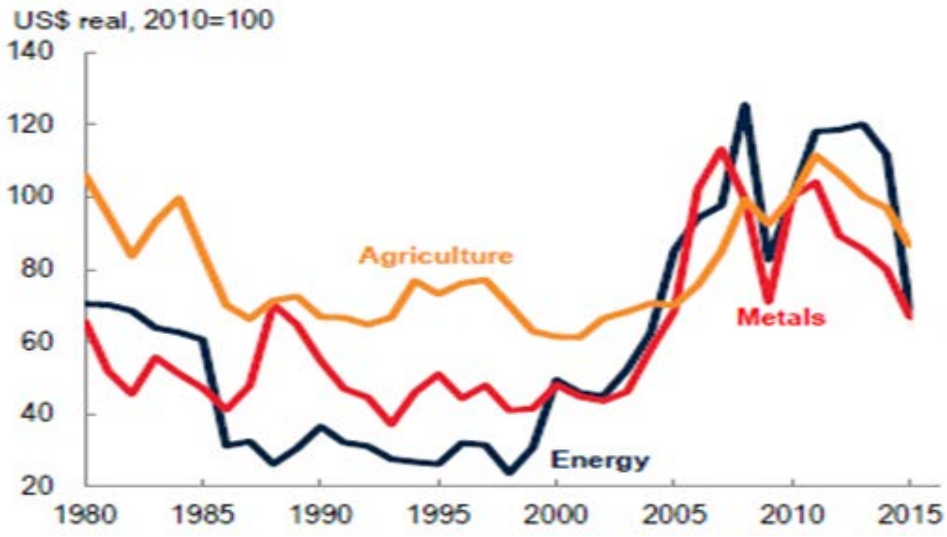
Figure 3: Agricultural terms of trade



Source: World Bank Group 2015, p. 12.

The falling terms of trade trend of agricultural commodities until the end of the 20th century, apart from short-term fluctuations and apart from a drastic increase in the middle of the 1970s (described earlier), shows that prices of manufactured goods had a tendency to be more advantageous than prices of agricultural commodities for this period of time. For this long time period, the Prebisch-Singer hypothesis was valid. Therefore, the long-term development of a commodity terms of trade index can reveal the export profitability of the specified commodity. This indicates that the export of agricultural commodities had a tendency to be less profitable than manufactured products**.** In the first decade of the 21st century, a change in the price trends occurred.

Figure 4: shows the development of the most important groups of primary commodity terms of trade since 1980.



Source: World Bank Group 2015, p. 12.

Figure 4 illustrates that after a decline in the terms of trade of the primary commodities in the 1980s, a stabilization at a relatively low level in the 90s had taken place. There had been no large changes, only minor fluctuations, in the terms of trade of agriculture, energy and metals, until the end of the 20th century.

At the beginning of the 21st century, a different price development took place. The prices of primary commodities began to rise faster than the prices of manufactured goods (see fig. 4). An important feature of this primary commodity boom has been a strong differentiation of price dynamics. The highest price increase has been denoted for metals and fuels, and the lowest for agricultural commodities (see IMF, 2008, p. 199).

The main reason for the price increases of primary commodities in these years has been a strong increase in demand for these products. There has certainly been a connection with the worldwide economic boom and the general growth of income per capita, but especially with the rapid pace of industrial development and economic expansion in the so-called emerging markets, especially China and India (see United Nations, 2005, p. 73).

In the described price increase, the low elasticity of supply has been an issue as well. The structural basis of the weak supply response has undoubtedly resulted from a general underinvestment in these sectors in the 90s of the 20th century, when primary commodity prices were still very low.

One important reason for the price increases of primary commodities since the beginning of the 21st century has been the rising global demand for oil. The rapid economic growth of countries like China and India has resulted in a rising demand for raw materials and rising commodity prices. After a significant increase in mid-2008, commodity prices began to fall. This was due to the global economic crisis. This strong decline was visible until the first quarter of 2009. After that, prices began to rise again. However, since 2012 a decline in most primary commodity prices has taken place, which is illustrated in table 2.

Table 2: Nominal price indices (2010=100)

Primary commodities	Price indices (2010 = 100)						Change in %	
	2011	2012	2013	2014	2015	2016 F[1]	2014-15	2015-16 F[1]
Energy	129	128	127	118	65	49	– 44,92	– 24,62
Metals	113	96	91	85	67	60	– 21,18	– 10,45
Agricultural	122	114	106	103	89	88	– 13,59	– 1,12

[1] F denotes forecasts. Source: Own representation, based on data from World Bank Group 2015a, p. 4; World Bank Group 2016, p. 8.

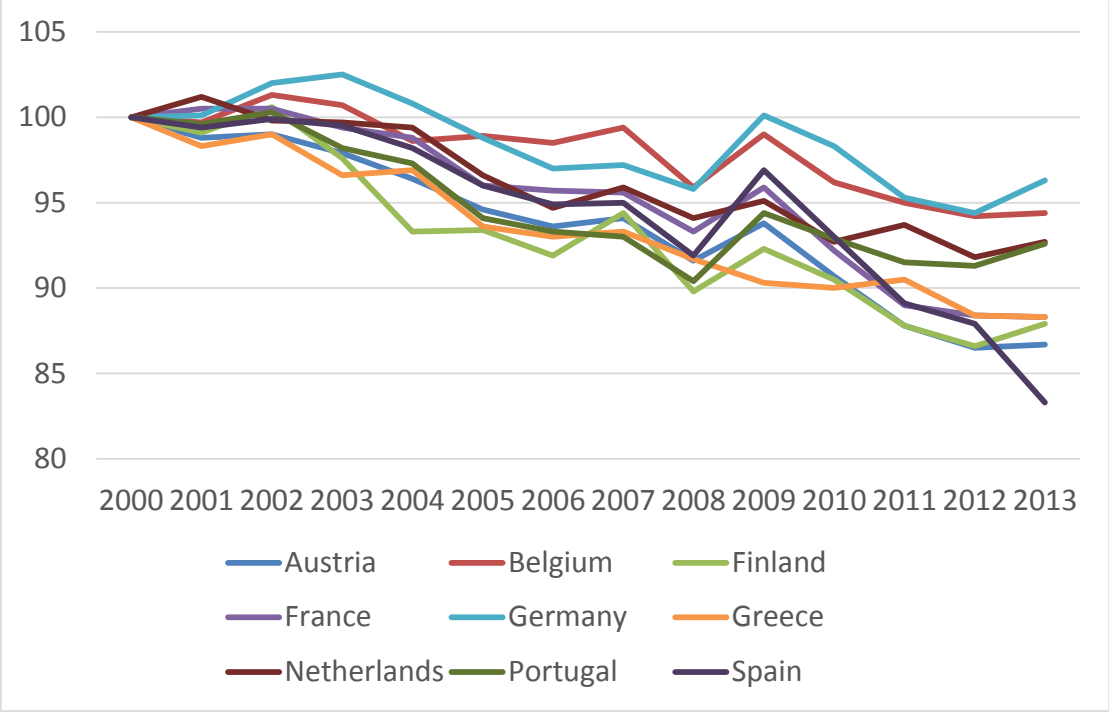
The price decline has resulted from an insufficient demand from important emerging economies, especially China. But also leading primary commodity producers have played a part in contributing to the fall in commodity prices. In the hope of a lasting boom, manager invested heavily in new capacity, only to face a market with insufficient demand (see Focus Webpage, 2015). Overcapacity had been created. In June 2014, a very strong oil price decrease had started. One reason for the price decline has been an excess supply in the international oil market, which has been mainly caused by the mass extraction of oil and gas from unconventional sources in the United States using fracking technology. Using fracking, the US was able to increase its oil production to 4 million barrels per day (World Bank Group,

2015a, p. 16; Unternehmenspositionen Webpage, 2015). As a consequence, the US improved its position in the oil market, while OPEC lost influence. Major oil producers such as Saudi Arabia did not react with a restriction of their oil production. On the contrary, they produced more in order to defend their market shares (see Unternehmenspositionen Webpage, 2015). Due to the nuclear agreement between Iran and the US, and the resulting lifting of Iran's oil export restrictions, it is very probable that another huge oil producer will enter the world market (see Tirone /Gaouette, 2015).

In the middle of 2015, a stock market crash in China occurred, and the Chinese economy deteriorated dramatically. This has had worldwide implications, especially for the German economy, which is very closely connected with China. China is Germany's third largest trading partner. In 2014, Germany's export value to China had been 74 billion EUR. Especially the automakers are affected. For the year 2014, 44 % of global Volkswagen sales had been achieved in China, one fifth of BMWs business activities had been carried out in China, and Audi had sold every third car in China. Now car sales in China are expected to decrease (Dometeit et al., 2015, p. 58). Moreover, the economic crisis in China has had a global impact on primary commodity prices (see World Bank Group, 2015, p. 11). All the major commodity price indices have fallen (see fig. 4).

Changes in the world prices of primary commodities have an impact on the formation of the terms of trade of individual countries. The persistent price increases for raw materials since the beginning of the 21st century were the main cause for the falling terms of trade of most EU countries. In the following, certain countries were selected to illustrate the terms of trade trend graphically (see fig. 5).

Figure 5: Trends in the terms of trade for selected EU member states: Austria, Belgium, Finland, France, Germany, Greece, Netherlands, Portugal and Spain, (2000=100)



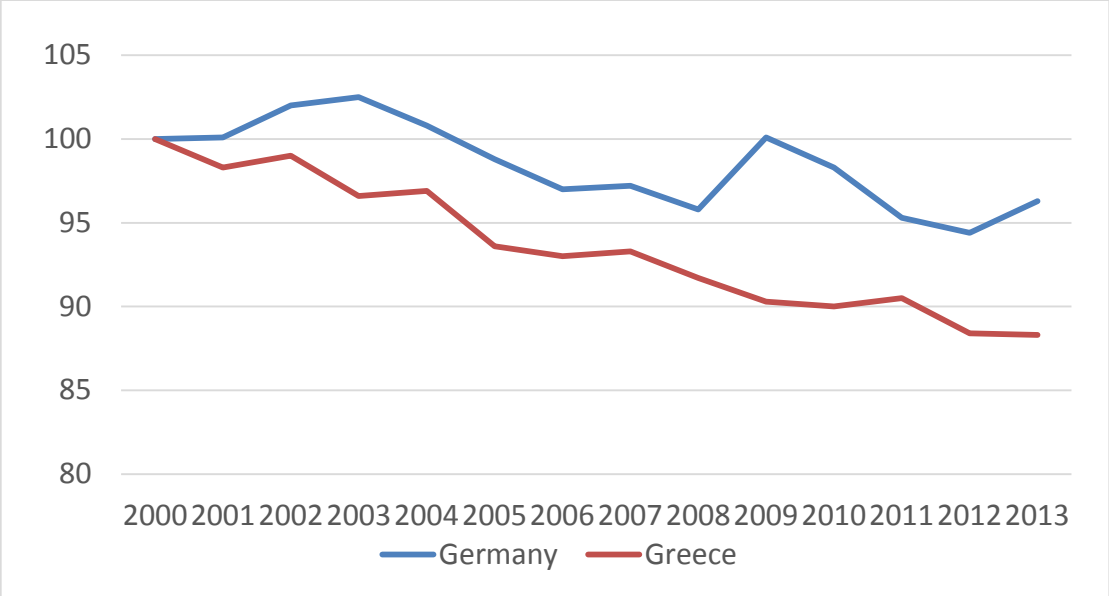
Source: Own representation, based on data from World Bank Webpage (2015).

As can be observed in figure 5, the terms of trade of most countries have been falling since the year 2000. This is due to the price increase for raw materials, which accounted for a large proportion of imports for many European countries.

Moreover the terms of trade of most EU countries responded to cyclical fluctuations, with an especially strong response to the global financial crisis that began in the United States in 2008. Almost all EU countries faced significant drops in their terms of trade that year.

The terms of trade analysis of the selected EU member countries shows that the terms of trade are very diverse, which is an indication of the different trade patterns and economic powers of these countries. As can be seen in figure 5, the terms of trade of most EU member countries are decreasing, but at different speeds. To illustrate this point, a comparison between the terms of trade of two countries, Germany and Greece, is made (see fig. 6), since their sectors of exports and imports are very different.

Figure 6: Trends in the terms of trade for Germany and Greece (2000=100)



Source: Own representation, based on data from World Bank Webpage (2015).

From figure 6 can be inferred that the terms of trade of both countries had fallen over time, but in varying degrees. The terms of trade of Germany had decreased more slowly than the terms of trade of Greece, and from the figure it is obvious that the scissors of terms of trade between the two countries are opening. The evolution of the terms of trade of Germany is very interesting. The terms of trade of Germany show a downward trend, which means there is a deterioration of the terms of trade ratio. Does this imply that the German economy is getting worse off? Such an impression could arise, if only the terms of trade development was viewed, but not the global revenue, which for that matter can be a valid point criticism regarding the terms-of-trade concept. If, for instance, certain German companies increase their productivity because of technological progress, and as a result their costs decrease, they can charge lower end-prices for certain products. As a consequence, the terms of trade of Germany can deteriorate, but it is possible that there is an increase in the welfare of the country. Also, if German companies can sell a higher number of products in new markets

because of good quality, reputation and marketing, which results in an increase of the total value of exports, then this situation can be advantageous for German companies, even if the terms of trade of Germany have a falling tendency. This has been the case for the German economy in the recent years. The quantity of products sold has been very high. Germany has been very successful in foreign markets and the surplus in the German trade balance has been relatively high. Greece, on the other hand, has been in a worse situation because of their weak exports and lack of competitive products and diversified exports. The consequence has been debt growth and decrease wealth. The slow growth of exports has only deepened the recession.

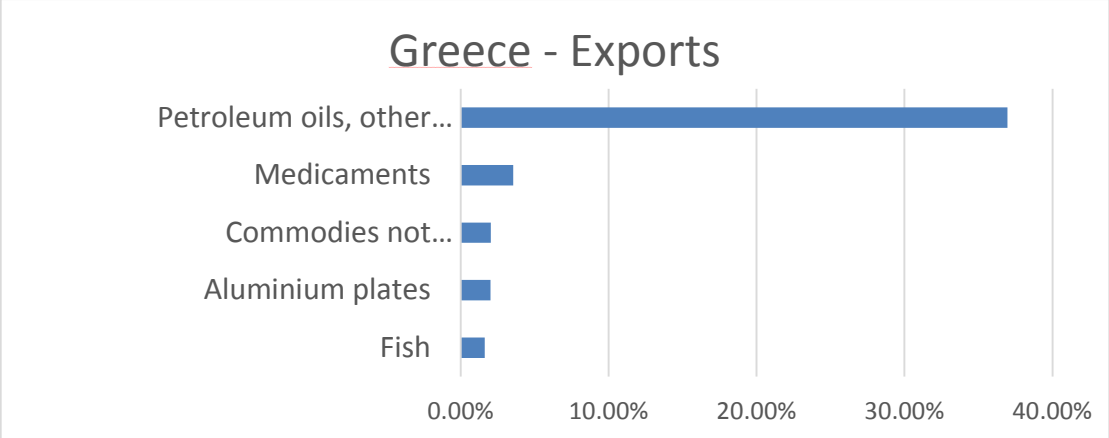
The limitations in the informational value of the terms of trade as a welfare indicator has led to the development of a number of other concepts. One of them is the *factorial terms of trade*. This ratio takes into account productivity gains in the domestic export industry and can be obtained by multiplying terms of trade with an index of factor productivity of the export industry (Wagner et al., 1983, p. 93 f.). Another important concept is the *income terms of trade*, which takes into consideration the quantities of exports. Income terms of trade are calculated as a multiplication of terms of trade with the index of the volume of exports (Knall/Wagner, 1986, p. 96). As the example of Germany shows, a decrease in terms of trade is not necessarily detrimental for a country if it leads to a significant expansion in export volumes which results in an increase in the value of exports.

To clarify the reasons for the different development of the terms of trade of Germany and Greece, it can be useful to take a look at the trade profiles to examine which goods make up the exports of each country. This way, the specialization of each country can be detected. Figure 7 and 8 show top 5 export commodities of Germany and Greece.

Figure 7: Top 5 exports of Germany in 2014 (export shares)

Source: Own representation, based on data from United Nations (2015): International Trade Statistics Yearbook, New York, p. 176

Figure 8: Top 5 exports of Greece in 2014 (export shares)



Source: Own representation, based on data from United Nations (2015): International Trade Statistics Yearbook, New York, p. 180.

The largest commodity groups for exports for Germany in 2014 were "machinery and transport equipment", "chemicals", "goods classified chiefly by material" representing respectively 47.2, 14.9 and 12.2 percent of exported goods (see United Nations, 2015, p. 176). From 2012 to 2014, the largest export commodity was "Motor cars and other motor vehicles principally designed for transport", 10.6 % of all their exports in 2014 (see United Nations, 2015, p. 176). Germany is the world's largest exporter of this commodity (see United Nations, 2015, p. 176). For Greece, the largest commodity groups for export in 2014 were "mineral fuels, lubricants", "food, animals + beverages, tobacco", and "goods classified chiefly by material" representing respectively 38.4, 15.9 and 13.8 percent of exported goods (see United Nations, 2015, p. 180). From 2012 to 2014, the largest export commodity was "petroleum oils, other than crude", 36.95 % of their exports in 2014 (see United Nations, 2015, p. 180).

In conclusion, there is a huge difference in the export sectors of both countries. Germany exports mostly highly developed goods from the industrial sector and there is a high diversification of exports. The export of Greece, on the other hand, is less diversified. Greece exports mainly various processed primary commodities, mostly petroleum oils (other than crude), aluminum plates, many intermediate goods and agricultural products, as well as some manufactured goods.

Consequently, the unfavorable development of the terms of trade of Greece compared to the terms of trade of Germany could be a result of a less favorable export structure of Greece compared to Germany. A possible explanation can be provided by the Prebisch-Singer hypothesis. As a consequence of this premise it can be conjectured that the terms of trade of a country tend to be less profitable when primary commodities predominate in its export structure, compared to a situation in which industrialized goods make up the majority of a country's exports. It can be assumed that a similar effect as in the case of primary goods also exists for industrial goods with a low percentage of value added.

Conclusion

Pointing to the Prebisch-Singer hypothesis, a long-term falling trend of primary commodity terms of trade in the second half of the XX century indicates that the export of primary commodities tends to be less profitable than the export of manufactured goods. Moreover, there are differences in the falling tendencies of the various primary commodity terms of trade, reflecting the diverse profitability of exports of these groups, such as energy, food, mineral commodities and agricultural raw materials. A long-term falling trend of the agriculture commodity terms of trade indicates that the export of agriculture commodities tends to be less profitable than the export of other types of goods.

Furthermore, it could be shown that the structure of exports and imports of a country and the corresponding price developments affect the gains from trade of a country. The long-term development of a commodity terms of trade index can reveal the export profitability of the specified commodity. In the analysis of the terms of trade it could be discovered that, when individualized products have a dominant position in the export structure of a country, this country tends to have more benefits from trade in the long run compared to a country whose exports are largely composed of more standardized products.

The idea of the Prebisch-Singer hypothesis can be used as an inspiration for the explanation of the diverse terms of trade of industrialized countries and to formulate the presumption, that not only the export of primary commodities, but also the export of relatively uncomplicated industry products tends to bring less gains than the export of highly-developed products. It can be assumed that a similar terms of trade development as predicted by the Prebisch-Singer hypothesis for countries exporting mainly primary commodities also exists for countries that are mostly exporting simple industrial goods with a relatively low percentage of value added.

As a result, the long run development of the terms of trade ratio of less industrialized countries is deteriorating when compared to the terms of trade of those highly developed countries that export very specific, high quality goods with high value added. Countries with an export structure, in which individualized, knowledge-specific products have a dominant position, and that have a high diversification of their exports, tend to have more benefits from trade than countries with an export structure with less individualized goods with a small percentage of value added. However, these benefits can only be maintained with continuous product and technology improvements that require high and consistent research and development activities.

The necessary profitability of trade has a dynamic effect on the domestic economy, since the national suppliers face competitive pressures and competitive world prices. This leads to an adjustment of production structures (improving productivity and specialization in favor of export goods), and a creation of incentives for investments in research and development. It can be concluded that the terms of trade concept is a meaningful ratio, which is particularly relevant in discussions about development and industrialization. Therefore, it is of great importance to calculate and analyze the terms of trade numbers in today's globalized world, since they are an important indicator of the gains from trade as well as the international competitive advantage of a given country.

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Industrial policy in the 21st century: merits, demerits and how can we make it work

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Abstract
East Asian countries may have succeeded with industrial policy, but one might argue that in today's 21st century context its applicability to other regions of the developing world is very limited. This paper explores how successful East Asian economies applied industrial policy and then discusses critical challenges in applying similar strategy by developing countries today. The paper argues that industrial policy is still relevant and applicable for today's developing countries, and more importantly is being actively applied. In choice of instruments the paper argues that between functional and targeted industrial policies, there is in reality a case of superficial dichotomy; given our scarce resources, we are doomed to choose. Hence it is very difficult to provide prescriptive industrial policies which developing countries can follow straightaway; thankfully there can be no equivalent 'Washington Consensus' view on industrial policy. The final section of the paper discusses an innovative framework to make industrial policy work better for the poor. The paper will discuss a model through which the international development community, especially donors, can assist developing countries to develop a governance structure so that these countries can organically develop and formulate effective industrial policies. It is suggested that through formation of independent Market Development Institutions, which act as facilitator and collaborate with different private and public agencies; industrial policy will evolve out of this deliberation process.

Keywords: East Asia, industrial policy, market development approach, South Korea

JEL Classifications: E60, N10, O14

1. Introduction

It is a fact seldom contested at present that East Asian economies like Japan, South Korea, Taiwan and even Singapore used industrial policy as a tool to alter their sectoral structure and foster economic growth. All these countries followed some form of industrial policy and protectionist measures to protect their industries. Often these protections were geared towards specific firms; the 'chaebol' in Korea, the 'Keiretsu' in Japan, the State owned enterprises (SOEs) in Taiwan. Evidence also shows that developed countries used industrial policy to nurture firms and in some cases even in the recent past to foster economic growth (Chang, 2002, 2003).

While many contested the success of such policies in stimulating growth these economies (Noland and Pack, 2002; Pack and Saggi, 2006; World Bank 1993), a consensus has emerged among different researchers regarding their efficacy. There is a tacit agreement that such policies have been pivotal for the meteoric growth of these economies (Amsden, 1989; Lall 2000; Hausmann and Rodrik, 2006; Chang, 2011; Lin, 2012). Debate still rages on the nature of the policies that were critical, and the realistic possibility of other countries emulating them and whether they are still relevant today. After all, the global context might have altered radically and precluded the possibility of using such mechanisms. The historical success of

industrial policy in these East Asian economies does not in itself give credence to 'industrial policy' as a panacea for developing countries to follow.

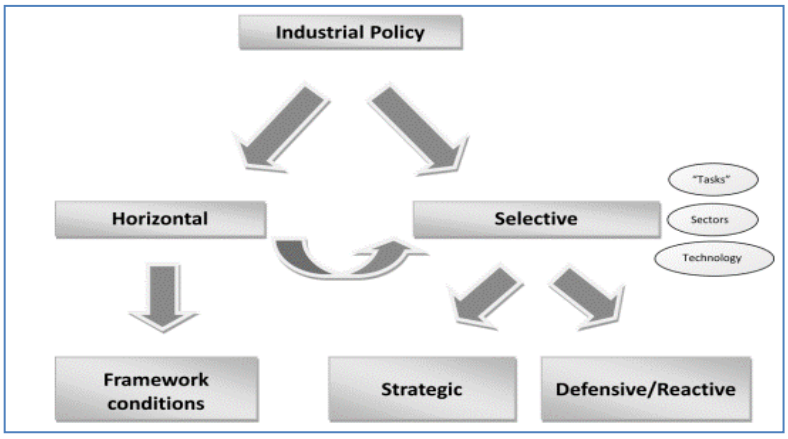
This paper first explores how successful East Asian economies applied industrial policy and then discusses critical challenges in applying similar strategy by developing countries today. The paper will argue that industrial policy is still relevant and applicable for today's developing countries, and more importantly is being actively applied. The paper will also discuss a model through which the international development community, especially donors, can assist developing countries to develop a governance structure so that these countries can organically develop and formulate effective industrial policies.

2. What is industrial policy?

Before one delves in to the efficacy of Industrial policy it is important to define the concept, since a plethora of definitions already exist, from the general *"Industrial policies are concerned with promoting industrial growth and efficiency"* (OECD, 1975) to the more nuanced and specific definition by Pack and Saggi (2006). However a narrow definition may not allow us to cover the variety of uses that are commonly associated with the term 'industrial policy'. In the present paper the author will use the definition used by OECD (Warwick, 2013) i.e. *"Industrial Policy is any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention."*

The definition covers both functional and targeted interventions, focuses on altering the structure of economy rather than relating only to manufacturing per se; emphasis is also placed on technologies and tasks beyond just sector promotion allowing, coverage of activities targeted towards technologies acquisition or specific tasks (e.g. R&D, design). Finally it allows for pursuing objectives beyond economic growth to include emergent social objectives like social cohesion, poverty alleviation etc (Warwick, 2013). The following Figure 1 shows the typology of such policy. The figure also includes defensive selective interventions which are similar to what OECD governments provided to major corporations and industries during the recent financial crisis; however this will not be covered in the present paper.

Figure 1: Typology of Industrial policy



Source: Warwick (2013)

Horizontal activities entail more broad based functional activities, for instance introduction of value added tax, promotion of primary and secondary educations, healthcare provision etc. What is important to note is that horizontal policies can have asymmetric and thereby selective effect on different sector/industries. Furthermore, beyond a few basic services such as rule of law, basic education, healthcare, it becomes very difficult to practically separate between functional/ horizontal and selective/targeted interventions. As Chang et al (2013) mention *"In a world with scarce resources, every policy choice you make, however general the policy involved may look, has discriminatory effects that amount to implicit targeting"*.

In the following section the author will discuss how industrial policy, as defined above, was used by the East Asian countries, specifically Japan, South Korea and Taiwan.

3. Use of industrial policy in East Asia

East Asian economies in general pursued a joint objective of infant industry protection and an export oriented growth strategy. Country policies were context specific, for instance multinational companies (MNCs) and targeted foreign direct investments (FDIs) played a much bigger role in Singapore's industrial policy, while in case of Taiwan and South Korea, domestic firms led the technological deepening and upgradation (Lall, 2004). But in most cases the state intervened with subsidies, purposefully distorting relative prices, thereby stimulating economic activities; they also ensured discipline by introducing performance standards (Amsden, 1989). The Taiwan government played the lead role in setting up the first semiconductor facilities in the country and then actively encouraged others to enter the sector; today it's a global leader in the field (Chang, 2010).

The major thrust of all these economies was to promote export by nurturing globally competitive firms and industries, particularly with a focus on technological upgradation and increased local value addition. This was achieved by employing specific policies like providing export subsidies, subsidized interest rates, and preferential allocation of foreign exchange to stimulate investment in export oriented sectors, encouraging adoption of foreign technology through investing in foreign licenses and technical assistance rather than imitation/absorption (Amsden, 1989). These economies also tried to keep real wages low through prohibition of collective bargaining, provision of government R&D facilities, tax credits for incentivizing private R&D, 'incubating' high-tech firms, regulating MNCs and directing FDIs focusing on specific technologies/sectors and enforcing local content requirement (Amsden, 1989; Chang, 2011; Weise, 2005).

The local firms, although they were nurtured and received targeted support, eventually were made to compete in the global market and in many cases were given explicit performance targets, which made them more efficient and self-reliant (Aghion et al, 2012; Weise, 2005). In case of sectors or firms that could not sustain themselves, support was either withdrawn or there were negotiated capacity cuts. For instance in South Korea, in the 1960s Shinjin was larger than Hyundai Motors in the local automobile industry, but the company could not survive competition and the oil shock in the 1970s. After the company went bankrupt, the government transferred Shinjin's holdings to Daewoo Motors (Amsden, 1989). But this approach of selectively nurturing a'national champion' led to massive levels of consolidation; Table 1 shows the average three-firm concentration ratios of Korea, Japan, and Taiwan in all manufacturing industries in the late 80s.

Table 1: Three firm concentration

Country (Year)	Average Market Share (%)
Korea (1980)	62.0%
Japan (1981)	56.3%
Taiwan (1980)	49.2%

Source: Amsden (1989)

These countries started with a focus on technologically simple and labor-intensive goods – textile, garments, sports goods, etc and gradually moved into more capital-intensive and technologically sophisticated items, albeit in varying pace, leaving space for the next in line (Weise, 2005; Hoque, 2007), a testament to the flying geese pattern of development (Lin, 2012).

The Japanese model of industrial policy entailed some innovative features. First, they set up deliberation councils in specific industries, comprised of government officials, industry representatives, and observers (e.g., journalists, academics). These councils were responsible for fine tuning the policies and enhancing information flow between the private sector and the government i.e. providing the requisite 'embedded autonomy'. Another feature was the improved management of cartels by allowing the existence of cartels only under clear and strict conditions in terms of their objectives; for instance avoiding duplicative investments, upgrading technology, avoiding debilitating price wars in the export market, orderly phasing-out of declining industries and life spans (Chang et al, 2013).

The unique feature of Singapore's industrial policy was the use of specialized scheme/subsidies, such as research incentive schemed for companies or corporate tax exemptions on income from specific activities, to incentivise multinational companies to enter specific targeted hi-tech sectors which the government considered were important for the future of the economy (Huff, 1999). While at the same time in sensitive and critical sectors Singapore promoted SOEs such as Singapore Airlines, and it still has a sizable SOE sector (Chang et al, 2013).

4. Challenges in implementing industrial policy

Many argue that while East Asian countries may have succeeded with such policies, it is difficult for today's developing countries to emulate them. In the following we discuss the key challenges that a developing country's government faces today when it tries to use such policies.

4.1 Government capacity

Before a developing country's government tries to protect and nurture a particular industry or firms it has to be able to pick winners ex-ante, otherwise it might end up protecting sunset industries at great cost (Harrison& Rodriguez, 2009). A common criteria that is often used is the Mill-Bastable test, which basically implies that the industry/firm should ultimately be capable of surviving international competition (protection cannot be perpetual) and the net

benefit to the society should defray the cost (through subsidy, tariff, other protection, etc.). While being simple in conception, it is extremely difficult to operationalise without adoption of restrictive assumptions that make it difficult to use for ex-ante policy prescription (Kemp, 1960; Melitz, 2005). The time horizon can also span decades; the current massive Japanese automotive industry in its early days in 1950s produced only tens of thousands cars compared to GM's millions.

A related challenge faced by a developing country's government is whether to support industries through mainly horizontal/functional interventions which conform to current comparative advantage, or defy their comparative advantage through targeted strategic interventions by actively promoting high-productive industries at the early stage of development (Lin and Chang, 2009). These issues are exacerbated by the fact that most developing countries, especially the LDCs don't have skilled bureaucrats who can develop such policies. A major reason for disenchantment with the state-led development model of the 1970s is the weakness of developing country's state machineries and their inability to translate ambitious development goals into effective action (Busch 1968; Goodwin, 1991), often leading to government failures and rent seeking behavior (Krueger, 1974; Bhagwati, 1982).

4.2 Global consolidation and cascade effect

The prospect of industrial policy is also hindered by the unprecedented level of consolidation and concentration that are happening across many industries led by the giant global players, the so called 'system integrators' (Nolan et al, 2008). The result, unbeknownst to most, is that in many industries the 'cascading effect' of consolidation and concentration has already reached maturity. Thus while Japan in the 1950s had to deal with GM, Ford, and few others, who were virtually making the lion's share of their components or procuring from numerous suppliers, today a developing country that is entering the sector not only faces these massive assemblers but also their vast array of global sub-system suppliers who are equally massive in terms of global reach and resources. This is not only common in high-tech industry but also in service sectors like banking and even the comparatively low-tech 'beverage' industry (Nolan et al, 2008). The level of consolidation is evident even in the East Asian economies discussed above (Table 1). Thus now it is much more difficult, both in terms of likelihood of success and cost involvement, to nurture national champions in global industries.

4.3 Shrinking policy space

Finally the rules of the game of international trade are heavily influenced by the transnational corporations (TNC) and the global financial organizations that are supported by the political clout ('regulatory capture') of their industrialized country of origin, through the medium of multilateral institutions like IMF and WTO (Nayyar, 2003). Some of the bilateral/regional trade agreements are even more stringent than WTO regulations, thus significantly limiting the policy space within which countries can operate. The WTO agreements on Trade Related Investment Measures and Intellectual Property (called TRIMS and TRIPS respectively), together make it either illegal or severely restrict many of the industrial policy instruments used by the successful East Asian countries, discussed aforesaid, to nurture their own firms/industries and technological capacities (Wade, 2003).Given these challenges and seemingly insurmountable level of entry barrier, what can a developing nation and especially a LDC do?

5. Overcoming challenges: how industrial policy is still applicable today

First and foremost it is important to realize, that notwithstanding the manifold challenges of implementing industrial policy, they are already widespread in the developing world and in many cases proving to be successful. Countries like Tunisia, Ethiopia, South Africa, Morocco, Brazil, and Turkey are but a few examples of countries with a well-defined industrial policy regime focused on industrial development and technological upgradation, with strong and targeted investments in capacity building and competitiveness initiatives, emulating the successful East Asian economies (OECD, 2013; Warwick 2013; Altenburg, 2011). Also developing countries have been actively developing and promoting specialized 'export' processing economic zones with tax holidays, curtailed labor freedom (lack of trade unions), uninterrupted and subsidized utility services, etc. This is very much industrial policy, similar to the ones used successfully by East Asian economies to attract and direct FDIs, but this has been encouraged as it is in line with the "Washington Consensus", the primacy of export and outward orientation (Rodrik, 2004).

The National Development Bank of Brazil and the Industrial Development Corporation in South Africa are actively engaged in implementing industrial policies and have introduced new financial mechanisms to stimulate innovation in specific fields in line with national priorities (OECD, 2013). These institutions are very similar to specialized institutions like Japan's MITI (Ministry of International Trade and Industry), and the Economic Planning Board in South Korea, which led the industrial policy of these countries. The government of Brazil has also initiated the Productive Development Policy (PDP), which is a complex policy package geared towards diversifying the export basket and boosting technological innovation (Chang et al, 2013). The PDP policy package targets specific sectors such as ICT, biotech, nanotech, aeronautics and petro chemicals among others (Balbachevsky & Bothelo, 2011). Brazil is also setting up sectoral competitiveness councils to improve policy effectiveness through improved communication flow between government and private sector (Kupfer, 2012); this is very similar in spirit to the deliberation councils set up by the Japanese government.

Second, given the pervasiveness of coordination, information failure and high transaction costs in exploring new markets, state directed industrial policy is probably a necessity. Structural transformations are path dependent and in such cases private incentives are lower than social benefit, so market based solutions are likely to be too slow (Hausmann and Rodrik, 2006). Furthermore research indicates that countries converge to the level of income predicted by their exports, or *"you become what you export"* (Hausmann, Hwang and Rodrik, 2005). Thus as Altenburg (2011) puts it *"Given the initial competitive disadvantages of latecomer countries, it is hard to imagine ways to unleash a virtuous circle of productivity development without a government…."*

5.1 Government can implement industrial policy

Numerous country specific case studies on recent application of industrial policy suggest that countries learn to implement such highly context specific policies, through trial and error, and success may depend more on political will than administrative capacity (OECD, 2013; Altenburg, 2011). As Chang (2011) shows, South Korea and Taiwan in the early days did not have a stellar bureaucracy, but they developed it gradually, a pathway that is open to any country with sufficient political will. Also during the Cold War, Korea and Taiwan were spending significant amounts on defense, a burden that is seldom carried by developing

countries today and especially LDCs. In the 1970s Korean government spent 6% on GNP in defense (Amsden, 1989), in comparison today developing country's defense budget is around 1.5% of GDP (World Bank, 2014). Finally institutions, both local and international, available to governments of today's developing countries are far superior to those that were available to these East Asian states.

Rodrik (2008) points out that potential for regulatory capture, corruption, and weak bureaucracy affect all policies including implementation of so called traditional functional policies and therefore singular skepticism towards industrial policy seems unjust. This sounds especially unwarranted and even paradoxical when WTO is at the same time also expecting the developing countries to have a first-world institutional framework with sophisticated patent enforcement and monitoring system to protect intellectual property rights. It is equally naïve to assume that open-door policy to TNCs will not result in a high degree of regulatory capture and rent seeking behavior. One is reminded of Union Carbide's legal maneuvering after the Bhopal disaster including their refusal to handover CEO Warren Anderson to a face criminal lawsuit. Bofors FB, a Swedish weapons firm, was also allegedly provided kickbacks to high officials of the Indian government, including the PM. Thus rent seeking behavior is an institutional problem and not an automatic outcome of industrial policy.

In reference to government's choice between conforming and defying comparative advantage, in reality it is messier than this dichotomy would have had us believe. For instance in the debate between Chang and Lin (2009), Chang takes the strong stance that government should defy their comparative advantage, but then acknowledges *"government should not push the economy too far away from its current structure too quickly*" or current comparative advantage. While Lin arguing for conforming to comparative advantages elsewhere (Lin, 2012) mentions governments should facilitate growth of *"industries that reflects country's latent comparative advantage"* or defying current manifest comparative advantage. Thus we see that while both took extreme positions initially, are in reality differing only in degrees.

In choice of instruments between functional and targeted, there is a similar case of superficial dichotomy. While there may be few broad functional instruments like increased credit facility through quantitative easing, or investing in infrastructure, more often given scarce resources, we are doomed to choose. As Hausmann and Rodrik (2007) point out regarding industrial policy *"The idea that the government can disengage from specific policies and just focus on providing broad-based support to all activities in a sector neutral way is an illusion based on the disregard for the specificity and complexity of the requisite publicly provided inputs or capabilities."*

Pack and Saggi, (2006) suggest that government's role in the growth of software industry in India was 'benign neglect'. However Indian government instituted an ambitious program in the early sixties to create Indian Institute of Technologies (IIT), which were declared as 'institute of national importance' (IT Act, 1961) and as early as 1964 it started offering education in computer science (Murali, 2011), taking technical support from MIT and the University of California at Berkeley among others through the Kanpur Indo-American Programme (IITK, 2014). Focusing on tertiary computer education and identifying it as of national importance in the early 1960s by a newly independent developing country was indeed a selective choice rather than functional intervention, which ultimately created the critical base of human capital to instigate economic boom in India's post 1990 reform.

Another good example is readymade garments industry (RMG) in Bangladesh which is currently one of the largest in the world exporting over USD 19 billion worth of goods per year and employing 4.2 million, mostly female workers (Farhana, 2014). The first milestone of this export oriented industry was in the early 70s when a joint venture between a local company 'Desh' and Daewoo of South Korea was setup. In the initial stage 130 Bangladeshi staff received six month long technical and HR related training in Daewoo facilities in Korea; these staffs later became industry leaders and entrepreneurs in Bangladesh's RMG sector (Yunus & Yamagata, 2012).

While the initial milestone was laid down by private entrepreneurs, later on successive governments took an active role in tailoring specific policies to support the growth of RMG industry. Based on continuous feedback from and engagement with RMG entrepreneurs, since 1980s onward the government issued licences for duty-free import of RMG related machineries; in the 90s government developed a framework to allow banks for operating back to back letters of credit thus significantly reducing working capital and foreign exchange burden; this was followed by allowing creation of bonded warehouse facilities which permitted RMG entrepreneurs to import fabrics, accessories in a duty free environment (Yunus & Yamagata, 2012). A key success factor for these policies has been the constant engagement/communication between government and RMG entrepreneurs. Although some of these policies may look 'horizontal', they were initiated at the behest of RMG manufacturers and targeted at them. In order to further strengthen the existing foothold successive governments have also taken steps to develop a competitive textile industry to improve backward linkage and increase local value addition. Textile industries can also import cotton, accessories, and machineries duty free. So it seems even a LDC like Bangladesh has been successfully able to develop targeted policies to promote and nurture globally competitive industries.

5.2 Leveraging existing foothold

Many developing countries already play a significant role in a number of global industries like Garments in Bangladesh, shoes in Vietnam, IT in India, furniture in Indonesia, among others. Although these are not as massive as the aircraft industry, they are nonetheless multibillion dollar industries employing millions of workers. Thus one strategy for LDCs and other developing countries could be to capitalize their position and nurture the firms in those sectors where they already have a global foothold and are part of the value chain.

Governments can also foster development of backward industries like the textile industry in conjunction with the competitive garments industry, thereby further increasing local value addition. It can promote growth of firms in industries where it has latent comparative advantage (Harrison& Rodriguez, 2009) and where the cascading effect hasn't reached maturity or is prone to periodic paradigm shifts (e.g. software). Table 2 shows that companies from BRIC countries have rapidly expanded and are becoming global players, in spite of the consolidation and cascade effect. Companies like Indian based Tata Consultancy Services had annual revenue of USD 11 billion in 2012-13 (TCS, 2013).

Table 2: Fortune 500 companies in 2005 and 2013

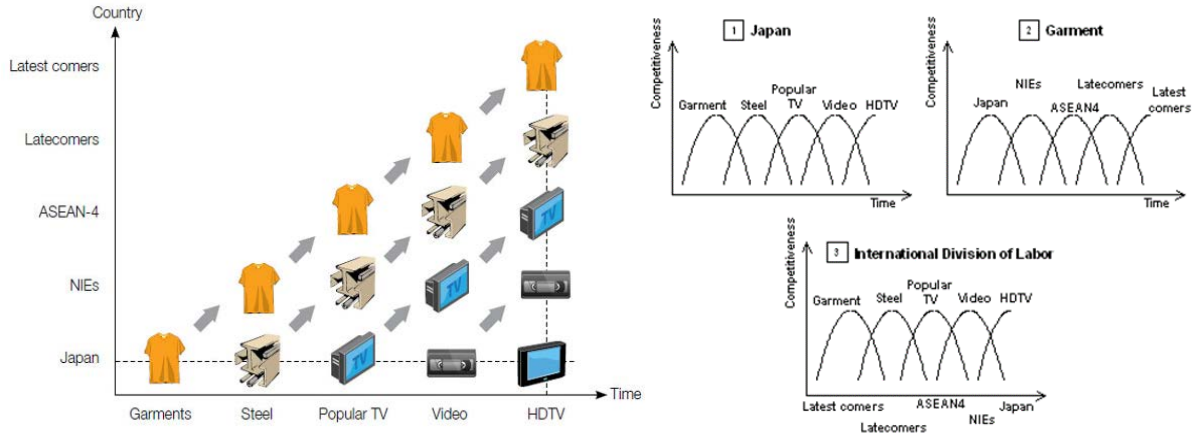
Countries	2005	2013	Change
Canada	13	9	-31%
UK	35	26	-26%

India	5	8	60%
Brazil	3	8	167%
China	16	89	456%
Thailand	1	1	0%
Turkey	1	1	0%

Source: CNN Money Fortune Global 500

For China most of these companies are state owned and are operating in a protected local market, so one can say that the picture may be misleading in some cases. But it implies that government through protection can nurture multibillion dollar firms, implying industrial policy cannot be trivial as some critics would have had us believe. But it is equally true that for LDCs it is still very difficult to develop and nurture globally competitive firms or industries. For LDCs the 'flying geese pattern' of development may be a salvation, i.e. when one country's export base moves from labor intensive to more capital intensive goods, it vacates the export market segment for labor intensive goods to be taken up by late-comer countries like LDCs (Figure 2).

Figure 2: Structural transformation in East Asia



Source: GRIPS (http://www.grips.ac.jp/forum/module/prsp/FGeese.htm) and Lin (2012)
Note:
ASEAN4 = Indonesia, Malaysia, the Philippines, and Thailand.
NIEs = newly industrialized economies, Hong Kong SAR, China; Korea; Singapore; and Taiwan, China.

As a cautionary note, the flying geese pattern is a useful metaphor but not a necessity. Nayyar (2013) mentions that Mexico entered at a lower level of the value chain focusing on television and vehicle assembly but has yet to progress upwards. Furthermore its position is being challenged aggressively by China. But in Bangladesh, a LDC, the government has started negotiating with South Korean government to assist its nascent shipbuilding industry through technology and technical knowledge transfer, by setting up collaboration between companies and educational institutors of both countries (Ho-hwan, 2010). Bangladesh is currently targeting the market for low-tech medium sized ships, which is worth USD 200 billion dollars, and has already exported ships worth USD 500 million and has further plans to export $2billion in the next five years (Ethirajan, 2012). This path was followed by South Korea, China and Japan, who have moved into the high-tech specialized ship industry, vacating the space for low-tech ship market to countries like Bangladesh. Thus it is up to governments

and their entrepreneurs to take advantage of the vacating export space and to upgrade themselves through structural transformation.

5.3 Manoeuvring within WTO regulations

For LDCs, WTO rules are still not stringent, for instance export subsidies are allowed, designated infant industries can be protected, albeit for a short span of time, and implementation of TRIPs regulations are much more relaxed. The TRIPs agreement was supposed to come in to effect from July 1st, 2013 but has been extended to July 1st 2021 for LDCs[1]. Similarly LDCs are allowed to introduce new measures that deviate from the TRIM agreement but they have to be phased out by 2020[2]. Thus LDCs can employ industrial policies similar to successful East Asian economies within the current WTO framework even though the timeframe has been fixed.

For developing countries prohibition of local content requirement has been circumvented to a substantial degree by the rules of origin requirement within regional agreements. Such was the case with Argentina though the MERCOSUR Automotive Policy and Mexico under NAFTA, both of which requires regional content (Elimination of TRIMS, 2007). While export subsidies are prohibited, production subsidies are not, although they are actionable and are subject to challenge[3]. But then one has to keep in mind that the transaction cost of engaging in legal battles are costly and so developed countries/MNCs are unlikely to engage in such battles frequently.

Subsidies which are research-related, regional or environment-related are allowed under WTO and are not even actionable[4]. Furthermore government procurement still remains outside the purview of much of the WTO rules. Thus government co-financing, subsidizing SOEs, providing subsidy in research, especially in green technology, can be followed by any developing countries under the WTO regime. Governments can create enabling environments and attract FDI to selected industries which they believe are of national importance and can assist in technological transformation.

So we can see that while global context might have changed substantially since the early days of industrial policy, there is still a strong need and applicability of using such policies to enable developing countries to bring about much needed structural and technological transformation.

6. Making Industrial policy work better for the poor

The author supports the idea that developing countries should use 'soft' industrial policy whereby there is a collaborative relationship between private sector firms and government to develop an enabling environment and provide necessary support which can enhance competitiveness and build local capability (Harrison& Rodriguez, 2009). It should be geared towards self-discovery whereby government subsides the search cost and informational externalities, and mitigates the coordination failure which inhibits firms entering new sector or

[1] WTO; Retrieved from: http://www.wto.org/english/tratop_e/trips_e/ldc_e.htm
[2] WTO; Retrieved from: http://www.wto.org/english/res_e/booksp_e/analytic_index_e/trims_01_e.htm
[3] WTO; Retrieved from: http://www.wto.org/english/tratop_e/scm_e/subs_e.htm
[4] Subsidies and WTO; Retrieved from: http://www.wto.org/english/res_e/booksp_e/anrep_e/wtr06-2f_e.pdf

unchartered territories where there can be latent comparative advantage (Hausmann, & Rodrik, 2003; Rodrik, 2004).

Rodrik (2004) provides ten design principles for developing such an industrial policy. They cover issues like what incentives should be given for new activities, how to clearly define a failure/sunset clause, how activities should have sufficient positive spillovers potential and bring sustainable changes, and what mechanisms there should be to reduce cost of mistakes but not chance of mistakes, i.e. ability to manage risk. However, as Rodrik mentions, it is more important to specify the process rather than the outcome of industrial policy. After all as most successful cases of industrial policies show, it was constant engagement and communication between private sector and government that made the policies effective. Policies are bound to be context specific, not only depending on industries and countries but also on the time, as what was once effective may not be effective now. Hence it is very difficult to provide prescriptive industrial policies which developing countries can follow straightaway; thankfully there can be no equivalent 'Washington Consensus' view on industrial policy. What can be prescribed is the process and mechanism through which effective industrial policies can be developed, and that is where Japan's deliberation councils or Brazil's sectoral competitiveness councils are worth emulating.

Although industrial policy might be a necessity for developing countries, the government's focus should not be building national champions but promoting inclusive growth and alleviate poverty. Therefore the author suggests that in order to avoid rent-seeking behavior and formation of a government-industrial complex, it may be important to create an independent market development institution (MDI) with its own highly competent technical staff, much like independent central banks. This will provide the requisite industrial support and offer sufficient level of "embedded autonomy" i.e. the government will have roots in the industry ('embeddedness') but also at the same time have its own will and independence ('autonomy') in order to be effective in its intervention (Evans, 1995). The institution will act as a facilitator and collaborate with different private sector firms and public agencies; industrial policy will evolve out of this deliberation process.

MDI should have a clear mandate from the funders (which might be combination of government and private sector associations/federations) in terms of priorities which may entail fostering employment creation, enhancing export competitiveness or promoting pro-poor growth through increasing manufacturing competitiveness. The idea is to provide the institution with clear direction while allowing sufficient flexibility so that it can respond to diversity and dynamism inherent to markets. Skilled technical staff is necessary so that they are able to understand and address underlying systemic constraints rather than symptoms. For instance lack of trained labor in industries often is addressed by increasing the number of vocational training institutes. In most cases these kinds of supply-side solutions based on symptoms miss underlying constraints which might be an outdated syllabus limiting the usefulness of such trained labour. The MDI can be an effective institution for shaping 'soft' industrial policy in the current global context.

A pertinent question could be how we can develop from scratch governance structure, requisite technical support and service markets, both at local and international level, to materialise the formation of such institutions. This is where the DFID's making the market work better for the poor (M4P) framework can come into use. Making Markets Work for the Poor (M4P) or market development is a relatively new phenomenon within the development community and has been here for less than a decade or so. It draws on learning from other

areas or methodologies like Value Chain analysis, Business Development Service framework, new institutional economics and others. The central idea is that the economically deprived individuals are dependent on market systems for their livelihoods. Thus it is believed that transforming these market systems, so that they work more effectively and sustainably, will improve the livelihoods of the economically deprived (M4P Synthesis Paper, 2008). Major bilateral donors, predominantly from European countries like Sweden, Switzerland and UK among others, have subscribed to this paradigm as one of their major private sector development strategies. Other donor countries like Australia, Canada and Netherlands, have also had experience in funding such projects.

A market development project, often called the facilitator, typically identifies the key market constraints (support functions and rules) that impinge upon a better performing market for the poor and then works with private or public sector partners to correct one or more of these key constraints, to bring about sustainable or systemic change (Kupper, 2013). In DFID, the touted 'Aid Superpower', there are 42 current or pipeline programmes following market development approach, with a total programme value of over £650m (DFID, 2014). DFID has also launched £3m project geared towards establishing a multi-donor funded Market Systems Development Platform. The platform will work with donor agencies, project managers, businesses and communities to promote market-led approaches to development programming.

Therefore there already exists a plethora of market development projects around the world, especially in developing countries, implying that there is already a structure and requisite technical support both local and international, in terms of human resource and good business practice, to materialise the formation of such MDI institutions. Bilateral donors can view this as an exit strategy whereby they can view these programmes as turnkey projects from the onset, with local government on board. After a successful run of the project, which is needed to gain traction and build networks within the local market, business community and public agencies, the donors can exit out of the funding and leave behind a fully established embedded MDI that facilitates the markets and assists in the formulation and evolution of industrial policies through self-discovery.

7. Conclusion

In this era of globalization, companies are much more footloose and so the idea of national champions is becoming less relevant. One should also remember that not all states are developmental states (Kohli, 2004). In a neo-patrimonial state, pursuit of industrial policy might be impossible or socially detrimental since it may give rise to an even higher degree of political consolidation. Today it is impossible and not even preferable to have or promote formation of a 'cohesive capitalist state', which is decidedly undemocratic. Therefore most states being "fragmented, multi-class states," it might be difficult to implement industrial policy and may require costly political settlement. In countries like Pakistan and Kenya with large 'landed gentry' and with no land-reform in sight, promoting growth of industrial elites through such policies may be politically very costly if not impossible.

Thus industrial policy like in the East Asian countries, while very relevant and applicable to today's developing economies, is highly context specific and is but an instrument, albeit a very important one, for promoting inclusive growth. Formation of independent MDIs can be a way forward which can bring in international best practices and allow both developed and

developing countries to work together in formulating a viable mechanism for developing context specific industrial policies. This will require strong buy-in, vision and moral thrust from large bilateral donors like DFID, to assist developing countries to help themselves to progress sustainably forward.

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Review of James Galbraith, *Welcome to the Poisoned Chalice* (Yale University Press, 2016)

Michael Hudson [University of Missouri at Kansas City, USA and Peking University, China]

Galbraith's articles and interviews collected in this book (ending in October 2015) traces his growing exasperation at the "troika" – the European Central Bank (ECB), IMF and EU bureaucracy – which refused to loosen their demand that Greece impoverish its economy to a degree worse than the Great Depression. The fight against Greece was, in a nutshell, a rejection of parliamentary democracy after the incoming Syriza coalition of left-wing parties won election in January 2015 on a platform of resisting austerity and privatization.

The world has seen the result: In contrast to the support given to countries with right-wing regimes, the ECB and IMF tightened their financial screws on Greece. The incoming finance minister, Yanis Varoufakis – who had been Galbraith's faculty colleague at Austin, Texas – asked Galbraith to join him in February to help develop an alternative to the austerity being demanded. They were optimistic that reason would prevail: an awareness that the creditors' program of "cutting wages and income without providing any relief from private debts (such as fixed mortgages) merely deepens debt burdens and forces people into bankruptcy and foreclosure."

This book reflects Galbraith's disappointment at how matters turned out so disastrously. In early June, a month before the July 5 referendum in which Greek voters rejected ECB-IMF demands by a heavy 61.5 percent, he thought that the government would fall if it capitulated. "So this option is not a high probability." But that is just what *did* happen. Tsipras surrendered, prompting Varoufakis to resign the next day, on July 6.

A week earlier Galbraith had spelled out what seemed to be the inherent logic of the situation: Tsipras "could not yield to the conditions being demanded. So then the onus will be back on the creditors, and if they choose to destroy a European country, the crime will be on their hands to all to see." Tsipras did yield, and the Greece's economy was destroyed by the Eurozone getting its way and imposing insolvency *within* the euro, not by forcing it out of the euro and leaving it bankrupt resorting to anti-Cuba or anti-Iran-type sanctions. Galbraith's book presents the prosecutor's case for what ensued. By May 3, he wrote to Varoufakis that he found "no prospect for development inside the current economic structures of the Eurozone."

The essays in this book present Greece's experience as an object lesson for other countries seeking to free themselves from right-wing financial control. The IMF and ECB do not even consider their destruction of Greece's economy to be a failure. They continue to impose an austerity doctrine that was shown to be fallacious already in the 1920s.

The EU Constitution imposes debt deflation and austerity

Galbraith expressed his "epiphany" already in 2010 that a "market-based" solution was a euphemism for anti-labor austerity and a reversal of political democracy. "In a successful

financial system, there must be a state larger than any market. That state must have monetary control – as the Federal Reserve does, without question, in the United States." That was what many Europeans a generation ago expected – for the EU to sponsor a mixed public/private economy in the progressive 20th-century tradition. But instead of an emerging "European superstate" run by elected representatives empowered to promote economic recovery and growth by writing down debts in order to revive employment, the Eurozone is being run by the troika on behalf of bondholders and banks. ECB and EU technocrats are serving these creditor interests, not those of the increasingly indebted population, business and governments. The only real integration has been financial, empowering the ECB to override national sovereignty to dictate public spending and tax policy. And what they dictate is austerity and economic shrinkage.

In addition to a writeoff of bad debts, an expansionary fiscal policy is needed to save the eurozone from becoming a dead zone. But the EU has no unified tax policy, and money creation to finance deficit spending is blocked by lack of a central bank to monetize government deficits under control of elected officials. Europe's central bank does not finance deficit spending to revive employment and economic growth. "Europe has devoted enormous effort to create a 'single market' without enlarging any state, and while pretending that the Central Bank cannot provide new money to the system." Without monetizing deficits, budgets must be cut and the public domain sold off, with banks and bondholders in charge of resource allocation.

As long as "the market" means keeping the high debt overhead in place, the economy will be sacrificed to creditors. Their debt claims will dominate the market and, under EU and ECB rules, will also dominate the state instead of the state controlling the financial system or even tax policy. Galbraith calls this financial warfare totalitarian, and writes that while its philosophical father is Frederick Hayek, the political forbear of this market Bolshevism is Stalin. The result is a crisis that "will continue, until Europe changes its mind. It will continue until the forces that built the welfare state in the first place rise up to defend it."

To prevent such a progressive policy revival, the troika promotes regime change in recalcitrant economies, such as it deemed Syriza to be for trying to resist creditor commitments to austerity. Crushing Greece's Syriza coalition was openly discussed throughout Europe as a dress rehearsal for blocking the Left from supporting its arguments. "Governments from the Left, no matter how free from corruption, no matter how pro-European," Galbraith concludes, "are not acceptable to the community of creditors and institutions that make up the European system."

Opposing austerity is called "contagion," as if prosperity and rising living standards are an economic disease, not national bankruptcy being enforced by the ECB and EU bureaucracy (and the IMF). To prevent Podemos in Spain and similar parties in Portugal and Italy from mounting a recovery from eurozone austerity, these financial institutions support right-wing governments while tightening the screws on Left governments. That is what happens when central banks are made "independent" of democratic electoral politics and parliamentary control.

Galbraith's month-by-month narrative describes how the IMF and ECB overrode Greek democracy on behalf of creditors and privatizers. They sought to undermine the Syriza government from the outset, making Greece an object lesson to deter thoughts by Podemos in Spain and similar parties in Portugal and Italy that they could resist the creditor grab to

extract payment by a privatization grab and at the cost of pension funds and social spending. By contrast, conciliatory favoritism has been shown to right-wing European parties in order to keep them in power against the left.

On the surface, the troika's "solution" – paying creditors by bleeding the economy – seems obviously self-defeating. But this seeming failure appears to be their actual aim: foreclosure on the assets of the indebted economy's public sector under the banner of its version of R2P: Responsibility to Privatize. For Greece this means its ports, islands and tourist centers, electricity and other public utilities.

The ECB and IMF accelerated Greece's economic collapse by demanding a rise in the VAT from 23 percent, making tourism in the islands more expensive. "The plain object of the creditors' program is therefore *not* reform," Galbraith points out. Instead of helping the economy compete, "Pension cuts, wage cuts, tax increases, and fire sales are offered up on the magical thought that the economy will recover *despite* the burden of higher taxes, lower purchasing power, and external repatriation of profits from privatization." Privatized public utilities are turned into "cash cows" to enable buyers to extract monopoly rents, increasing the economy's cost of living and doing business.

The European Union's pro-creditor policies are "written into every European treaty from Rome to Maastricht," overriding "the vision of 'sustainable growth' and 'social inclusion'" to which they pay lip service. Reinforcing the ECB's monetary austerity is the German constitution, imposing fiscal austerity by blocking funding of other countries' budget deficits (except for quantitative easing to save bankers).

The financial warfare being waged by the ECB and IMF

This is not how the EU was supposed to end up. Its ideal was to put an end to the millennium of internecine European military conflict. That was fairly easy, because warfare based on armed infantry occupation was already a thing of the past by the time the EU was formed. No industrial economy today is politically able to mount the military invasion needed to occupy another country – not Germany or France, Italy or Russia. Even in the United States, the Vietnam War protests ended the military draft. Warfare in today's world can bomb and destroy – from a distance – but cannot occupy an adversary.

The second argument for joining the EU was that it would administer social democracy against corruption and any repeat of right-wing dictatorships. But that has not happened. Just the opposite: Although the European Union treaties pay lip service to democracy, they negate monetary sovereignty. The IMF, ECB and EU bureaucracy have acted together to collect the bad debt left over from their reckless 2010 bailout of French, German, Dutch and other bondholders. In behavior reminiscent of Allied demands for unpayably high German reparations in the 1920s, their demands for payment are based on predatory junk economic theory claiming that foreign debt of any magnitude can be paid by imposing deep enough austerity and privatization sell-offs.

So the arena of conflict and rivalry has shifted from the military to the financial battlefield. Along with the IMF and ECB, central banks across the world are notorious for opposing democratic authority to tax and regulate economies. The financial sector's policy of leaving money and credit allocation to banks and bondholders calls for blocking public money

creation. This leaves the financial sector as the economy's central planner.

The euro's creation can best be viewed as a legalistic coup d'état to replace national parliaments with a coterie of financial managers acting on behalf of creditors, drawn largely from the ranks of investment bankers. Tax policy, regulatory and pension policies are assigned to these unelected central planners. Empowered to override sovereign self-determination and national referendums on economic and social policy, their policy prescription is to impose austerity and force privatization selloffs that are basically foreclosures on indebted economies. Galbraith rightly calls this financial colonialism.

The asset grab promoted by the IMF and ECB is incompatible with reviving Greece or other southern European economies (not to speak of the Baltics and Ukraine). The theory is unchanged from that imposed on Germany after World War I – the theories of Jacques Rueff, Bertil Ohlin and the Austrians, controverted by Keynes, Harold Moulton and others at the time.[1] Their victorious role in this debate has been expurgated from today's public discourse and even from academia. What passes for economic orthodoxy today is an unreformed (and incorrigible) austerity economics of the 1920s, pretending that an economy's debts can all be paid simply by lowering wage levels, taxing consumers more, making workers (and ultimately, businesses and government) poorer, and selling off the public domain (mainly to foreigners from the creditor nations).

Galbraith contrasts economists to doctors, whose professional motto is "Do no harm." Economists cannot avoid harming economies when their priority is to save bankers and bondholders from losses – by bleeding economies to pay creditors. What the IMF calls "stabilization programs" impose a downward spiral of debt deflation and widening fiscal deficits. This forces countries to sell off their land and mineral rights, public buildings, electric utilities, phone and communications systems, roads and highways at distress prices.

At first glance the repeated "failure" of austerity prescriptions to "help economies recover" seems to be insanity – defined as doing the same thing again and again, hoping that the result may be different. But what if the financial planners are *not* insane? What if they simply seek professional success by rationalizing politics favored by the vested interests that employ them, headed by the IMF, central bankers and the policy think tanks and business schools they sponsor? The effects of pro-creditor policies have become so constant over so many decades that it now must be seen as deliberate, not a mistake that can be fixed by pointing out a more realistic body of economics (which already was available in the 1920s).

Given the eurozone's mindset, Galbraith asks whether Greece may be better off going it alone, away from the IMF/ECB "hospice" and its financial quack doctors. Saving the economy requires rejecting the body of creditor demands for austerity by central planners at the IMF, ECB and other international institutions.

Any sovereign nation has the right to avoid being impoverished by creditors who have lent sums far in excess of the amount that can be paid without being forced to engage in privatization selloffs at distress prices. Such demands are akin to military attack, having a similar objective: seizure of the indebted economy's land, natural resources and public infrastructure, and control over its government.

[1] My book *Trade, Development and Foreign Debt* (2002) reviews the German reparations debate over "capital transfers" with regard to how austerity actually reduces the ability to pay.

These demands are at odds with parliamentary democracy and national self-determination. Yet they are written into the way the eurozone is constructed. That is why withdrawal from the current financial regime is a precondition for recovery of economic sovereignty. It must start with control over the money supply and the tax system, followed by control over public infrastructure and the pricing of its services.

The future of Europe's Left

What led governments (although by no means all voters) to accept a supra-national pan-European authority was the trauma of World War II. It seemed that nation-states were prone to making war, but a United States of Europe would not fight – at least, not internally. But the authority that has been put in place is financial, pro-creditor and anti-labor, empowered to impose austerity and turn the public domain to into privatized monopolies.

The EU cannot be "fixed" by marginal reforms. Greece's treatment shows that it must be recast – or else, countries will start leaving in order to restore parliamentary democracy and retain what remains of their sovereignty. The financial sector's ideal is for economies centrally planned by bankers, leaving no public infrastructure unappropriated. Privatized economies are to be financialized into opportunities to extract monopoly rent.

The gauntlet has been thrown down, posing a question today much like that of the 1930s: Will the alternative to austerity, debt deflation and the resulting economic breakdown be resolved by a pro-labor socialist alternative, or will it lead to a victory by anti-European right-wing parties?

What makes the situation different today is the remarkable extent to which today's European parties calling themselves Socialist, Social Democratic or Labour have accepted privatization and opposition to budget deficits. This shift reverses what they urged at their origins more than a century ago. So the problem is not only to resist the right wing of the political spectrum; it is to reconstruct a real European left.

Galbraith's book has important implications for the policies needed to save the eurozone from being turned into a dead zone along the lines of Latvia's disastrous oligarchic "success" story. (Drastic emigration and declining after-tax wages are the "Baltic Miracle" in a nutshell.)

If European Left does not succeed in creating an alternative to eurozone austerity, right-wing nationalists will lead a withdrawal campaign. Golden Dawn in Greece, France's National Front, along with Hungarian, Austrian and Polish nationalist parties and Britain's UKIP are moving to fill the vacuum left by the absence of a socialist alternative to financialization under ECB and IMF *dirigisme*.

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A travesty of financial history – which bank lobbyists will applaud

Review of William Goetzmann, *Money Changes Everything: How Finance Made Civilization Possible* (Princeton University Press, 2016)

Michael Hudson [University of Missouri at Kansas City, USA and Peking University, China]

Debt mounts up faster than the means to pay. Yet there is widespread lack of awareness regarding what this debt dynamic implies. From Mesopotamia in the third millennium BC to the modern world, the way in which society has dealt with the buildup of debt has been the main force transforming political relations.

Financial textbook writers tell happy-face fables that depict loans only as being productive and helping debtors, not as threatening social stability. Government intervention to promote economic growth and solvency by writing down debts and protecting debtors at creditors' expense is accused of causing an economic crisis (defined as bankers and bondholders not making as much money as they thought they would). Creditor lobbyists are not eager to save indebted consumers, businesses and governments from bankruptcy and foreclosure. The result is a biased body of analysis, which some extremists project back throughout history.

The most recent such travesty is William Goetzmann's *Money Changes Everything*, widely praised in the financial press for its celebration of finance through the ages. A Professor of Finance and Management at the Yale School of Management, he credits "monetization of the Athenian economy" – the takeoff of debt – as playing "a central role in the transition to … democracy" (p. 17), and assures his readers that finance is inherently democratic, not oligarchic: "The golden age of Athens owes as much to financial litigation as it does to Socrates" (p. 1). That litigation consisted mainly of creditors foreclosing on the property of debtors.

Goetzmann makes no mention of how Solon freed Athenians from debt bondage with his *seisachtheia* ("shaking off of burdens") in 594. Also airbrushed out of history is the subsequent buildup of financial oligarchies throughout the Mediterranean. Cities of the Achaean League called on Rome for military intervention to prevent Sparta's kings Agis, Cleomenes and Nabis from cancelling debts late in the third century BC.

Violence has often turned public policy in favor of debtors, despite what philosophers and indeed most people believed to be fair, just and stable. Rome's own Social War opened with the murder of supporters of the pro-debtor Gracchi brothers in 133 BC. By the time Augustus was crowned emperor in 29 BC, the die was cast. Creditor elites ended up stifling prosperity, reducing at least 15 percent (formerly estimated as a quarter) of the Empire's population to bondage. The Roman legal principle placing creditor rights above the property rights of debtors has been bequeathed to the modern world.

The Bronze Age was not yet ripe for oligarchies to break anywhere near as free of palace control as occurred in classical Greece and Rome. But to Goetzmann the creditor takeover is

the essence of progress, despite the economic polarization and Dark Age it brought on for the 99 Percent.

Misrepresenting why individuals ran into debt in ancient economies

Ignoring the abundant documentation, the author misrepresents why early economies ran up personal debt. He falls into the modernist trap of depicting all debt as resulting from borrowers taking out loans, eager to invest the proceeds profitably. He does not recognize debts as accruing in the form of unpaid taxes or fees. Yet this was the case with most Mesopotamian debts, which is where he starts his narrative. Personal debts subject to royal Clean Slate edicts did *not* result from money lending, but accrued as obligations owed to the palace and its collectors – for example, to providers of temple or palace services such as boatmen, "ale women" and so forth.[2] These payments were to be made at harvest time. But sometimes the harvests failed, as a result of drought, flooding or war.

Taking it as an article of faith that debt always benefits the "borrower," Goetzmann does not recognize any need to write down debts under such conditions. His blind spot regarding the problems that arose when crop failure or military hostilities prevented cultivators from paying their debts leads him to single out a royal edict from Rim-Sin of Larsa (1822-1763) that allegedly caused the quite modern-sounding "great crash of 1788."

The idea that Clean Slate edicts were a "crash"

Mesopotamian rulers are documented as protecting their citizenry from foreclosing creditors by cancelling debts since at least as early as Enmetena of Lagash c. 2400 BC. By the Old Babylonian epoch (2000-1800 BC) it was customary for nearly every Near Eastern ruler to cancel personal debts upon taking the throne, and again as economic or military conditions required – *e.g.*, if a flood or other natural disaster or military disturbance prevented harvest debts from being paid on a widespread basis. Goetzmann treats this normal practice of protecting debtors from losing their liberty (and hence their ability to serve in the army and provide corvée labor on public building projects) as if it were an isolated example, not the rule – and as if it *caused* a crisis, not *prevented* it.

Rim-Sin is reported to have cancelled debts on three occasions.[3] But only agrarian debts for consumption or public fees were subject to such Clean Slate edicts. Like other rulers of his epoch, Rim-Sin evidently recognized that if he permitted usury and debt bondage to persist, much of the population would lose its land and be unable to provide labor services or fight in the army. He needed "warriors from abroad, from the surrounding deserts, who had to be attracted by agreeable conditions." That may have been the proximate cause of Rim-Sin's moves to break the influence of powerful creditors "and to favor his soldiers, for example, by means of the loan of fields, upon which taxes were levied when the soldiers were not on

[2] See Cornelia Wunsch, "Debt, Interest, Pledge and Forfeiture in the Neo-Babylonian and Early Achaemenid Period: The Evidence from Private Archives," in Michael Hudson and Marc Van De Mieroop, eds., *Debt and Economic Renewal in the Ancient Near East* (CDL Press 2002), pp. 221-255.
[3] F. R. Kraus, *Königliche Verfügungen in altbabylonischer Zeit* (Leiden, 1984). On Rim-Sin's measures see Charpin, *Archives familiales et propriete privee in Babylonie ancienne* Geneva-Paris 1980), pp. 273f. and 133f. and W. G. Lambert, *Babylonian Wisdom Literature* (Oxford, 1960; 2nd ed. 1967), pp. 54f.

active service."[4] The economy was saved, not the creditors (mainly collectors or officials in the palace bureaucracy).

As for commercial "silver" loans and investments in trade ventures, they were not affected by these royal decrees. And even in this commercial sphere, economies hardly could have worked (nor can they survive today) without leeway to bring debts in line with the ability to pay. In the case of long-distance trade, financial "silent partners" typically consigned goods or lent money to travelling merchants in exchange for receiving double the value of their original advance after five years. But if a ship were lost or its cargo taken by pirates, or if a caravan were robbed, the merchant was not liable to pay. This debt forgiveness under extenuating circumstances remained a common legal feature from the Laws of Hammurabi down through Roman law.

After misrepresenting Rim-Sin's edict as "eliminating all debt by royal decree," he speculates: "Perhaps he himself or those close to him had gotten into debt" (pp. 57f.). But Goetzmann's reading reverses the actual situation. Bronze Age palaces were society's major *creditors*, not debtors! The agrarian "barley debts" that Rim-Sin cancelled were not those that he owed, but those that the population owed *to* his palace.

Abundant historical documentation exists that could have saved Goetzmann from his embarrassing insistence that finance and money itself arose as individualistic arrangements by private-sector creditors with no role for government, and that it always is best to pay all debts, without regard for the social and economic consequences. When Hammurabi lay dying in 1749 BC, his son Samsuiluna wrote a letter saying that he found the land so burdened by debt that he remitted arrears owed by many types of royal tenants. To revive their economic position he "restored order (*misharum*) in the land," directing that tablets recording non-commercial debts be broken so as to cancel the agrarian debts that had accumulated since the last such *misharum* act thirteen years earlier (in Hammurabi's 30th year, 1762). "In the land, nobody shall move against the 'house' of the soldier, the fisher, and other subjects."[5]

Goetzmann does acknowledge that, "perhaps it was a political move to restore popularity with his subjects." But more than just popularity was involved. Rim-Sin needed their support for his looming fight with Hammurabi, who soon conquered Larsa in 1763. Goetzmann believes that Rim-Sin's debt cancellation was a disaster – as if it ended a golden age. Writing that Larsa lost power as if "the crash of 1788" was to blame, he seems not to understand that the victor, Hammurabi, proclaimed four debt cancellations to protect his own citizen army during his reign.

Goetzmann cites as his source the respected assyriologist Marc Van De Mieroop of Columbia University. As it happens, he and I co-edited a well-known colloquium in 2000 on debt cancellations in the ancient Near East (see fn 1). Leading assyriologists and Egyptologists traced over a thousand years of royal Clean Slates cancelling agrarian debts owed to the palace, its collectors and other creditors. David Graeber's bestseller, *Debt: The First 5,000 Years* (2011) summarizes this volume's findings for the popular audience. This research would have saved Goetzmann from imagining that Larsa's debts were owed by rulers *to*

[4] W. F. Leemans, *The Old Babylonian Merchant: His Business and Social Position* (Leiden, 1950), p. 122.
[5] Translations of this letter (TCL 17 76) in Leo Oppenheim. *Ancient Mesopotamia* (1965), p. 157, and *Letters from Mesopotamia* (1967), and F. R. Kraus, *Königliche Verfügungen* (1984), p. 67.

merchants. His aversion to such findings has the effect of wiping his narrative clean of logic that would show any logic for endorsing regulation or cancellation of debt.

Goetzmann does cite the first historical example of compound interest: the Stele of the Vultures boundary stone erected on the irrigated buffer territory between Lagash and Umma citing the reparations that Umma had accrued to Lagash c. 2440 BC. But he does not note that this debt had grown far too large ever to be paid – and hence became a cause of future war. That is the problem with compound interest (and too large reparations debt demands). The rate of interest outruns the debtor's capacity to pay.

The starting point of financial theory should be recognition of this tendency of debts to be unpayable – that is, unpayable without a massive property transfer, economic polarization and impoverishment. However, today's vested financial interests do not want to see a reasoned discussion of the repertory and consequences of policy responses to this problem through the ages. The guiding motto is: "If the eye offends thee, pluck it out." In order to insist that all debts must be paid, the thousands of years of Bronze Age Mesopotamian examples and those of Graeco-Roman antiquity must be censored, because the policy lesson is that bad debts should be written down or annulled.

Asserting that in the abstract, finance "is not intrinsically good or bad," Goetzmann is unwilling to draw the seemingly obvious conclusion that what determines *whether* its effects are good or bad depends on whether debts are cancelled when they grow beyond much of the population to pay. To have kept Mesopotamia's personal debts on the books (or more accurately, on the clay tablets) would have reduced debtors to bondage and led to loss of the land rights that gave them their status as citizens.

It is not hard to see the modern ay relevance. Keeping bad bank loans on the books in 2008 saved bankers and bondholders from taking a loss, but left austerity in its wake by passing the financial losses onto the economy at large.

The false assumption that all loans are "productive" and readily payable

Goetzmann's misreading of antiquity (on which he grounds his bombastic big assumptions about the long sweep of financial history) follows from his narrow view of debt only in terms of personal bargains between creditors and borrowers – to share in a supposedly mutual gain. In reality, the tendency was for debtors to lose their liberty and land to foreclosing creditors – who put their usurious gains into more land acquisition instead of investing in means of production to expand economies.[6]

It has been to avoid repeating this impoverishing debt dynamic that the past few centuries have seen more humanitarian treatment of debtors. But the past century's "Austrian" and kindred individualistic "free market" financial theories have created a junk archaeology that depicts monetary and fiscal reform as being against nature and leading to a crash – such as Goetzmann's fantasy of "the crash of 1788" – instead of avoiding financial distress by restoring economic balance and equity.

[6] "Entrepreneurs: From the Near Eastern Takeoff to the Roman Collapse," in David S. Landes, Joel Mokyr, and William J. Baumol, eds., *The Invention of Enterprise: Entrepreneurship from Ancient Mesopotamia to Modern Times* (Princeton: Princeton University Press, 2010):8-39.

Goetzmann's obsolete theory of money as a commodity, not a fiscal institution

Georg Friedrich Knapp's *State Theory of Money* (1905), defines money as what governments accept in payment of taxes or fees. This theory also is called Chartalism. It is confirmed by the assyriological research noted above: Mesopotamian mercantile debts typically were denominated in silver, while personal debts were denominated in grain, above all to the temples and palaces.[7] Their acceptability to these large institutions led the economy at large to accept its valuation.

To defend his "free market" ideology, Goetzmann ignores the character of money as debt, headed by debts owed to governments for taxes or other payments. It is as if we are talking about barter, with money being just a commodity, given value by "markets" with no apparent linkage to government to denominate and pay tax debts. He repeats the century-old threefold view of money as a means of exchange, a measure of value and store of value.

For starters, according to this view, metal was a handy *medium of exchange*, presumably to barter. A buyer simply pulled out a coin or broke off a piece of metal to pay for food, wool or whatever product was wanted.

Problems quickly arise with this scenario. Who produced the silver? How was counterfeiting avoided? The Bible and Babylonian "wisdom literature" are rife with condemnations of crooked merchants using false weights and measures – a light weight for lending money or buying commodities, and a heavy weight for measuring out repayment of debts.

To avoid such problems, metallic money had to be public in order to be used as a means of payment. Babylonian contracts typically called for settlement in silver of 5/6 or some similar specified purity. From third millennium Sumer down through Greece to Rome (the Temple of Juno Moneta), temples produced the monetary metals and coins. Their role as minters dovetailed with that of overseeing honest weights and measures to prevent fraud.

Money's second function cited in modern textbooks (which Goetzmann repeats) is to serve as *a unit of account*, a common measure of value against which other commodities (and labor) are priced. The paradigmatic historical example would seem to be the parity between a Babylonian shekel-weight of silver and a "liter" of barley, fixed by royal edict in for a thousand years, mainly to determine how debts could be paid. Such money was a price schedule of how a specialized economy could make payments, apparently evolving as part of the accounting system that enabled the large institutions to allocate food and raw materials to their labor force, to evaluate output consigned to (or bought from) traders, keep their administrative accounts and denominate debts owed to them. (Later, when Rome developed coinage, its nominal value was maintained even while adulterating its purity.)
But this debt dimension is missing from Goetzmann's survey.

[7] I trace the background in "The Cartalist/Monetarist Debate in Historical Perspective," in Edward Nell and Stephanie Bell eds., *The State, The Market and The Euro* (Edward Elgar, 2003):39-76; "The Archaeology of Money in Light of Mesopotamian Records," in L. Randall Wray (ed.), *Credit and State Theories of Money: The Contributions of A. Mitchell Innes* (Edward Elgar, 2004); and "The Development of Money-of-Account in Sumer's Temples," in Michael Hudson and Cornelia Wunsch, ed., *Creating Economic Order: Record-Keeping, Standardization and the Development of Accounting in the Ancient Near East* (CDL Press, Bethesda, 2004):303-329.

Goetzmann's failure to understand that "finance" has something to do with debt

Goetzmann's desire to credit finance for almost everything good and positive in civilization leads him to attribute the origin of writing to finance. This distorts the researches of the archaeologist whom he credits as acting as his informant, Denise Schmandt-Besserat. Her research started half a century ago at Harvard's Peabody Museum on Neolithic and Early Bronze Age ceramics. It seems that when traders (chieftains or individuals) sent animals, wool or textiles over a distance for trade from about the 9th millennium to the 4th millennium BC, they would indicate each item with a small-animal- or geometric-shaped baked clay token, and wrap it in a clay envelope. The recipient of such deliveries would compare what was received with the itemized set of tokens.

In time, Schmandt-Besserat proposed, impressions of these tokens were imprinted on the clay envelope, to indicate the contents. (Many such envelopes have survived). Such tokens were accounting devices. In time, according to the plausible theory, the design of the impression evolved into cuneiform writing.[8]

The vast majority of cuneiform tablets are accounting records, debt notes and temple and palace accounts, *e.g.*, to distribute rations to the temple labor force and track the delivery and allocation of wool, grain and other raw materials. Prices for silver, grain and a few other basic commodities were administered to create an accounting system to co-measure and allocate resources as well as to denominate payments to themselves. But such fiscal accounting practice is not finance. It is an economic and administrative use of writing, but finance involves debt, not just trade or account-keeping. Goetzmann's narrative suggests that "finance" exists without a debt dimension.

This basically public institutional setting for writing, accounting, money and archaic interest rates is precisely what the anti-government and pro-creditor Austrian and Chicago Schools of "free market" financial relations oppose. Their censorial view defends the privatization of money as a "market creation," and hence today's bank monopoly on credit creation as opposed to government creation of money (They claim that this would be hyperinflationary and lead economies on the road to Zimbabwe – as if bank credit has not fueled a vast asset-price inflation bubble that burst in the 2008 crash.) And as noted above, they also insist that all debts must be paid, even at the cost of impoverishing the economy – as the world has seen most recently in Greece.

Some years ago, a German assyriologist told me why so many members of that discipline choose to publish in German or French instead of in English. The reason is that so many Americans (and also Englishmen) take documentation out of context to force into "crazy" theories. To protect itself from such intervention, the assyriological discipline is isolated from other academic departments. An unfortunate byproduct is that cuneiform studies are rapidly shrinking throughout Europe.

No doubt a contributing factor is that the practices of Bronze Age Mesopotamia and its neighbors controvert the most basic assumptions of today's free market orthodoxy, above all its denigration of public enterprise and opposition to government money creation (leaving this as a private bank monopoly), and its refusal to acknowledge logic justifying debt writedowns.

[8] Denise Schmandt-Besserat, *Before Writing* (2 vols., University of Texas Press, 1992), and *How Writing Came About* (University of Texas Press, 1996).

Goetzmann has used the exclusion of early economic history from the academic curriculum, and hence from popular discussion, as an opportunity to substitute unrealistic pro-creditor assumptions for the reality that he seems to find too abhorrent to inform his readers about.

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Capitalism, corporations and ecological crisis: a dialogue concerning *Green Capitalism*

Richard Smith, William Neil and Ken Zimmerman

Editor's preamble

In the monograph *Green Capitalism: The God that Failed*, published by the World Economics Association (2016), and in a series of papers in *Real-World Economics Review* (2015; 2013; 2011; 2010), Richard Smith has set out a stark and unsettling argument. According to Smith, capitalism is systematically incapable of solving the most profound problem it creates. That is, ecological crisis. In making his case, Smith argues that many current analyses recognize the problem but do not go far enough in identifying solutions. For example, he provides a constructive critique of Daly's steady-state approach to capitalism. Smith advocates a form of eco-socialism. In the following dialogue, adapted from a series of blog posts, he introduces some of his key themes in an informal way and responds to interlocutors.[1] Smith's papers are amongst the most widely read that *Real-World Economics Review* has ever published. One need only consider the limitations and problems emerging from the recent Paris COP 21 climate change agreement (see Spash, 2016) to realise that Smith's work deserves careful attention.

Richard Smith: From climate change to resource overconsumption to pollution, the engine that has powered three centuries of accelerating economic development revolutionizing technology, science, culture, and human life itself is, today, a roaring out-of-control locomotive mowing down continents of forests, sweeping oceans of life, clawing out mountains of minerals, drilling, pumping out lakes of fuels, devouring the planet's last accessible resources to turn them all into "product" while destroying fragile global ecologies built up over eons of time. Between 1950 and 2000 the global human population more than doubled from 2.5 to 6 billion, but in these same decades consumption of major natural resources soared more than 6 fold on average, some much more. Natural gas consumption grew nearly 12 fold, bauxite (aluminum ore) 15 fold. Despite 'efficiency' gains, discourses of decoupling and of sustainability, and despite decades of attempts to resolve "market failures" through regulation, these kinds of trends persist.

Companies are run by management, often in their own interests and occasionally against the interests of the shareholders (notoriously, Goldman Sachs). But, at the end of the day, corporations have to answer to investors or investors will flee. The problem is corporations function in a competitive economy. Investors are constantly searching for the highest returns and this is capitalist-rational. Those investors include capitalists, investment banks, and institutional investors, like pension funds. This latter includes you and me (if only via our retirement portfolios). We're all in this together – and don't have much choice about it. The occasional CEO who gets carried away with environmental

[1] https://rwer.wordpress.com/2016/06/02/capitalism-is-overwhelmingly-the-main-driver-of-planetary-ecological-collapse/ Other contributors have been referred to obliquely for the sake of brevity and can be identified through the original blog.

concerns and elevates saving humans and the planet over maximizing profits will soon find himself out of a job. Look at Lord John Brown (former CEO of BP who was fired after wasting company resources on solar power projects), or the Body Shop's CEO Anita Broderick who spent too much time trying to save Nigerians from Oil corporations. The point is, we're all in this together: investors, employees, governments, under capitalism we all have reasons to promote growth. So long as we live under capitalism, profit maximization trumps all else. If not we all suffer in the short run. But the problem is that maximizing our short-term interest in growth only destroys the world for our children. Indeed, we're destroying the world environment right now.

Corporations aren't necessarily evil, though plenty are diabolical. The problem is that systemically they can't help themselves. They're just doing what they're supposed to do for the benefit of their shareholders (and agency alignment with key personnel typically augments the problem). Shell Oil "can't help" but loot Nigeria and the Arctic and cook the climate. That's what shareholders demand, even if they don't realise it. BHP Billiton, Rio Tinto and other mining giants can't resist mining Australia's abundant coal and exporting it to China and India. Mining accounts for 19% of Australia's GDP and substantial employment even as coal combustion is the single worst driver of global warming. IKEA can't help but level the forests of Siberia and Malaysia to feed the Chinese mills building its disposable furniture (IKEA is the third largest consumer of lumber in the world). Apple can't help it if the cost of extracting the "rare earths" it needs to make millions of new iThings each year is the destruction of the eastern Congo. They do not hold themselves responsible for violence, rape, slavery, forced induction of child soldiers, and the poisoning of local waterways. Monsanto and DuPont and Syngenta and Bayer Crop Science have "no choice" but to wipe out bees, butterflies, birds, small farmers and extinguish crop diversity to secure their grip on the world's food supply while drenching the planet with their Roundups and Atrazines and neonicotinoids. This is how giant corporations are wiping out life on earth, it is in the course of a routine business day. And the bigger the corporations grow, the worse the problems become.

Editor: One way to respond to Smith is to stress that capitalism as a system creates solutions to its own problems, eventually. That is, increasing scarcity, rising costs and human ingenuity within capitalism call forth technological innovation. The system creates a combination of substitutions and efficiencies. Ecological problems are, from this position, an opportunity on which capitalism can orient. One contributor to the blog briefly raises this point to suggest that perhaps resource intensity and its problems could provide a focus for capitalism to respond to the problems of growth or secular stagnation that seem to be affecting economies. Much of the evidence so far indicates this has not occurred in any fundamentally effective way. William Neil ("Gracchibros") intervenes to pursue this point with reference to Smith's work.

William Neil: Isn't this exactly what Richard Smith writes about in terms of the early hopes of the Green Capitalists? Among the best and most sincere practitioners and promoters has been Paul Hawkens. Check the dates on some of Hawkens' most famous books: *The Ecology of Commerce: A Declaration of Sustainability* (1993), *Natural Capitalism: Creating the Next Industrial Revolution*, (1997)… Hawkens is name-checked by Bill Clinton and he was all the rage among Republicans in New Jersey during my environmental career, easing their fears about the conflicts between profit and protection of nature… Governor Christie Whitman said it was all about the "green and gold," and was enraptured with the Dutch model…

So where are we today, almost a quarter of a century later, with that "Next Industrial Revolution?" Can anyone discern an eco-revolution in Asian manufacturing processes? Consider all the untested chemicals still used in the United States. The Environmental Protection Agency is politically blocked by capitalist lobbyists from even following the law by testing beyond the tiny percentage they've examined… Consider the role of the U.S. as the great consumer nation of "last resort" and the many consequences this involves. For example, the U.S. does not require manufacturers or retailers to take responsibility for return and disposal, much less recycling of IT components. So, there is no sign that capitalism is coming to terms with the great proliferation of harms created by and persisting from previous industrial revolutions. Smith's *Green Capitalism* is essentially about the failure of "opportunity". It is a cold slap in the face to the "smiling, cheerful aspects" of American life – and green illusions.

You may not agree with Smith's deep reasons for the failure, that capitalists have not and cannot adjust to limits based on their core values… That's the heart of the matter, whether you agree or not. If we all become Social Democrats, can that work? Smith pushes us further than that, in selected places. But we can't get to where Smith wants to go politically, not yet, nowhere close, and particularly not in the U.S. as it appears in the 2016 Presidential race… But you can't evade Smith's questions or his evidence, such as the dissections of the full life cycle of what we consume. I woke up when establishment conservative and well-credentialed James Gus Speth of the Yale School of Forestry wrote *The Bridge at the Edge of the World: Capitalism, the Environment and Crossing From Crisis to Sustainability* (2008). Speth argues that despite the growth in environmental awareness and activism environmental harm has reached critical levels and catastrophe looms unless major transformations occur. I kept wanting to read the title as *At the End of the World*. The book was a shock to a lot of environmental groups who work on their own narrow interests and are congenitally optimistic since they're all fund-raisers and believe pessimism and despair thwart constructive efforts (they offer a confidence fairy for donors). So here we are in 2016, and how's it going? Smith without illusions tells us: not so well.

I guess this is a plug for Smith's book. But what do I know? I only devoted 12 years of my life working in the environmental trenches. It didn't seem to help much. And no one in the establishment has invited me back to Chris Christie's New Jersey.

Editor: Smith also intervenes at this point to address the basic point about opportunity. However he focuses on the basic tension inherent in aspirations for green growth, and places an order of priority around a transition from capitalism, rather than population reduction per se.

Richard Smith: The argument I'm making is that "getting GDP back on track" will only drive us off the cliff to ecological collapse sooner. There's no magic tech fix here. We live in an economic system built on perpetual growth but we live on a finite planet with limited resources and limited "sinks" (capacity to absorb pollution). So far at least, no one has come up with a way to magically "de-materialize" production, to "decouple" growing production from growing resource consumption and pollution. For example, solar power solves little if it just reinforces perpetually growing consumption. It creates a "Jevons paradox" where more efficient resource use promotes more rather than less resource use in aggregate. This remains likely if our economies are based on growth via ever-more junk we don't need and can't sustainably produce. My core contention is that there is no

pervasive solution to these kinds of problems within the framework of any conceivable capitalism. We need an entirely different kind of economy, some elements of which I try to sketch out in my book.

I argue (based on extensive evidence) that we need to rethink the whole system. We need to come up with an entirely different economic system with entirely different incentives and interests, and we need to hurry up about it or our goose is cooked. Population is a related problem. By any measure, there are way too many of us. But resource consumption and pollution are growing at *multiples of* the rate of population growth – and those are driven by capitalist production for market. The only way to humanely reduce population growth is to provide resources, especially adequate retirement and healthcare funding so that people don't feel they need to have so many kids as social insurance in their old age. That too will require revolutionary changes in the allocation of social resources. I don't ignore this problem. However, the fact is, if we don't derail the capitalist locomotive we will face a population crash across the planet such as we can't imagine. That's not the kind of population control we want to see.

Editor: Ken Zimmerman then provides a contribution in which he notes that exploitation has a historical record that is longer than capitalism. This raises many issues familiar in ecological circles regarding how humans relate to the natural world. (For example, there is a tradition that identifies a Judaeo-Christian sense of dominion over the earth, which in turn raises issues of whether we are stewards or destroyers). William Neil responds by considering ideas about human nature and also how mainstream economics operates within capitalism but does not seem to comprehend the effects of capitalism on the implementation of its theories. This has been antithetical to a fully realised eco-consciousness. The two then elaborate further.

Ken Zimmerman: Being greedy, self-centered and arrogant to the point of psychosis, and short-sighted in terms of harm done are not features exclusive to capitalism. As a consequence, neither is a lack of concern for one's natural surroundings. While returning to England from the Crusades, Richard Coeur de Lion (Richard the Lionheart) attacked, sacked, and burned the Abbey of Le Chalard and the village nearby, and several other abbeys and villages. All were on France's "Gold Route." Richard had spent all the money he had on fighting in the Holy Lands. He needed more. The "rich" abbeys and villages along this route seemed a good target for that purpose. He found little gold but did kill (and dismember) several thousand priests and villagers.

The oldest farming technique among humans is slash-and-burn — creating farmland by cutting and burning of plants in forests or woodlands. The technique is still in use in parts of South America and Africa today. The technique is greatly destructive of forest ecology and bio-diversity. It also adds pollutants and particulates to the air. Human civilization has been built on being out of balance with nature. This has been the case since we moved on from foraging and hunter-gathering. Harm to ourselves, others, and the planet has a long history among humans. Capitalism is the most "successful" system for such harm so far conceived.

William Neil: The point made has a lot of validity. Historically human species survival has pressed if not oppressed "nature", usually at nature's expense. Full ecological awareness is a relatively late dawning form of consciousness. With some exceptions, it was not brought to the forefront until Leopold and Polanyi, and, thereafter, post 1970, the first

Earth Day in the United States. A conservative, neoliberal would see the issue as human nature in regard of "nature". Capitalism is merely the system we've developed that takes best advantage of that human nature for our own productive purposes. We've always been greedy, cruel and self-centered individuals, tribes and nations. However, Karl Polanyi went to the anthropological record to try to get at "human nature" as expressed in the realm of economics. He didn't find proto-capitalist traders weighing the costs and benefits based on marginal analysis. Other motivations and species characteristics were evident. There is something ideological at work in this construction.

We're here in the second decade of a new century, and the dominant economic thinking says capitalism is wonderful. If it presses too hard on nature, as surely evidence indicates it is doing, and not just on the global warming front, then it will offer us "the" solutions. However capitalism cannot protect the environment. This can be illustrated using William D. Nordhaus' review of the book, *Climate Shock: The Economic Consequences of a Hotter Planet* by Gernot Wagner and Martin Weitzman. The review appears in the June 4, 2015 print edition of the New York Review of Books.

Nordhaus has been a recent President of the American Economics Association, and seems to have been given the task of defending capitalism, with adjustments, in the face of environmental criticisms coming from the left. That is, from figures such as Naomi Klein and Richard Smith. *Climate Shock* positions global warming as a risk management issue. Wagner is a leading non-profit economist at the conservative leaning group Environmental Defense. Weitzman is a new name for me but his praises are sung in the review by Nordhaus. Nordhaus asks the obvious question: "Why has progress in climate change policy been so slow?" In the last third of the article he ventures, "We might think that capitalism is the problem because economic growth has led to rising emissions. But (the authors under review) argue, a modified invisible hand is the only workable solution: 'It's capitalism with all its innovative and entrepreneurial powers that is our only hope of steering clear of the looming climate shock.'"

What Nordhaus de-emphasizes, by indirection, is how the 30-year plus dominance of neoliberal values has undermined even the case for national environmental regulatory processes. He can divert us to "free-riding," a temptation internationally which "human nature" (he implies) can't overcome. Nordhaus proposes to create an international "club", which would then impose a tariff upon developing nation's like India and China. These nations wouldn't get to sell their products in the old way without triggering a cost-tariff, unless they set a price for carbon inside their nations. This proposal is problematic for many reasons. Importantly, it fits poorly with the explicitly anti-regulatory thrust of neoliberalism in the United States since 1980… and elsewhere, although German successes will have to be footnoted heavily.

Neoliberalism is dynamic with its "catechism," and by that I mean it has actively undercut all the market-based solutions mainstream economists, such as William Nordhaus offer within capitalism. Nordhaus recommends carbon credit trading schemes and a carbon price to address global warming. However, both are attacked in the U.S. as taxes, hidden or direct, which is verboten. Government, as the designer and judicial overseer of such solutions, has been under attack by most of the neoliberal spectrum for decades. Market based solutions from academe, so clean and logical, fail in the political marketplace, because of power and the force of neoliberal ideology and its real world manifestations.

Of course, it is true there is a significant portion of the Greens who want to decentralize everything: energy, agriculture… as a response to the central stalemate in national legislatures for any type of decisive action, be it environmental or economic. I read Richard Smith as straddling the line between a Green New Deal relying on a powerful federal government and the green decentralizers, like Gar Alperovitz…

I'm a new Green New Dealer, dubious that we can extensively decentralize, despite the intellectual rigor of the exercise that camp brings to the table. As I see things in the U.S. in 2016, the intensity of the personal economic suffering of so many people is the political driver, for better (Sanders) or worse (Trump). No matter the damage we are doing to nature, which we certainly are, humans will put their essentials and their standard of living in general ahead of nature's well-being. No matter the cost to our collective future. It remains to be seen if an ecological emergency equivalent to the economic one of the Great Depression would change this. Most, likely, we will get a recession or another financial crisis first. We could design an MMT style Jobs Guarantee or and Employer of Last Resort program to meet both needs. But so far, even Sanders hasn't called for a "Right to a Job" drawing historically on FDR's Second Bill of Rights to match his call for the right to Universal Healthcare.

Ken Zimmerman: It is important to emphasise that capitalism's contention that it is *the* only way of life that works or can work for human survival is just incorrect. As you suggest, anthropology is a way to consider these questions that has few rivals in terms of insights and potential paths of action. So let me approach these questions anthropologically. Humans, unlike their near cousins, chimpanzees and gorillas, have limited social abilities. Unlike our cousins humans do not work together as a natural course of affairs (unreflectively). Humans must construct social arrangements for living together, sharing, and finding/acquiring the means for survival. Humans create what's called, depending on your academic inclination, institutions, social structures, moral codes, laws, cognitive theories, etc. Humans are never really comfortable in any of these, since none is perfect and provides humans all the support they want and need. Unlike our cousins a primary concern for humans is whether the "things" we've built actually are doing the job of allowing us to live and survive together. For it is quite clear that humans, like their cousins can only survive together. To "truck and barter" is one possibility concerning how humans can live. Neoliberal economics is an amplified version of this basic structure. But humans have also constructed ways of life around cooperation and direct/indirect sharing of resources and care. So, with this in mind it is essential that humans continue to assess how they've chosen to set up their social arrangements and what those arrangements are. The arrangements must on average help more than hurt the chances for human survival. Capitalism of all forms scores low on this assessment. Capitalism scores low for two reasons. First, it harms the physical relationships (air, water, land) on which human survival depends, where other options may not. Second, it pits humans against one another in the pursuit of something that has virtually no survival value for humans – money. So, on the basis of human survival capitalism is a poor choice. If carried to an extreme it may represent an extinction choice for humans.

William Neil: There are various levels to Smith's book as I look at it. Why has capitalism failed to follow Hawkens' next or green industrial revolution? Why couldn't it reform itself to substitute the least toxic and extractively disruptive inputs and create the largest number of recyclable products from our industrial and chemical "manufacturing" processes? I tend to view the losing fight against global warming as a larger example of

this dynamic. Nordhaus argues that it is because of free-riding, or, in less polite terms, free-loading: nations refusing to pay their share of cleaning up the broader atmospheric commons. This kind of economics evades the more uncomfortable analysis Smith undertakes regarding the nature of capitalism's internal processes, which centers upon a ruthless cost competition.

Smith's conclusion seems to be that the intensity of competition means that firms cannot take the time and research costs to fully explore the changes someone like Hawkens anticipated. It is a cost/dime drain, which has no guarantees and apparently doesn't have enough takers or positive breakthrough outcomes to position green products advantageously for price… even as we acknowledge that some consumers will pay a price premium for greener products. Green remains a consumer and product niche, although a growing one. It has not transformed the nature or the impacts of our basic processes in the direction Hawkens hoped.

So what happened? It seems Lester Thurow was correct. Capitalism cannot project societal and environmental cost/benefit analysis very far into the future. Nordhaus argues that tough, good governance and the regulatory state in conjunction with markets can work; for example, in the case of Sulphur Dioxide. However, a single or special case does not demonstrate a general principle or pervasive policy relevance or effectiveness. In any case, the implication that one falls back on state imposition contradicts the basic framework (and the particular leanings of *Climate Shock*). The further implication is that the internal processes of capitalism cannot accomplish the desired environmental ends via "better" business practices.

In *Green Capitalism* Richard Smith has the courage to face up to the fact that internal capitalist processes are still sufficiently ruthless, selfish and short run to prevent a widespread transformation. This, let me be clear, really ask firms and the system to organize – or better, re-organize their whole operation along a new value scheme spectrum. One supposes, given a much greater public opinion pressure, that they could be forced to do this, to overturn capitalism's old value system for its processes. But based on what we know today, capitalism has captured more of the processes of the political system for its own present methods than the environmental "community" has been able to do for its values. Some capitalists have wanted to transform themselves to be greener, but not enough to tip the balance.

Richard Smith: In terms of final comment and context consider the following.[2] In 2014, IPCC climate scientists told us that on present trends we're headed for a 3.7-7.8 Centigrade (or more) warming by the end of this century.[3] Of course, if we had begun suppressing emissions back in the 1990s, we wouldn't be in the fix we're in now. But since we didn't and haven't, scientists tell us we now face a CLIMATE EMERGENCY.

If we want to contain global warming to within 1.5 to 2 degrees centigrade above preindustrial levels, to preserve a habitable planet, industrialized economies must immediately begin massive reductions in fossil fuel consumption. In the case of the worst polluters such as the U.S. and China this may require reductions of as much as 7-10%

[2] The material form this point onwards is not based on the original Blog exchanges.
[3] IPCC Climate Change 2014: Summary for Policymakers, p. 20: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

per year with the aim of reducing emissions to zero (or even negative) by 2050.[4] The problem remains the same one that prevented early action. We live in a capitalist economic system based on privately owned corporations, in which jobs and profits all depend upon perpetual growth? How can ExxonMobil and Toyota and Boeing Aircraft put themselves out of business to save the humans when their fiduciary and legal responsibility is to maximize profits for their owners *and nothing else*?

Editor: So creative destruction may be a familiar concept to economists but the benevolently self-annihilating corporation is simply alien to capitalism? Not even with a nudge from the state?

Richard Smith: Last summer, California's would-be "green" Governor Jerry Brown and the California Senate Democrats proposed legislation to cut the state's petroleum use by 50 percent by 2030 in line with IPCC's target of cutting emissions by 90-100 percent by 2050. An exemplary proposal. However, the Western States Petroleum Association said that a 50 percent mandate would mean job losses, increased fuel and electricity costs. The oil industry took out ads asserting "that it could lead to fuel rationing and bans on sport utility vehicles."[5] Facing revolt in the State Assembly, erstwhile green Governor Brown dropped the plan, sacrificing the planet to economic growth like capitalist governments everywhere.[6]

In point of fact, the oil companies were correct: If California cuts fossil fuel consumption by 50 percent, large numbers of workers in affected industries would indeed have to be laid off, gasoline would have to be rationed, gas-hog SUVs and bloated pickup trucks – the biggest selling vehicles in the U.S. -- would have to be banned, and more. Much more.[7]

Yet if we're going to save humans, *we have to do just that. At the end of the day, after all the cap & trade and carbon tax ruses have failed, the only way to suppress fossil fuel consumption is to suppress fossil fuel consumption.* That is: mandate cuts, impose rationing of fossil fuel consumption, ban production of gas-hog vehicles and more. This is direct state intervention analogous to the bans imposed bans on DDT and Thalidomide and ozone-depleting CFCs, or rationing of essentials and restrictions on production during WWII.

Editor: So an ecological crisis creates a metaphorical war situation – at least in so far as humanity is at war with its own ability to act long term rationally?

Richard Smith: The problem is that fossil fuel use is pervasive throughout the economy. And since we're not talking about a temporary ban for a few wartime years, but a radical, steadily deeper, and permanent suppression of the fuel that powers the engines of commerce around the world – and not just producing electricity but heating, manufacturing, industrial farming, transportation, construction, tourism, most everything –

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[4] *Climate Change 2013: The Physical Science Basis (Part 7):* https://johncarlosbaez.wordpress.com/2014/04/18/what-does-the-new-ipcc-report-say-about-climate-change-part-7/. (My thanks to David Klein for this reference.)
[5] Adam Nagourney, "California Democrats Drop Plan for 50 Percent Oil Cut," *New York Times* September 10, 2015.
[6] Brent Kendall and Amy Harder, "Industry, States set to Fight EPA Greenhouse Gas Rules," *Wall Street Journal*, August 9, 2015.
[7] See Smith 2016; 2015.

under capitalism, cutting fossil fuel consumption by anything like 50% let alone 90% would not just unemploy the last 60,000 coal miners left in the U.S. It would precipitate global economic collapse, mass unemployment, and worse. On this point, the Chamber of Commerce and National Association of Manufacturers are right and pro-growth, pro-market "green capitalism" environmentalists are wrong: *Cutting greenhouse gas emissions means cutting jobs. Given capitalism, there is just no way around this conundrum.* And yet, if we don't cut those jobs, if we don't stop burning ever more coal and oil and converting ever-more of the planet into product, our goose is cooked. What to do?

Environmentalist Bill McKibben, co-founder of 350.org has just called for a global EMERGENCY MOBILIZATION akin to the full-scale mobilization marshalled by FDR during WWII that turned U.S. industry around on a dime to win the war.[8] But McKibben's mobilization assumes perpetually growing (albeit solar-powered) GDP, not "degrowth." But as I've argued, if "clean green" energy is just turned into a "new industrial revolution" to convert more and more of nature into yet more junk we don't need, as every new energy "efficiency" has done since the days of William Stanley Jevons, this solves nothing.

We certainly need an emergency mobilization. But since no one has yet come up with a magic tech fix to "dematerialize" production such that we can keep growing our economy without growing pollution including greenhouse gas emissions, then the only way to suppress emissions, especially in the rapidly closing window of opportunity we still have left before all hope of stopping runaway global warming is lost, is to massively and quickly start suppressing unnecessary industrial production, especially in China and the United States. We need to stop talking about carbon taxes and start talking about shutting down polluting industries because if we don't enforce a rational planned deindustrialization, nature is going to shut down our industries for us, in a most unpleasant manner.

Needless to say, capital would not like this plan. And neither would labour – unless society can guarantee that the retrenchments and closures necessary to save the human race in the long run won't throw them out in the streets in the short run. As I noted in my book, polls show that large majorities of people: 69 percent of Americans, 71 percent of Chinese, 77 percent of Nigerians, and 88 percent of Brazilians, want binding limits imposed on CO_2 emissions.[9] But they can't support the sorts of retrenchments and closures necessary to cut those emissions if it means they'll be unemployed.

As one contributor notes, what we would need is "an MMT style Jobs Guarantee," a "Right to a Job", perhaps something along the lines of "FDR's Second Bill of Rights." Since no capitalist economy can save the planet without collapsing into depression, and since no capitalist economy can guarantee full employment, I don't see how we can prevent planetary collapse unless we find a way to transition to some kind of eco-socialist economy that can, among other things, create replacement jobs in socially needed and

[8] Bill McKibben, "A world at war," New Republic August 15, 2016:
https://newrepublic.com/article/135684/declare-war-climate-change-mobilize-wwii.
Also, The Climate Mobilization, Victory Plan by Ezra Silk, August 19, 2016:
https://drive.google.com/file/d/0Bze7GXvI3ywrSGxYWDVXM3hVUm8/view

[9] Sewell Chan, "Poll Finds Global Consensus on a Need to Tackle Climate Change," *New York Times,* November 5, 2015.

low-to-non-polluting work. We can save capitalism (for a few decades) or we can save the planet. We can't save both.

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