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## DEFLATION AND ECONOMIC GROWTH: THE GREAT DEPRESSION AS THE GREAT OUTLIER

PAVEL RYSKA

*ABSTRACT:* This paper deals with the relationship between deflation and economic growth. Although there are numerous theories on the potential effects of deflation on real output, empirical evidence in this field is still incomplete. In order to explore the relationship between prices and output in a more comprehensive way, I use a large panel data set of 20 countries over roughly 150 years, which contains frequent deflationary episodes. Since mainstream macroeconomists often refer to alleged bad historical experience with deflation, I employ an econometric model to examine both contemporaneous and lagged correlation between prices and output. There are two important results. First, there is no general relationship between price growth and output growth. Coefficient estimates have very small magnitude in both the whole sample and in different monetary regimes. Second, well-known episodes of deflation differ a lot. The Great Depression is the only period where deflation seems to be strongly associated with recession. By contrast, Japan in the 1990s and 2000s bears no resemblance to it. Here, both empirically and theoretically, deflation is highly unlikely to have caused economic stagnation.

*KEYWORDS:* deflation, price level, economic growth, monetary systems, panel data, economic history

*JEL CLASSIFICATION:* E31, E42, C33, N10

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## 1. INTRODUCTION

Between the years 1804 and 1900, the price level in the United States decreased by almost 30 percent, and over the same period, output grew more than 40-fold. Price deflation was an ordinary phenomenon that did not provoke necessarily bad connotations. Nowadays, however, deflation has a bad reputation. Both the current and the former chair of the Federal Reserve have expressed strong commitment to prevent deflation from appearing. As Ben Bernanke noted, “Sustained deflation can be highly destructive to a modern economy and should be strongly resisted.” (Bernanke, 2002, p. 8) What is responsible for this view? The legacy of the Great Depression, which associated economic contraction with falling prices, and the lackluster economic performance of Japan, which has seen occasional deflation in the past 25 years, are the primary reasons. The 2013 announcement of the Bank of Japan to launch an unprecedented expansion of the monetary base to reverse deflationary pressures and attain a 2 percent inflation rate is a symbol of how much deflation is feared. The repeated ‘quantitative easing’ programs in the US in 2009–2014 are another example.

Mainstream macroeconomists often turn to empirical evidence to assert the validity of their theories. However, the situation with deflation is asymmetric: there appear many arguments why deflation should be bad for economic growth, but there is little empirical evidence to support it. Most references are concerned with the Great Depression, but they very rarely mention any other period.

The present work aims to fill this gap and provide a more comprehensive look at what we know about the relationship between deflation and economic growth. To do so, I have assembled a large dataset that contains annual data on output and prices for 20 countries over the past 130–200 years. Thanks to the length of the time series, it is possible to draw valuable information from pre-World War I data which are rich in episodes of deflation. The goal of this paper is to find out whether deflation is associated with recession—as is often suggested—when taking into account long-run empirical evidence.

The text proceeds as follows. In Section 2, I provide a brief survey of the current state of knowledge about deflation, both from a

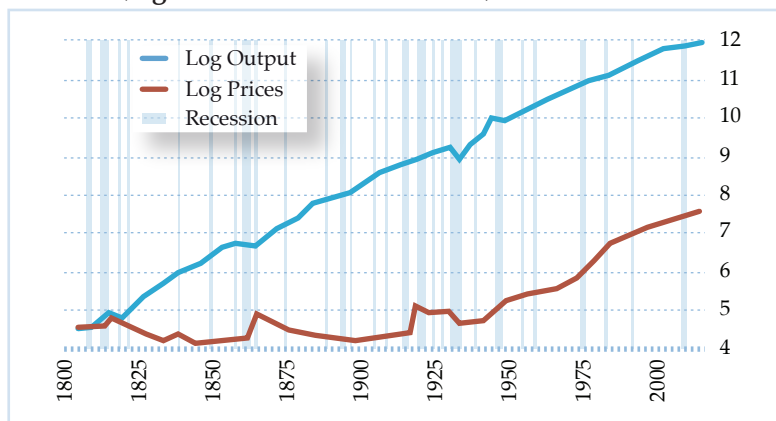
theoretical and empirical point of view. In Section 3, I present the dataset used in this paper and show basic properties of output and inflation data. I then use an econometric model in Section 4 to see whether changes in prices have an effect on changes in output and whether deflation is in general associated with a weaker economic performance. Overall, the results provide very little evidence of an effect of prices on output. Special attention is paid to the Great Depression and Japan's recent economic performance. Section 5 concludes the paper.

## 2. CURRENT KNOWLEDGE ABOUT DEFLATION

### 2.1 Two Theoretical Approaches

The theoretical literature on deflation has one strikingly clear division line that splits researchers into two categories. The first group, which is the more numerous and influential one, tends to approach deflation as a *cause*. These authors show how decreasing prices may affect aggregate demand or financial stability through various channels and almost uniformly conclude that deflation should be avoided. They typically point to the Great Depression as a distinct empirical example (see Figure 1 for the concurrent drop in prices and output in the US between 1929 and 1933). By contrast, the second group approaches deflation as a *symptom*. Either deflation can arise as a consequence of economic growth in a regime with constant money supply, which was typically the case of the second half of the 19th century (see Figure 1), or it can just as well occur in periods of distressed selling in recessions. Either way, however, economists of this second group argue that deflation should be let to run its course as it is not a cause, but a symptom of forces working in the background. Each approach is discussed below.

**Figure 1: US Real GDP and Consumer Price Index 1804 – 2015**  
(log of index where 1804 = 100)



## Deflation as a Cause

There are four basic lines of reasoning according to which deflation is harmful. First, deflation causes a delay in spending. When consumers see decreasing prices, they expect them to decrease further and want to take advantage of this by buying cheaper in the future. That reduces current consumption and causes a contraction of aggregate demand.

Second, deflation increases the real interest rate. Generally, the Mundell-Tobin effect states that due to people's portfolio decisions, inflation does not influence only the nominal interest rate, but also the real interest rate. When prices start to fall, holding cash earns a return and people shift a part of their wealth from interest-bearing assets to money balances. That causes the real rate of interest to rise, which lowers investment. A special case is the Keynesian liquidity trap. Here, the nominal interest rate is fixed at zero and the deeper is deflation, the higher is the real interest rate by the same magnitude (as seen in the Fisher equation  $i = r + \pi$ ). That depresses investment and aggregate demand. In the case of Japan in the 1990s, Krugman (1998) argues that deflation is responsible for the stagnation of the economy in an environment of a liquidity trap. Christina Romer (1992) argues similarly for the Great Depression period in the US.

Third, deflation may prove especially harmful in an environment of high indebtedness. Fisher (1933) asserted that if economic agents (especially firms) have their debt contracts specified in nominal terms, then deflation causes the real value of their debt to rise. Since this real growth in debt is not matched by a similar real growth in their revenues, many firms find themselves unable to pay off debts and declare bankruptcy. In addition, the very effort to sell assets in order to pay debts makes the situation only worse as these efforts further depress prices and reinforce the increase in real debt burden. This gives rise to a debt-deflation spiral, which causes a contraction in both aggregate demand and aggregate supply. The mechanism works mainly when deflation is unanticipated. Otherwise, an anticipated path of prices may already be reflected in the debt contract.<sup>1,2</sup>

Fourth, prices of certain factors of production may be rigid downwards, which in a deflationary environment causes their real prices to rise and their utilization to fall. This concerns especially wages whose flexibility may be limited, at least in the short run. If wages do not decrease or decrease less than other prices, the labour market does not clear, causing unemployment and reduction in production. Bernanke (1995) asserts that the failure of wages to adjust played a considerable role in the Great Depression.<sup>3</sup>

## Deflation as a Symptom

By contrast, some economists view deflation—and price changes in general—rather as a symptom of other, independent processes. In their view, attention should be paid to where deflation comes

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<sup>1</sup> A modern variation on Fisher's debt-deflation is from Bernanke and Gertler (1989), who incorporate the effect of firms' net worth on the ability to borrow in an environment of asymmetric information.

<sup>2</sup> Hülsmann (2008) criticized the debt-deflation theory on grounds that bankruptcies do not mean disappearance of assets, but rather their transfer to new owners. This transfer of ownership is only a reverse of the previous inflationary redistribution of wealth.

<sup>3</sup> It is interesting that Keynesian-oriented economists are not in agreement when drawing conclusions from downward rigidity of wages. Some recognize that if wages were flexible, deflation would not do harm to the economy. Others like DeLong and Summers (1986) or Palley (2008) argue that deflation is also harmful for other reasons (such as those listed above), and thus for deflation not to spread, downward rigidity of prices should be reinforced.

from, rather than to deflation per se and its possible secondary effects. Selgin (1997, 1999), Šíma (2002), Salerno (2003), and Bagus (2015) represent this point of view. Salerno (2003) identifies several general sources of deflation: bank-credit deflation, stemming from deflationary monetary policy or bank runs, cash-building deflation, caused by individuals' change in preferences towards holding more money balances, confiscatory deflation, where the government seizes people's cash balances, and finally growth deflation, arising from increasing output. Interestingly, some types of deflation like bank-credit deflation and cash-building deflation are usually associated with recessions, while growth deflation comes directly from growth in output. This illustrates that when regarded as a symptom, there is no unambiguous way to match deflation with either recessions or booms.

Growth deflation is of special interest since it may explain long periods of deflation with increasing output observed in the gold standard era of the late 19th century. Economic growth can take two forms: extensive, where factors of production increase in numbers or amount, and intensive, where investment increases factors' productivity. Increasing productivity, in turn, is equivalent to lower costs of production per unit of output. Therefore, as firms have lower marginal costs, they can attract more marginal demand. Supply curves move downward and lead to higher equilibrium quantities and lower equilibrium prices. At a macroeconomic level, this is seen from the quantitative equation  $M \cdot V = P \cdot Y$ . If money velocity is assumed to be constant, then any increase in output greater than increase in money supply must necessarily cause the price level to fall. In terms of mainstream macroeconomics, deflation resulting from economic growth is equivalent to the aggregate supply curve shifting to the right in the AS-AD diagram.<sup>4</sup> Selgin (1997, 1999) argues in detail why deflation that results from productivity growth does *not* have the harmful effects on output as presented above.

## 2.2 Empirical Literature

Several studies have explored the relationship between output and prices but only a part of them covers a large enough sample to allow general conclusions. Bordo and Redish (2003) and Bordo,

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<sup>4</sup> Hayek (1931) is an important early work that argues in detail why deflation is a symptom of healthy economic growth.



Lane and Redish (2004) focus on the classical gold standard period in 1870–1913 and 1880–1913, respectively. They find no evidence of prices influencing output in these periods. McCandless and Weber (1995) look at a large number of countries between 1960–1990. Similarly, they find little evidence of a relationship between output and prices, but their sample is limited to a period that had generally few episodes of deflation.

Some studies have covered samples that are longer in time. Atkeson and Kehoe (2004) look at a sample that spans from the 19th century until the modern day. Their general conclusion is that inflation had at best a very small positive impact on economic growth. They highlight that the Great Depression is different from the rest of the sample. Borio and Filardo (2004) report a relationship between inflation and growth only in some subsamples of their dataset but not a general one. Similarly, Borio, Erdem, Filardo and Hofmann (2015) find that there is correlation between economic growth and asset prices rather than broad consumer prices.

By contrast, Guerrero and Parker (2006) side with the opposite view. They find a lagged negative impact of deflation on economic growth, although the economic significance (the magnitude of the coefficient) is rather small. Finally, Benhabib and Spiegel (2009) explore a non-linear relationship—i.e., one that changes with the crossing of a certain threshold in the inflation rate. They conclude that the relationship is an inverted U-shape—that is, inflation positively affects economic growth until a certain threshold from which the effect becomes negative.

Independently of the conclusions reached, the cited studies have certain drawbacks. Atkeson and Kehoe (2004) explore a relatively long dataset but they use 5-year averages for their regressions. That has the disadvantage of missing some of the short-term variation. Guerrero and Parker (2006) use yearly observations but they rely only on the lagged effect of prices on output. However, most importantly, none of the studies attempts to use a control variable which would remove some of the potential omitted-variable bias. In other words, if a certain important determinant of output is missing from the regression, the coefficient for inflation could be biased because it takes on some of the effects from the omitted variables.

In the present paper, I include the investment-output ratio as a control variable and explore both contemporaneous and lagged

effects in order to obtain more robust results compared to the previous studies.

### 3. DATA

#### 3.1 Data Description

I have compiled a large historical dataset with annual observations on prices and output. Output is measured as real GDP and prices are represented by the Consumer Price Index or the GDP Deflator.<sup>5</sup> As a control variable, I also use the investment-output ratio in the regressions below. The reason for the use of the investment-output ratio is that it is the most historically available complementary variable that is likely correlated with output and therefore should be included in the regression. The dataset consists of 20 countries and spans from the 19th century to 2015.<sup>6</sup> To give a glimpse of the length of the time series, the earliest observations on prices start as early as 1804 for Sweden and the US. Most countries, however, have records on prices that begin several decades later. Altogether, there are 3293 annual observations that have both a reading for price growth and output growth.

Below for basic statistics, I present the dataset in two forms. First, I use the complete dataset, and second, a truncated dataset where

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<sup>5</sup> The reason for the use of both indices is availability. I use the Consumer Price Index where possible since it is today the generally preferred measure of inflation by most economists and organizations. I use the GDP deflator where the CPI is unavailable, which is true particularly for the older observations. It is generally possible to retrieve very long times series on prices such as from Reinhart and Rogoff (2011), which span back to the 18<sup>th</sup> century, but these are based on narrow baskets or individual goods' prices, not on broad indices. Here, I only use CPI or the GDP deflator.

<sup>6</sup> The starting years are different for each country according to data availability. The countries included are Argentina, Australia, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States. Prices before 1980 are from Atkeson and Kehoe (2004) and Jorda et al. (2017), except for Australia, Denmark, Switzerland and Belgium which are taken from Bordo (2010). Prices from 1980 onwards are from IMF (2017) and World Bank (2017) for all countries. Output is defined as GDP or GNP in constant currency. Data on output before 1980 is from Atkeson and Kehoe (2004), Jorda et al. (2017), Mitchell (2003) and Smits et al. (2009), except for Australia, Belgium, Denmark and Switzerland which is taken from Maddison (2010). GDP from 1980 onwards is from Maddison (2010) and World Bank (2017) for all countries. The investment-output ratio is the fraction of gross investment and GDP or GNP, both in current prices. The data is from Jorda et al. (2017) and from the World Bank (2017).

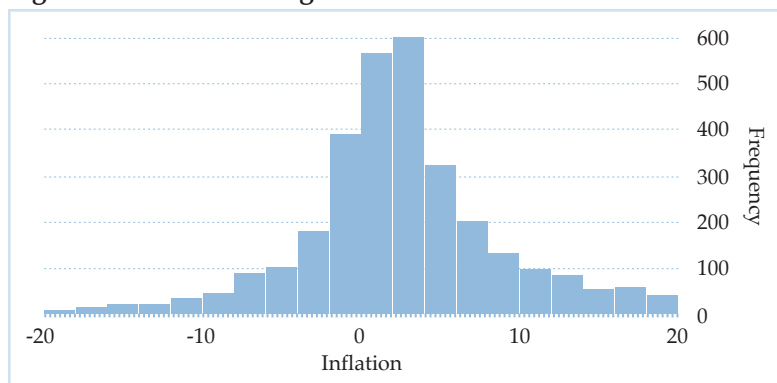
I leave out observations with extreme values of price growth. The reason is that the main question of interest is how economies perform under reasonably ‘normal’ inflation rates compared to ‘normal’ deflation rates. Leaving hyperinflations as well as extremely deep deflations in the sample would severely bias the regression results and would not help answer the question whether mild inflation is preferable to mild deflation. I exclude all years with price growth greater than 20 percent or lower than –20 percent.<sup>7</sup>

### 3.2 Basic Statistics

In the complete sample, positive price growth prevails, with years that saw positive inflation accounting for 72 percent of all annual observations. Inflation rates between 2 and 4 percent are the most frequent observation (see Figure 2). This prevalence of inflation over deflation in the sample mostly reflects the generally inflationary post-World War II period which saw only sporadic deflation.

However, thanks to the inclusion of the pre-World War I data, deflation is far from infrequent and allows a comparison of economic performance under inflation and deflation.

**Figure 2: Inflation: histogram for all data**



<sup>7</sup> The choice of such a boundary is necessarily arbitrary. I follow Atkeson and Kehoe (2004), Ichiue and Nishiguchi (2014) and Bachmann et al. (2015) who all use the 20 percent and –20 percent thresholds. A 20 percent inflation is roughly the one that developed economies reached at the height of inflation in the late 1970s and early 1980s.

Figure 3 illustrates the major difference in the behavior of the price level before and after World War I. Under the classical gold standard, which was in place in most countries until roughly 1914, very mild deflation of 0 to –2 percent was the most common observation. After the abandonment of the classical gold standard, the average inflation rate shot up and positive inflation became the standard.<sup>8</sup>

Table 1 compares economic growth under inflation and deflation.<sup>9</sup> There are several important observations. First, economic growth was positive in 81.1 percent of years with inflation and in 74.8 percent of years with deflation. While this preliminary observation shows that deflation is far from recessionary, economies still seem to fare a bit better under inflation. A second and more meaningful approach is to compare the average growth rate of output. Under inflation, output grew 2.85 percent per year on average, while under deflation the growth rate was 2.73 percent. Again, this suggests that the output loss of having deflation instead of inflation is very small. Third, output growth appears to be slightly less volatile under inflation than under deflation, as measured by standard deviations.

To test whether the observed differences of output behaviour are statistically significant, in Table 2 I present formal tests of equality of parameters.<sup>10</sup> Interestingly, it is not possible to reject the null hypothesis (at any standard significance level) that the average output growth rates under inflation and deflation are equal. Similarly, the variances are not statistically different either. To sum up, there is no statistically significant difference in the average growth rate of output or in the variance of output growth under inflation versus deflation.

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<sup>8</sup> The term ‘classical gold standard’ denotes what was in most countries the period from approximately the 1870s until the beginning of World War I. The later forms of the gold standard did not guarantee full convertibility of currency into gold.

<sup>9</sup> ‘Zero price change’ is included in Table 1 as there are observations, though not many, with exactly zero reported inflation. This is due to rounding of the index in the original data source.

<sup>10</sup> The sign \* denotes statistical significance at 10%, \*\* at 5% and \*\*\* at 1%. I use the Welch (unequal variances) two-sample t-test for the equality of means and the F-test for equality of variances.

Figure 3: Inflation: comparison of histograms for two monetary regimes

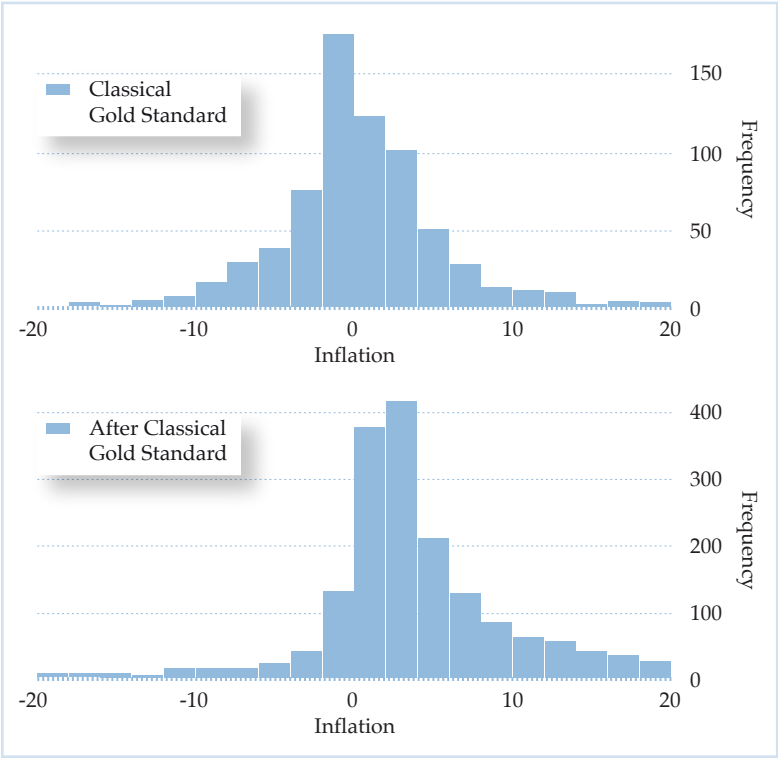


Table 1: Output growth under different price scenarios: all data

	All data	Inflation	Zero price change	Deflation
Total observations	3293	2387	106	800
- obs. with output increase	79.6%	81.1%	84.0%	74.8%
- obs. with output unchanged	0.4%	0.3%	0%	0.6%
- obs. with output decrease	20.0%	18.6%	16.0%	24.6%
Average output growth	2.85	2.85	3.52	2.73
Output growth st. deviation	5.59	5.58	4.69	5.74

**Table 2: Tests of equality of parameters: inflation vs. deflation**

	Test statistic	P-value
T-test for equality of means	-0.507	0.612
F-test for equality of variances	1.059	0.158

Tables 3 and 4 report the same computations, but now with the sample reduced to contain only inflation rates in the interval [−20%, 20%]. The results suggest that this limitation works in favor of inflation: a slightly higher percentage of inflationary observations now have output increase and also the average output growth under inflation increases to 2.98 percent. Similarly, the variance of growth under inflation drops significantly.

This shift is easy to explain. Hyperinflations and very fast inflations are harmful to economic growth and also cause its higher volatility. As a result, leaving these extreme values out of the sample helps the statistical properties of growth under inflation. By contrast, growth under deflation does not profit from the truncation. The reason is also apparent: very deep deflations below −20 percent rarely occur under ‘normal’ conditions; instead, they appear often as a reversal of wartime inflations. Therefore, growth under these extreme deflations is often solid since it reflects post-war recoveries. This is the reason why leaving out extreme deflations leads to a slightly lower average output growth under deflation. However, the statistical tests again fail to reject the hypothesis that the two output growth rates are equal (Table 4). In other words, given the size of the samples and the variation in observations, the two rates of output growth are very similar. Only the variances are confirmed to be different.

Overall, when using all available observations, there is little doubt that economic performance is very similar under inflation and deflation. Even when extreme observations are omitted from the sample, which ‘helps’ growth under inflation, the economic performances are still very comparable. This runs against the deflation-recession theories.

**Table 3: Output growth under different price scenarios: inflation narrowed to [-20%, 20%]**

	All data	Inflation	Zero price change	Deflation
Total observations	3029	2141	106	782
- obs. with output increase	80.9%	83.0%	84.0%	74.7%
- obs. with output unchanged	0.4%	0.3%	0%	0.6%
- obs. with output decrease	18.7%	16.7%	16%	24.7%
Average output growth	2.91	2.98	3.52	2.63
Output growth st. deviation	4.97	4.74	4.69	5.58

**Table 4: Tests of equality of parameters: inflation vs. deflation**

	Test statistic	P-value
T-test for equality of means	-1.561	0.119
F-test for equality of variances	1.387***	< 0.001

A cautionary note is due, however. The statistical relationships say nothing about causation. Theory is key in interpreting the data. A mainstream interpretation would be that the perhaps slightly higher growth rate under inflation proves that inflation is conducive to growth. In contrast, it could well be that this observation is due to the composition of data. While deflation was a normal growth symptom before World War I, the postwar years with much more inflation only saw deflation during distressed selling and recessions. The 'ordinary' growth deflation that had been allowed before World War I could not be observed after it due to permanent increases in money supply after currencies had been separated from gold. Therefore, the observation of 'bad' deflations after World War I could prevail, but this does not imply anything about deflation in general or the direction of causation. To be able to answer more, I look at the data in more detail in the next section.<sup>11</sup>

<sup>11</sup> A remark is due concerning the higher standard deviation of output growth under deflation than under inflation in Table 1. As much more deflation was recorded

## 4. REGRESSION ANALYSIS

### 4.1 Method

I use a regression model in which inflation (or deflation) is the explanatory variable, while current output growth is the explained variable. The model reflects the common notion in mainstream macroeconomics that causation runs from prices to output—that is, that inflation or deflation affect the growth of output (see Section 2.1). The regression also contains lagged prices and lagged output to account for a potential delayed response of output to prices. As such, it constitutes the often-used autoregressive model. Although the model uses panel data with a long time dimension, it is designed to capture a relatively short-run (contemporaneous or one-year lagged) effect of prices on output. This is line with the current focus of theory and monetary policy on short-run effects of deflation—for example, the postponement of current spending in favor of the future. Finally, the model contains the so-called unobserved effects—i.e., any other factors specific for a country that may affect output but cannot be included among the regressors since the data is not available.

As a result, the model is of the form

$$y_{it} = \beta_0 + \beta_1 y_{it-1} + \beta_2 p_{it} + \beta_3 p_{it-1} + a_i + u_{it}$$

where  $y$  is real output growth,  $p$  growth in the price level (both in percent terms),  $a_i$  the country-specific unobserved effect and  $u_{it}$  the error term. Below I call this model ‘unconditional’ since the only additional regressor besides  $p$  is the own past value of  $y$ .

I estimate the model using the so-called fixed-effects method. This method allows arbitrary correlation between the unobserved cross-sectional effects  $a_i$  and regressors  $y_{it-1}$ ,  $p_{it}$ ,  $p_{it-1}$ . For example, institutional arrangement in country  $i$  (included in  $a_i$ ) may affect

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in the 19<sup>th</sup> century than in recent times, there is the possibility that the higher standard deviation of growth during deflation is caused by the imprecision of measurement for the older observations. There was no systematic measurement of GDP, GDP deflator or broad consumer price indices in the 19<sup>th</sup> century. The series have not been measured, but rather estimated from other series such as industrial production, agricultural production and wholesale price indices, which are themselves typically more volatile. This could add to the volatility of the derived series. I thank an anonymous referee for pointing this out.



both the explained variable (output growth), but also some of the explanatory variables (price growth).

As noted above, a major shortcoming of the existing research is the absence of control variables. Out of candidate control variables, the investment-output ratio stands out as being both important for output and relatively available as historical data. The second, enlarged model which includes investment is

$$y_{it} = \beta_0 + \beta_1 y_{it-1} + \beta_2 p_{it} + \beta_3 p_{it-1} + \beta_4 invr_{it} + \beta_5 invr_{it-1} + a_i + u_{it}$$

where *invr* is growth in the investment-output ratio (again in percent terms). I call this model 'conditional' below. The inclusion of *invr* comes at a cost: since this variable is not available as far back as output and prices, roughly a 1/3 of observations is lost after its inclusion. Still, the sample has more than 2000 observations.<sup>12</sup>

As the model contains the lagged dependent variable  $y_{it-1}$  among regressors, the fixed-effects estimator is generally not consistent. That is, the estimated coefficients do not converge to the 'true' value as the number of observations grows. However, the bias falls at a rate  $1/T$  as  $T$  (the time dimension of the sample) grows. For a time dimension high enough, the bias is negligible.<sup>13</sup> This is the case here, where in the full sample,  $T$  is between 130 and 200 years, so inconsistency is not of concern.<sup>14</sup> A robust variance matrix estimator was used when heteroskedasticity or serial correlation were detected.

## 4.2 Full Sample

Table 5 presents the results for the whole sample. The unconditional and conditional regressions show very similar results: the

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<sup>12</sup> The investment-output ratio is available as a fraction of investment and output, both in *current* prices. Its growth rate  $invr_{it}$  is therefore not in constant prices, so it does not correspond perfectly to the growth in *real* output  $y_{it}$ . However, it is still the best control variable available.

<sup>13</sup> See Nickell (1981) for the original reasoning and Wooldridge (2002, p. 302) for a shorter review.

<sup>14</sup> The only instance in this study where  $T$  is small is the regression for the Great Depression period in Section 4.4, which is 6 years long. For that case, I also estimate the regression equation using the general method of moments, which confirms the results.

coefficients on  $p_t$  and  $p_{t-1}$  have opposite signs and are statistically significant. Although this may seem peculiar, the bottom line is that both coefficients are very close to zero. If the positive coefficient of  $p_t$  was taken as evidence that contemporaneous inflation affects output positively, the economic magnitude is so small that it offers little practical effect: with a coefficient estimate between 0.058 and 0.066, inflation would have to increase by roughly 17 percentage points to bring about a 1 percentage point increase in real output. The estimate around 0.06 is also very close to Atkeson’s and Kehoe’s (2004) estimate of 0.08 for their entire sample.

Table 5: Regression of output growth on inflation: All data

	Unconditional		Conditional on Invr	
	Coefficient	p-value	Coefficient	p-value
$y_{t-1}$	0.213***	<0.001	0.197***	<0.001
$p_t$	0.066**	0.020	0.058**	0.027
$p_{t-1}$	-0.042*	0.063	-0.036*	0.093
$invr_t$	-	-	0.048***	<0.001
$invr_{t-1}$	-	-	0.008	0.299
Observations	2158		2158	
Adj. $R^2$	0.020		0.081	

4.3 Comparison in Time: Monetary Regimes

In Section 3.2, it was shown that deflation was much more common under the classical gold standard before 1914 than in the period after World War I, when the gold standard was gradually loosened or abandoned and inflation became on average positive. This raises the question whether the change in monetary regime itself had an impact on the relationship between prices and output. Table 6 presents regression results for the classical gold standard era and for the period since its abandonment until the present time.

There are two results worth noting. First, the overall small economic magnitude of the coefficient estimates for inflation holds under both monetary regimes and the two regimes do not display big differences. The coefficients on  $p_t$  and  $p_{t-1}$  are never outside the

interval  $(-0.1, 0.1)$  in either case. The stability of results also has an econometric meaning: estimating two parts of the sample separately does not bring a considerable change in the magnitude of coefficient estimates. Second, however, there is a change in statistical significance. After controlling for the investment-output ratio, the effect of inflation becomes statistically insignificant especially in the classical gold standard period. This underlines an expected feature of the classical gold standard: correlation between output and prices was none or negligible since in the long run, output grew while prices were constant thanks to an inelastic money supply.

As an interesting difference, the coefficient estimate on  $y_{t-1}$  is negative under the classical gold standard, while it is positive after it. The reason could be that periods of growth and recession alternated more frequently during the gold standard, which renders the coefficient negative. In contrast, the later part of the 20<sup>th</sup> century became typical for longer periods of positive economic growth (albeit sometimes at a slower annual pace), and this renders the correlation positive.

## 4.4 Selected Episodes of Deflation

### The Great Depression

Many theories on the consequences of deflation resulted from the experience of the Great Depression. Is this episode special? Table 7 shows regression results for the Great Depression period (1929–1934) and for all data in the sample outside the Great Depression.

The results show a clear difference. The Great Depression period yields a positive and statistically significant slope coefficient for contemporaneous inflation. Although it drops after controlling for the investment-output ratio, it still stays important at 0.358. The drop in the coefficient estimate after the inclusion of  $invr_t$  suggests that there is some effect of investment on output which is not linked to prices. Importantly, unlike all previous results, the coefficients on  $p_t$  at 0.690 and 0.358 for the two models are not only economically substantial, but also highly statistically significant. In contrast, the sample of all data except the Great Depression yields statistically and economically insignificant results. The big difference in slope

coefficient on  $p_t$  is seen in Figure 4.<sup>15,16</sup> Due to the much lower time dimension (6 years in 1929–1934), the fixed-effects approach is at risk of reporting biased coefficient estimates when including the lagged value of output  $y_{t-1}$ . As a check, I re-ran the regressions using general method of moments (GMM) estimation, which is more appropriate in such cases. GMM confirms the significant and relatively large coefficient on  $p_t$  (0.499 for the unconditional and 0.544 for the conditional model, respectively, and both significant at 1 percent.).

**Table 6: Regression of output growth on inflation: Classical gold standard period and after**

Classical gold standard	Unconditional		Conditional on Invr	
	Coefficient	p-value	Coefficient	p-value
$y_{t-1}$	-0.172***	<0.001	-0.201***	<0.001
$p_t$	0.082*	0.054	0.043	0.376
$p_{t-1}$	0.069	0.115	0.037	0.452
$invr_t$	-	-	0.080***	<0.001
$invr_{t-1}$	-	-	0.037***	0.002
Observations	543		543	
Adj. $R^2$	0.036		0.090	
After classical gold standard	Unconditional		Conditional on Invr	
	Coefficient	p-value	Coefficient	p-value
$y_{t-1}$	0.341***	<0.001	0.333***	0.096
$p_t$	0.064*	0.094	0.051	0.178
$p_{t-1}$	-0.080**	0.040	-0.065	0.111
$invr_t$	-	-	0.045**	0.018
$invr_{t-1}$	-	-	-0.002	0.617
Observations	1428		1428	
Adj. $R^2$	0.132		0.156	

<sup>15</sup> The economically and statistically significant slope coefficient for  $p_t$  in the Great Depression does not change considerably after the exclusion of the most apparent outliers.

<sup>16</sup> Since the regression line in Figure 4 was estimated by fixed effects (or ‘within transformation’) and this model subtracts all time-constant elements, the intercept  $\beta_0$  cannot be estimated. Therefore, the regression line has by default an intercept of zero and visually may not go through the main cluster of the data. Nevertheless, the point is to show the slope.

Overall, the results show that apart from the Great Depression, the sample does not reveal a link between inflation and economic growth. From the perspective of correlations, the Great Depression is an exception rather than a rule.

It is highly likely that rather than a single factor, a number of forces caused the strong positive relationship between prices and output during the Great Depression. Many authors reason that it was the collapse in money supply and prices that led to the depression: Friedman and Schwartz (1963) blamed the Fed for allowing money supply to fall, while Christina Romer (1992) stressed liquidity-trap theories and depressed investment, implying reflation as the answer. In stark contrast, Rothbard (2000) saw the previous money supply expansion in the 1920s as the root cause of the depression and the depression itself as liquidation of malinvestment. In his opinion, the depression in the United States was further exacerbated by the government's intrusion in the setting of prices and especially wages.

**Table 7: Regression of output growth on inflation: Great Depression and outside of it**

Great Depression	Unconditional		Conditional on Invr	
	Coefficient	p-value	Coefficient	p-value
$y_{t-1}$	0.018	0.897	-0.074	0.467
$p_t$	0.690***	<0.001	0.358***	<0.001
$p_{t-1}$	-0.074	0.721	-0.126	0.325
$invr_t$	-	-	0.124***	<0.001
$invr_{t-1}$	-	-	0.039**	0.022
Observations	90		90	
Adj. $R^2$	0.253		0.453	
All data except Great Depression	Unconditional		Conditional on Invr	
	Coefficient	p-value	Coefficient	p-value
$y_{t-1}$	0.189***	<0.001	0.182***	<0.001
$p_t$	0.028	0.298	0.025*	0.320
$p_{t-1}$	-0.043*	0.095	-0.040	0.129
$invr_t$	-	-	0.030*	0.079
$invr_{t-1}$	-	-	0.005	0.528
Observations	2068		2068	
Adj. $R^2$	0.039		0.049	

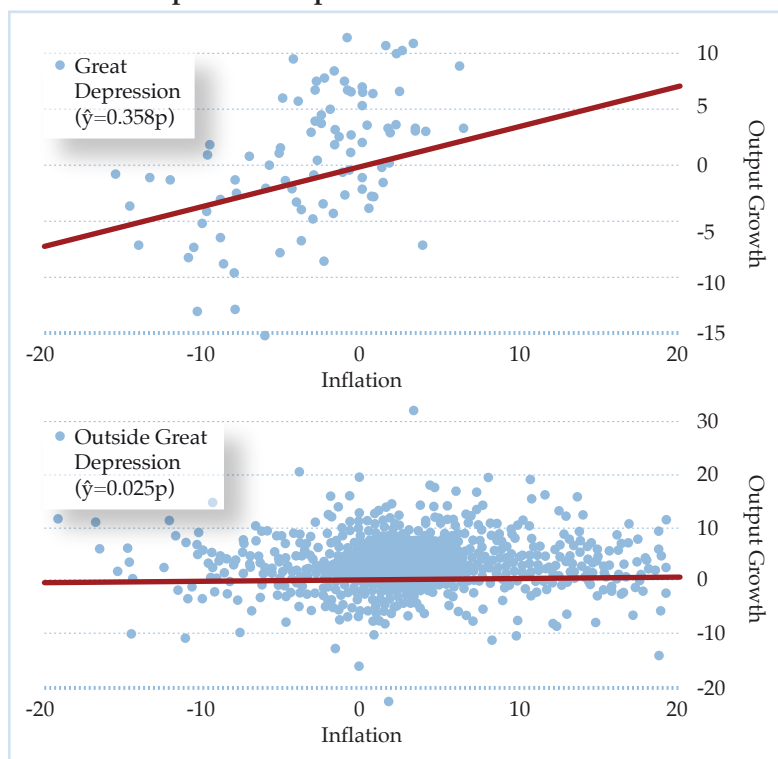
More recently, this view was supported by Ohanian (2009) who emphasized the role of labor unions and government in preventing nominal wages from adjusting downward, creating mass unemployment.

Although the Great Depression overall shows a link between deflation and recession, the picture is not as unambiguous as is commonly believed. There are two interesting aspects of the data at hand: one regards what preceded the Great Depression and the other regards cross-country differences.

First, deflation in most countries did *not* appear simultaneously with the Great Depression. Figures 5 to 8 show that in many countries, prices started falling already in the 1920s when most economies grew solidly. This illustrates the pitfall of analyzing only the most debated period 1929–1934. Deflation in the 1920s could well be of the ‘good’ sort, reflecting growth in output. But if inflation and deflation are defined in terms of prices and not money, then the malign price deflation of the 1930s should be fairly weighed against the benign price deflation of the 1920s.

Second, countries differed sharply in terms of decreases in prices and output. Figure 5 shows the United States and Germany, which are the textbook cases of ‘malign’ deflation. Both countries went through a deep and long slump in output accompanied by a deep drop in prices. A similar situation was experienced by Canada, Argentina, Brazil, Chile, Australia and to a certain extent also France.

**Figure 4: Regression for (a) Great Depression and (b) all data except Great Depression**



However, other countries had very different experiences. I show three different pairs of countries in Figures 6 to 8. Japan and Norway (Figure 6) did have sharp recessions, but these lasted only one year and their economies quickly recovered while prices kept falling. Norway is a striking case as it had been experiencing deflation many years before any recession came and also long after the recession ended. Italy and Denmark (Figure 7) had only moderate recessions that one would probably hesitate to call the 'Great Depression'. In Italy, real GDP was higher in 1934 compared to 1929 while prices continued to drop every year.

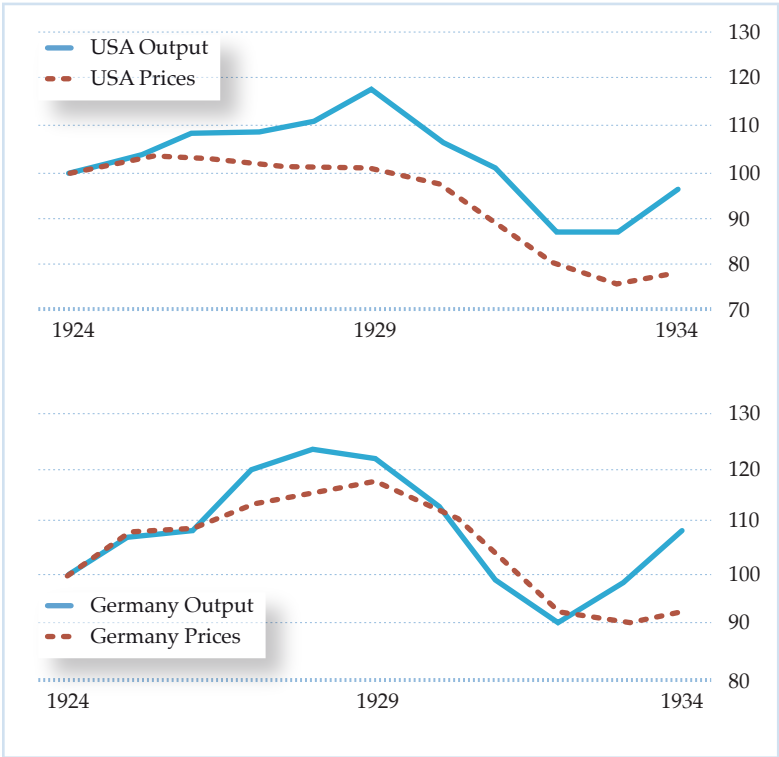
Finally, Figure 8 shows atypical evolutions of output and prices in the Netherlands and in Portugal. The Netherlands had an

extreme drop in prices, unseen even in the United States. Its price level dropped 47 percent between 1924 and 1934. If we narrow our attention to the period 1929–1933, prices in the Netherlands dropped by 28 percent, a quicker pace than in the US (24 percent). However, output decreased only by 6 percent, while in the US output decreased by 27 percent over the same period. This starkly different situation with a similar drop in prices suggests that the rate of deflation alone cannot account for the depth of the depression. The second atypical case is Portugal, which defies the pattern seen in other countries. Portugal had repeated sharp recessions in the 1920s, but its economy started a rapid growth phase in 1931 while prices continued to fall.

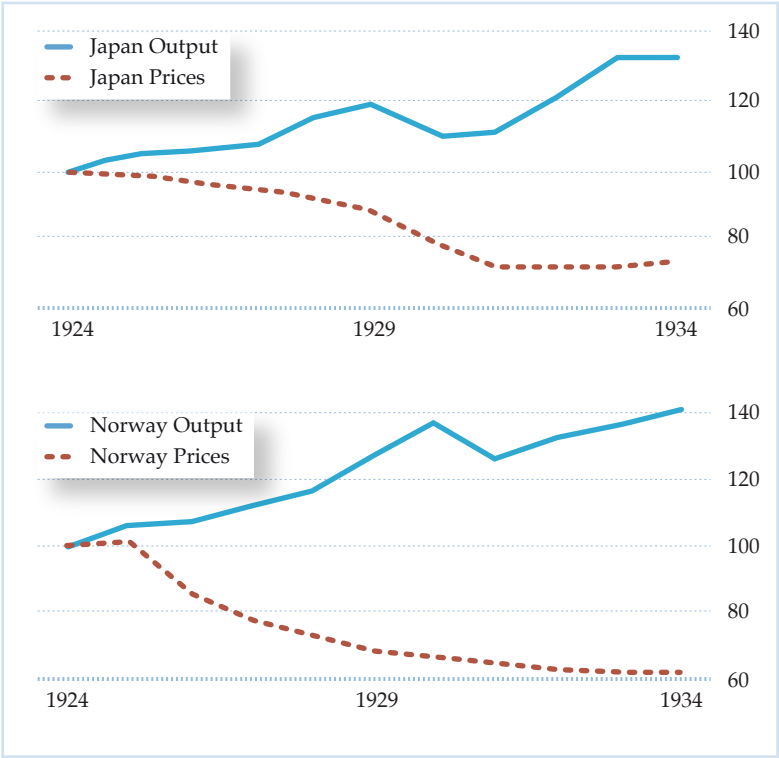
It is outside the scope of this text to analyze the situation in each country and find out why the evolution of output differed so much across countries. The point here is only to highlight the empirical differences—i.e., that the Great Depression was not a homogeneous event from the perspective of prices and output. One thing can be said for sure: although the early 1930s' recession appeared in almost all countries, deflationary years on the whole were not at all a synonym for recession. Nevertheless, it seems that the sharp concurrent drop in output and prices in the US lead to a certain bias in American academic research which started to take the deflation-depression logic as given.



Figure 5: Great Depression and before (1924 = 100): Deep and long contractions



**Figure 6: Great Depression and before (1924 = 100): One-year sharp contractions**



**Figure 7: Great Depression and before (1924 = 100):  
Moderate contractions**

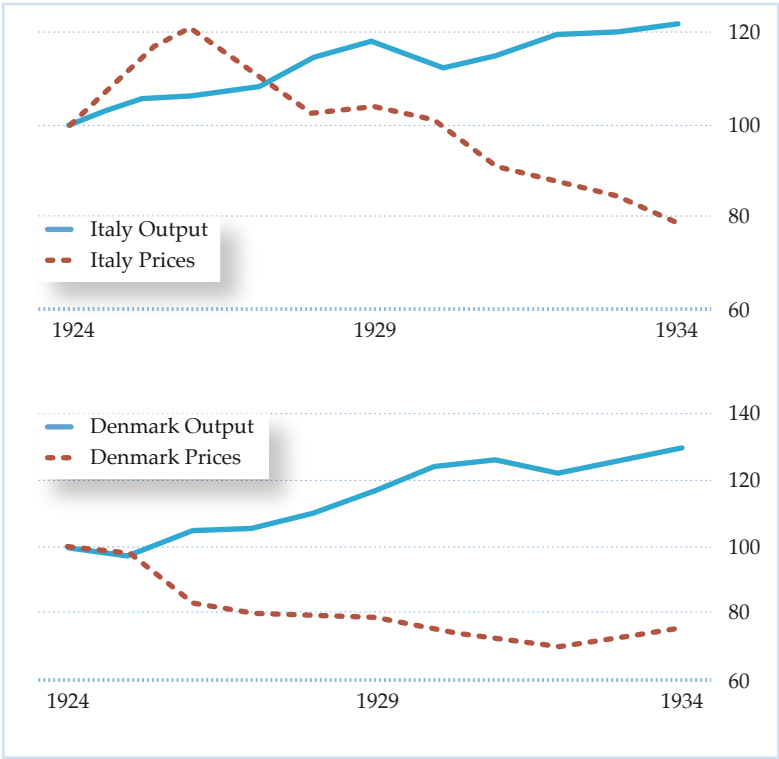
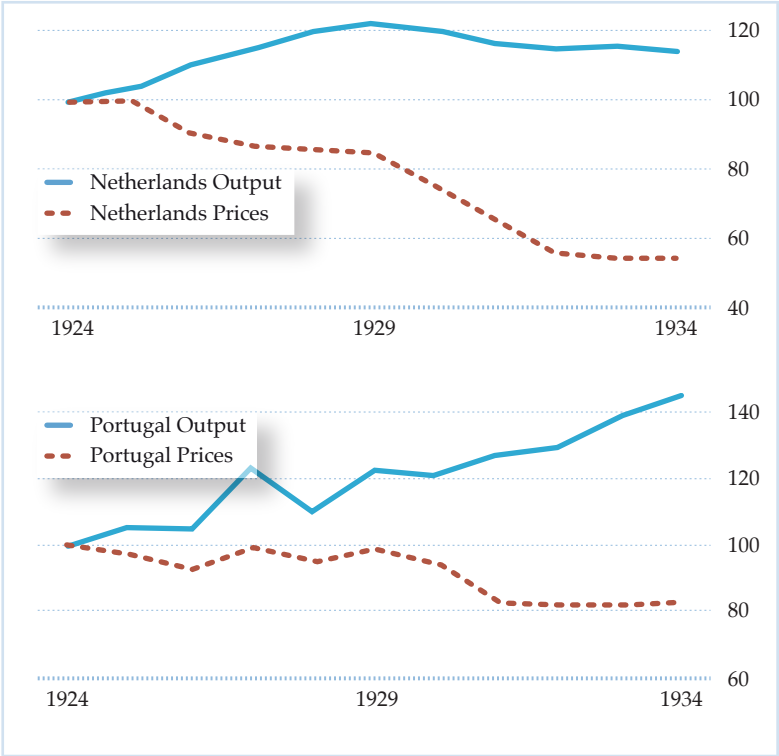


Figure 8: Great Depression and before (1924 = 100): Atypical cases



Contemporary Japan

The relatively poor growth performance of Japan that started roughly in 1992 and still continues has made it an alleged symbol of the harmfulness of deflation. Haruhiko Kuroda, the governor of the Bank of Japan, recently also blamed almost all of Japan’s difficulties on price deflation (Kuroda, 2016).

The fact that we are now dealing with only one country over roughly 2 decades leads to a low number of data points and unfortunately limits the possibilities of the above econometric analysis. However, we can make several interesting observations just by going through the data at hand.

First, it is remarkable that most of Japan's deflation occurred not during recessions, but during the longest of modern Japan's growth periods in 2000–2007 (see Figure 9, part (a)). At this point, we can well describe the crux of the disagreement over Japan among economists. On the one hand, it is argued that lower inflation rates in the 1990s were associated with lower output growth as compared to previous decades. While this observation is correct, it is also true that since the 1990s, deflationary years have been accompanied almost exclusively by growth, not recession (see again Figure 9). As a result, it was rather the years with inflation that contributed more to the environment of notoriously slow growth and recession than the years with deflation. Furthermore, Atkeson and Kehoe (2004) point out that the growth rate of GDP in Japan had already been decelerating decade after decade, long before deflation first appeared. Therefore, regardless of which theory of growth or business cycle one sides with, the slowing growth after 1992 was a continuation of a trend that had already been present. It did not come with deflation. The comparison of the price level and the unemployment rate in part (b) of Figure 9 is even more striking. In 1990–2015, the unemployment rate dropped more often after a decrease in prices rather than after an increase in prices.<sup>17</sup>

Second, since 1992 (when growth decelerated sharply) prices in Japan have shown either very mild inflation or very mild deflation, with the inflation rate always in the (–2%, 2%) interval except for one year. Overall, the price level grew a cumulative 9.6 percent between 1990 and 2015 (see Figure 9). As such, Japan's mild deflation episodes are incomparable with the deep deflation during the Great Depression or with the frequent and sizeable deflation during the classical gold standard. Therefore, from a theoretical point of view, to automatically apply the experience of the Great Depression to modern Japan, which is for example the approach of Krugman (1998), is a stretch. As shown in the previous section, the Great Depression indeed saw a statistical link between deflation and recession, but the pace of price decreases was much quicker.

Third, the mild deflation that has repeatedly occurred in Japan is asking for particular theoretical questions. Given that the Japanese encountered deflation mostly between –1% and 0% (only

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<sup>17</sup> Data on unemployment are from the OECD (2016).

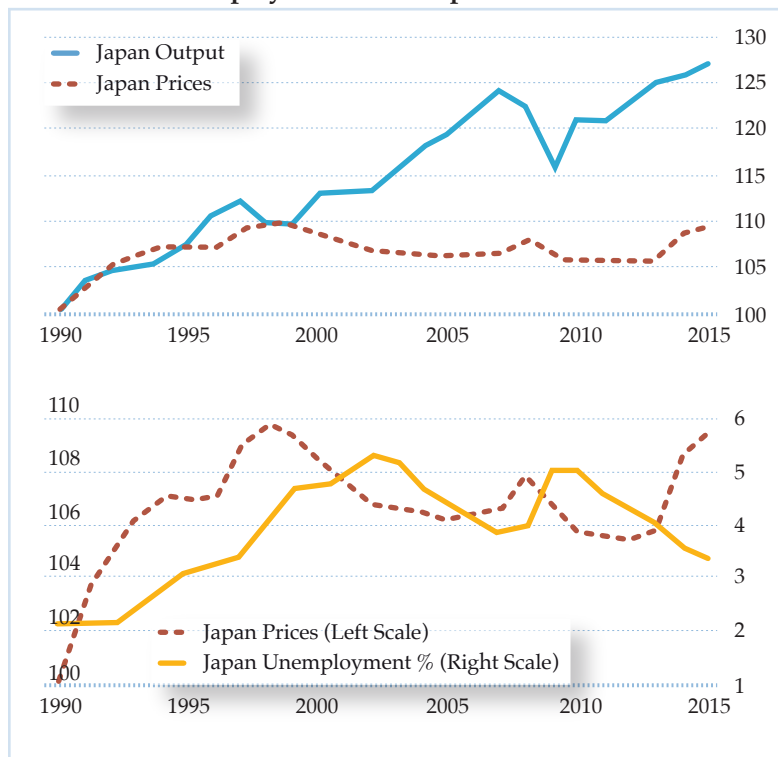
the crisis year 2009 had deflation deeper than  $-1$  percent), could this have tangible economic consequences? For example, if one theory presented in Section 2.1 states that deflation induces people to postpone consumption, it is hardly plausible that consumers would wait one year with their purchase in order to save, say, 0.5 percent of the price. In other words, personal discount rates would have to be virtually zero in order to make this mechanism work. By the same token, if the Japanese economy was in a liquidity trap, deflation would only cause a 0.5 percentage point difference between nominal and real interest rates. With nominal rates permanently low in Japan, deflation would therefore hardly contribute to a level of real interest rates that discourages investment. Finally, the debt-deflation theory rests on the assumption that debtors are caught by surprise by a sudden appearance of deflation when they cannot change their nominally specified contracts. But it seems unlikely that contracts in Japan would not be adjusted to this possibility after, say, 10 years of recurring deflation. While this mechanism could have theoretically played a role in the mid-1990s when deflation was a novelty, it is improbable that it has had an effect in the past decade.

All in all, while the theories which assert that deflation is harmful could perhaps be applicable to the depth of deflation seen in the Great Depression period, they seem very hard to apply to the modern Japanese experience. This is also confirmed by the full sample for all countries and all years: observations with inflation rate in the interval  $(-2\%, 2\%)$ —which Japan had all the time between 1992 and 2015 except for one year—have an average output growth of 2.8 percent per year in the entire dataset. This suggests that the rate of inflation common in Japan is in no way generally associated with subpar growth. The reasons for slow growth must lie elsewhere.<sup>18</sup>

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<sup>18</sup> See Hayashi and Prescott (2002) and Johnson (2005) for non-mainstream views on Japan.

**Figure 9: Contemporary Japan (1990 = 100): (a) Output and prices, (b) Unemployment rate and prices**



## 5. CONCLUSION

The empirical approach employed in this paper leads, in my view, to three major results. First, there is no general relationship between output and prices. The coefficient estimates are generally very small, be it in the whole sample or in the subsamples for the classical gold standard and after it. Second, the Great Depression stands out as the only episode in the sample with both a statistically significant and economically important (positive) relationship between output and prices. When one leaves out the Great Depression, which represents only 90 out of 2158 observations used in the regressions, correlations between inflation and output

growth in the rest of the sample lose their significance entirely. Third, Japan's economy in the 1990s and 2000s shows no evidence that poor economic growth was associated with deflation. The very moderate pace of price decreases also looks difficult to reconcile theoretically with the popular notion that deflation has had a profound effect on Japan's economic growth.

Overall, there is very little empirical evidence in favor of theories that assert that deflation is decidedly harmful. Rather it seems that such theories rest on very strict assumptions, which have been satisfied only rarely. The Great Depression, in which some of these theories might have worked, does not generalize to other episodes, including today's Japan.

Nonetheless, empirical research on deflation remains in a preliminary stage and much scope is available for advancement. On the data-related side, finding more control variables which would have enough historical readings remains one of the goals. Inspection of the modern Japanese experience with more frequent data, perhaps quarterly, is another. But completely different ways of assessing the effect of deflation on growth are also possible. Besides simply looking at the relationship between prices and output, one could analyze the particular theories (or transmission channels) of how deflation may affect growth. Those theories presented in Section 2.1, like the Mundell-Tobin effect or the debt-deflation theory, can be used to construct testable hypotheses on investment, indebtedness, and other variables. In the field of consumption and inflation expectations, some work has already been done. Another way forward would be to inspect the behavior of sectors of the economy that today exhibit deflation. That would provide modern-day data on deflation that are otherwise difficult to find in macroeconomic aggregates. These could be promising ways how to learn more about the empirics of deflation and output. So far, however, empirical research has not found much support for the popular notion that deflation is harmful for economic growth.

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## THE NON-PRICE EFFECTS OF MONETARY INFLATION

ARKADIUSZ SIEROŃ

**ABSTRACT:** The aim of this paper is to examine the non-price effects of monetary inflation. An increase in the money supply may lead to price inflation, but it may also affect the non-price parameters of goods and services, such as quality or the quantity enclosed in packaging. Based on our analysis, we claim that an expansionary monetary policy may cause a decline in quality (quantity) of produced goods and services if the rise in costs prompts the entrepreneurs not to increase nominal prices of their product but to decrease their product's quality (quantity), increasing its effective price—price adjusted for quality (quantity). In this way, the increase in money supply may have, *ceteris paribus*, a negative impact on innovativeness of entrepreneurs who, instead of improving the quality of products they offer, may in fact take the opposite action in order to avoid evident nominal price increases of their products.

**KEYWORDS:** monetary inflation, non-price parameters of goods and services, non-price effects of monetary inflation, pricing strategy, product quality

**JEL CLASSIFICATION:** B53, D40, E31, E51, L11

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## 1. INTRODUCTION

The influence of monetary inflation<sup>1</sup> on price changes has been subject to many research studies (e.g., Cantillon, 1959 [1755]; Mises, 1953 [1912]; Hayek 2008 [1935], Friedman and Schwartz, 1963). However, less attention has been paid to the analysis of the relation between monetary inflation and the changes in remaining parameters of goods and services, such as quantity (actual volume enclosed in packaging), quality, or the type and the date of delivery, etc.<sup>2</sup> There is plentiful anecdotal evidence on quality or quantity adjustments (e.g., Martin, 2008), but the academic literature on the subject is modest.

Armstrong and Chen (2009) argued that producers may use non-price (rather than price) adjustment mechanisms, if they have more information than consumers about goods' attributes, while Snir and Levy (2011) found that producers are more likely to decrease quantities than increase nominal prices when consumers are more price attentive than quantity attentive, especially in periods of high inflation and in markets where producers face strong competition.

Imai and Watanabe (2013) examined the extent to which product downsizing occurred in Japan in 2000–2010. They found that one pricing strategy adopted among firms reluctant to raise nominal prices was to reduce the size or the weight of a product while leaving the nominal price practically unchanged, thereby raising the effective price. Importantly, the number of product downsizings has been particularly high since 2007, when firms faced substantial cost increases due to the rise in the price of oil and other imported raw materials.

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<sup>1</sup> Originally the term "inflation" stood for increase of the money supply, though nowadays this term is identified with the effects of this phenomenon: the increase of prices. Therefore, the term "monetary inflation" is used in this work and it stands for increase of money supply. "Price inflation" stands for increase of prices (Mises, 1998 [1949], pp. 419–421).

<sup>2</sup> There is a question whether goods of different quality are still the same goods. Therefore, economists investigate the impact of monetary inflation on prices taking into account the *ceteris paribus* clause. However, we believe that focus on the factors economists usually abstract from can be helpful in better understanding the inflationary process and the behavior of entrepreneurs confronted with monetary inflation.

Cakir, Balagtas, and Okrent (2013) analyzed the effects of package downsizing in the United States on household food-at-home consumption and expenditure in 2004–2010, while Cakir and Balagtas (2012) examined package downsizing in the Chicago ice cream market. Both studies found that producers use downsizing to implicitly increase prices in order to pass through increases in production costs.

These mainstream articles, although interesting, do not mention explicitly the link between monetary inflation and the changes in the non-price parameters of goods and services. They also tend to focus only on the package downsizing, omitting the changes in product quality.

Although Austrian economists analyze thoroughly the harmful consequences of rising money supply under the fiat monetary system and fractional-reserve banking, they are not interested in the problem of non-price effects of monetary inflation either. The only two exceptions known to us are Rothbard (2005) and Hülsmann (2008). The former (Rothbard, 2005, p. 53) assumed that consumers are more price sensitive than quality sensitive and wrote:

The general atmosphere of a “sellers’ market” will lead to a decline in the quality of goods and of service to consumers, since consumers often resist price increases less when they occur in the form of downgrading of quality.

The latter (Hülsmann, 2008, pp. 187–88) was a bit less laconic:

Then there is the fact that perennial inflation tends to deteriorate product quality. Every seller knows that it is difficult to sell the same physical product at higher prices than in previous years. But increasing money prices are unavoidable when the money supply is subject to relentless growth. So what do sellers do? In many cases the rescue comes through technological innovation, which allows a cheaper production of the product, thus neutralizing or even overcompensating the counter-vailing influence of inflation. This is for example the case with personal computers and other products made with large inputs of information technology. But in other industries, technological progress plays a much smaller role. Here the sellers confront the above-mentioned problem. They then fabricate an inferior product and sell it under the same name, along with the euphemisms that have become customary in commercial marketing. For example, they might offer their customers “light” coffee and “non-spicy” vegetables—which translates into thin coffee and

vegetables that have lost any trace of flavor. Similar product deterioration can be observed in the construction business. Countries plagued by perennial inflation seem to have a greater share of houses and streets that are in constant need of repair than other countries.

However, neither Rothbard nor Hülsmann analyzed the above-mentioned problem in a systematic way, in contrast to our article. This limited interest in the literature is puzzling for three reasons. First, researchers have already shown that other goods' attributes can also change depending on market conditions. Price is one of several elements that matters for consumers. Actually, in many marketplaces, adjustments in non-price attributes of products may be more important than changes in price. Thus, entrepreneurs may also compete on service quality, product quality, size or weight of a product, methods of distribution, delivery time, and so on. The non-price competition is well established in the literature (Blinder et al., 1998). Carlton (1987) even claims that markets may clear in terms of other factors than price—for example, delivery lags (Carlton, 1983). Therefore, the assumption that entrepreneurs always increase nominal prices in response to monetary inflation and rises in costs is not true.

Second, the growth of consumer prices resulting from monetary inflation is not automatic and deterministic, but depends on autonomous decisions made by entrepreneurs who, dealing with higher expenses, may or may not raise the prices of their products. Austrian economists always criticized the deterministic approaches of mainstream economics, particularly the hydraulic interpretations of the quantity theory of money, which postulate that a given increase in the money supply would lead to a proportional and mechanistic rise in the general price level (e.g., Mises, 1998 [1949], pp. 398–416). Although they are aware that increases in the money supply do not need to be revealed in increases in the consumer price level (e.g., Shostak, 2002), Austrians hardly analyze the impact of monetary inflation on non-price parameters of products.

Third, historically, until the implementation and distribution of banknotes in use, monetary inflation occurred in fact as a coin debasement—that is, a reduction in the weight or a deterioration in the quality (fineness) of coins, without changing the nominal value (Hülsmann, 2008, pp. 89–91). Therefore, economists should be aware that increases in money supply may be reflected in

changes in non-price parameters of products, such as quality or weight (size).

The aim of this article is to fill the gap in the literature and thoroughly examine how the increases in money supply influence the non-price parameters of goods and services, especially how it affects the actual volume enclosed in packaging and the quality of the products. In other words, our goal is to draw a connection between monetary inflation and the non-price adjustments. Hence, we develop a theory of inflation and changes in the non-price parameters of goods and services. It turns out that neither are entrepreneurs greedy individuals who want to cheat consumers all the time, nor are downsizing and reduction in product quality always the optimal market outcome and beneficial for consumers. Our conjecture is that an expansionary monetary policy may, *ceteris paribus*, cause a decline in quality (quantity) of produced goods and services if the rise in costs prompts the entrepreneurs to not increase nominal prices of their products, but to decrease the products' quality (quantity), raising rather their effective prices—prices adjusted for the volume or quality. In this way, the increase in money supply may have a negative impact on innovativeness of entrepreneurs who, instead of improving the quality of products they offer, may in fact take the opposite action in order to avoid explicit nominal price increases of their products.

The remainder of the paper is organized as follows. Section 2 analyzes the link between monetary inflation and non-price changes of goods and services. Section 3 focuses on the downsizing, and section 4 on decreasing quality. Section 5 examines the indirect effects of monetary inflation on quality of goods. Section 6 concludes.

## 2. MONETARY INFLATION AND NON-PRICE CHANGES OF THE GOODS AND SERVICES

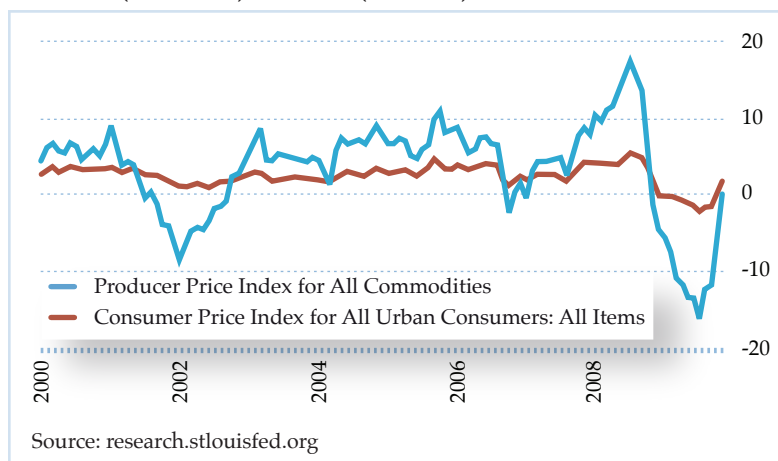
The starting point for our analysis is the Cantillon effect, a distributional effect and price effect resulting from the uneven increase in the money supply (Cantillon, 1959 [1755]). The new money is not evenly distributed in the economy but only runs through specific channels (Sieroń, 2015). This implies that only some entrepreneurs observe the increase in monetary demand for their products (or they observe it earlier than others). Other market actors will be



confronted with a relative increase in the price of the factors of production used by them in the production process. The increase will be particularly widespread if the new money entered the economy through credit expansion (Huerta de Soto, 2006), which would lower the interest rates and, as a consequence, increase the monetary demand for raw materials and producer goods.

The rise in commodity prices was particularly strong in the 2000s (Trostle et al., 2011), when the annual percentage changes in the producer price index (PPI) were usually bigger than changes in the consumer price index (CPI), as one can see in the chart below.<sup>3</sup> This chart shows that producers faced significantly rising costs at that time, which could prompt them to reduce either quality or quantity of products, without adjusting nominal prices. Hence, focusing on the CPI is not sufficient in order to understand the inflationary process taking place in the economy. It cannot be ruled out that the greater increases in the PPI in the 2000s could partially have resulted from the fact that producers of consumer goods changed either the quantity or the quality of their products (and these changes were not properly reflected in statistics).

**Figure 1: The percentage change from a year before in the PPI (blue line) and CPI (red line) in the 2000s**



<sup>3</sup> However, the percentage changes in the PPI were often smaller than changes in the CPI in other decades.

Entrepreneurs facing the increase in costs may raise their nominal prices. However, such a solution is not always an optimal one. If the demand for a good is elastic, then an increase in price causes a decrease in revenues.<sup>4</sup> Moreover, a few articles show that consumers are more sensitive to price than non-price changes due to lack of appropriate knowledge about non-price parameters or cognitive costs associated with processing information about both products' prices and non-price parameters (Gourville and Koehler, 2004; Snir and Levy, 2011).<sup>5</sup> Moreover, some consumers may be completely aware of an increase in an effective price (price per unit) but focus more on the nominal (absolute) price due to being short on cash.

What is more, sometimes entrepreneurs are not permitted to freely change prices. Price controls implemented by governments to keep inflation in check force them directly to change non-price attributes of products and, for example, reduce the quality or lengthen the delivery time during inflation (Carron and MacAvoy, 1981).<sup>6</sup> For these reasons, entrepreneurs are forced to adjust non-price parameters of products in order to sustain their level of profitability.<sup>7</sup>

There are many ways to deal with the rising costs. In certain sectors and at a certain point in a company's development, the technological process plays the most important role (Hülsmann, 2008, p. 187).<sup>8</sup> However, the role and the rate of technological progress vary from one sector to another (Castellacci, 2004). For that reason, some entrepreneurs, operating in industries when

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<sup>4</sup> It is worth mentioning that entrepreneurs always try to establish the price on the level maximizing profit, so any raising of price above the optimum value may lead to a decrease of revenue. Therefore it is not true that entrepreneurs can smoothly pass the rise in costs on to their consumers (Rothbard, 2009).

<sup>5</sup> On the other hand, Imai and Watanabe (2013) did not agree that consumers are sensitive to price changes but not to size/weight changes.

<sup>6</sup> Under the communist system, inflation was repressed. The increase in money supply led to shortages and non-price rationing—for example, in terms in time spent in lines (Kolodko and McMahon, 1987).

<sup>7</sup> A similar example may be a minimum wage. The increase in the minimum wage may prompt employers to reduce fringe benefits or worsen the working conditions (Wessels, 1987).

<sup>8</sup> Please note that these efforts to deal with monetary inflation decrease the officially reported consumer inflation rate due to hedonic adjustments.

the technological progress plays a much smaller role, may try to implement one of the two following major strategies (or both of them at the same time):

- a) curtailing the amount of product, but keeping the nominal price unchanged (i.e., downsizing); or
- b) reducing costs through offering products of inferior quality.<sup>9</sup>

Surely, entrepreneurs may also adopt other solutions in response to monetary inflation and a surge in costs. However, we focus on the above-mentioned strategies because quantity and quality are the most important (and most general) non-price parameters of products. In particular, entrepreneurs can also increase the costs of shipping, reduce customer service, or move production to cheaper locations. They can also lower product variety because an increase in costs resulting from monetary inflation may reduce their companies' profitability, which may lead to a narrowing of product range only to those products with the highest margin (instead of hiking prices). This is important because the literature shows that product variety enhances customers' welfare (Dong, 2010).<sup>10</sup>

### 3. DOWNSIZING

Downsizing means decreasing the quantity of a product sold at the same nominal price. It seems to be a relatively new strategy, and can be either illegal or legal. The illegal one consists in placing less of the product in the packaging than was mentioned on the label, while the legal one consists in explicitly reducing the net content,<sup>11</sup> often

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<sup>9</sup> The difference between them is often very subtle as producers may use cheaper substitutes reducing quality and, for example, add water to foodstuffs in order to reduce the quantity of the primary nutrient used in the production of given goods. It seems however that it is worth distinguishing between these two methods, as the first one does not influence the quality of the products per se.

<sup>10</sup> It is worth noting that non-price changes of a product may cause the relative underestimation of the CPI. We write about "relative" underestimation because it is difficult to determine whether there is absolutely positive or negative measurement bias in the CPI (Rossiter, 2005). However, goods substitution in the basket does not cover the loss of usability resulting from replacing more expensive goods of high quality by cheaper ones with lower quality. On the contrary, economists generally believe that substitution bias overstates the CPI.

<sup>11</sup> The number of items or units in the packaging may also decrease, which is not easy to identify—for example, in the case of toilet paper sheets.

in a way unnoticeable for consumers, however. Although sellers are obliged to present unit price as well—that is, price per unit of weight or per product unit—the studies show that consumers are far more sensitive to changes in nominal prices than to the quantitative changes even if they both lead to the same change in effective price (Gourville, Koehler, 2004; Snir and Levy, 2011).<sup>12</sup>

The nature of this phenomenon is complex. On the one hand, some argue that the above-mentioned actions show how greedy producers are and that the actions may be perceived as examples of fraud, or at least misleading packaging practices (Lawrynowicz, 2012). On the other hand, one can claim that producers almost always inform consumers about the actual quantity of the product in the packaging and indicate the unit price, whereas the consumers voluntarily make decisions on the purchase. It may also be true that some of the changes in the packaging may have an innovative character and may be an attempt to meet consumers' needs.<sup>13</sup>

However, it may be that downsizing is only an attempt to ensure profitability by companies facing rising costs and price-sensitive clients. This is not due to the entrepreneurs' greed, but due to inflationary monetary policy. Because of inflation, entrepreneurs devote their time, energy, and scarce resources to producing smaller packaging in an unobvious way instead of offering products in the most appropriate form of packaging from the consumers' point of view.

#### **4. REDUCTION OF QUALITY OF GOODS AND SERVICES ("CANTILLON DEFECT")**

Although the phenomenon of decrease in quality of some goods is a subject of research, nevertheless economists generally do not

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<sup>12</sup> Although this fact seems to prove that consumers do not always act rationally, it is worth mentioning that comparing both prices and quantity of different products involves additional costs in the form of time and effort (Snir and Levy, 2011). It should also be noted that unit prices are not always given, and even if they are, they are usually written with small characters. Therefore, consumers comparing only nominal prices can be considered rationally ignorant.

<sup>13</sup> For example, beverages sold in tiny cans are often far more convenient though much more expensive in comparison with bigger containers when adjusted for per-unit volume.

relate it to inflation policy. In this paper, we consider the reducing of quality of goods and services while keeping the same nominal price as a second non-price strategy for enterprises to adjust to monetary inflation and an increase in price of the means of production.

Reducing quality while keeping a stable nominal price, just like decreasing the quantity of the product, may turn out to be an attractive strategy aiming at increasing the effective price of goods or services as it is a parameter substantially harder to measure than price.

Two basic ways of lowering the quality are as follows: reducing durability or modifying components.<sup>14</sup> Reducing durability of the products can be achieved mainly through the use of cheaper components of lower quality. It was recognized in the literature long ago (Swan, 1972; Gregory, 1947; Goering, 1993), but it seems this phenomenon, at least in general perception, has taken on more significance in the last several years.

The modification of components has a particular meaning in the case of non-durables, especially food. Contrary to durables, modifying components of given foodstuffs may rely on extending their durability to the detriment of nutritional values. This phenomenon is based on decreasing the content of the primary component in the product in the face of rising prices of raw materials. It may occur through replacing it with cheaper substitutes<sup>15</sup> (including diluting it with water), using raw materials of lower quality, or adding chemical substances (and applying production methods) that make the product more tasty or durable but harm health.<sup>16</sup>

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<sup>14</sup> Deterioration of durability may be the result of modifying components used to produce given goods. However, not every modification of components reduces durability, which is why these methods shall be discussed separately.

<sup>15</sup> An example of this problem is the European horse-meat affair, as the horse meat used for bovine hamburgers was cheaper (Wikipedia, 2013).

<sup>16</sup> One research area of particular interest is the coexistence of unprecedented monetary inflation since the 1970s (as a result of President Nixon's definitive break from the gold standard in 1971) and the development of the world obesity epidemic, which in OECD countries dates to the 1980s (OECD, 2010; NIDDK, 2012). There are some indications that low-quality components used for production of foodstuffs, which may partly result from cheaper methods of production adopted by entrepreneurs in the inflationary environment, cause increase of obesity

It is very difficult to evaluate the strategy of reducing the quality of products while keeping the same nominal price. Some will try to find reason for this in entrepreneurs' willingness to increase sales and profits by all means, though some will defend this phenomenon and claim that clients purchase these products voluntarily. However, it should be noted that the voluntary nature of a transaction does not preclude that consumers' utility could be higher if they were offered goods and services of better quality. Public monopoly is an example of such a situation. Clients purchase products voluntarily from the public monopoly, but their situation would be better if there were more competitors on the market.

Analyzing this phenomenon is difficult also because decreasing the quality of goods may result from many reasons, not only from expansionary monetary policy. First, it may result from monopolization of the market (Bulow, 1986). Second, government regulation<sup>17</sup> may influence the quality of the products. Third, the literature on the subject points to asymmetric information (Grout and Park, 2005). Finally, decreasing quality may correspond with real consumer needs. Market actors may prefer less durable goods because of lower prices, changing trends in fashion, or rapid pace of technological developments.<sup>18</sup> It can therefore be reasonably concluded that though some goods were once of the higher quality, only the wealthiest people could afford them. Nowadays, thanks to lower prices, but lower quality as well, these goods are available for a wider range of consumers. From this view point,

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(Schoonover and Muller, 2006). Wiggins and Keats (2015) found that in high-income countries over the last thirty years, the cost of healthy items in the diet has risen more than that of less healthy options, thereby encouraging unhealthy diets. The reason may be that it is more difficult to cut costs associated with production of fruits and vegetables than with production of processed foods.

<sup>17</sup> We refer in particular to price regulations, which often apply to the so-called public utility companies. Changes in the quality of services offered by public utilities due to the monetary inflation may have particular significance (Troxel, 1949). Carron and MacAvoy (1981) researched the quality of services of public utilities in the United States in the 1970s. As regulators did not give their consent to increasing prices, the quality of services and the volume of investment expenditure decreased, while delays in delivery appeared.

<sup>18</sup> It should also be noted that "quality" is a wider notion than "durability." Some goods may be characterized by shorter durability, but, for example, extra convenience and functionality.

decreasing quality allows most consumers to purchase desired goods at low price. Simultaneously, there are goods of high quality on the market offered for more demanding and richer consumers.

It is notable, however, that consumers, *ceteris paribus*, prefer more durable goods as they “render more total service” (Rothbard, 2009, p. 16). As Reisman (1990, pp. 214–216) proved, if higher costs of producing more durable goods on the free market are less than proportionate to the product’s longer life, entrepreneurs have incentives to produce more durable products. Thus, it seems that the decreasing quality—including durability—of some goods and services may result from different government interventions, including monetary inflation, that impose higher costs on companies. Monetary inflation decreases innovation of companies, which may choose methods of production not necessarily the most innovative and favorable for consumers but that guarantee the highest rate of return in an inflationary environment.<sup>19</sup>

Hence, we call the decline in quality due to monetary inflation “Cantillon defects,” as it occurs because the new money supply does not distribute itself evenly through the economy, but runs only through specific channels. Therefore, if new money enters the economy through the capital-goods and commodity sectors, entrepreneurs producing consumer goods may face rising costs that could prompt them to adjust non-price parameters of products they sell.

## 5. INDIRECT EFFECTS OF MONETARY INFLATION ON QUALITY OF GOODS AND SERVICES

It is worth pointing out that reduction of the quality of goods and services offered does not have to follow directly the increase of costs of production and be the direct aim of entrepreneurs. The reduction may be only relative and occur with a delay as a

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<sup>19</sup> We can argue that inflation, in a sense, forces innovation by producers in cutting costs and investments that allow them to reduce the use of raw materials whose prices increase. However, it should be noted that such an allocation of resources does not have to coincide with a counterfactual free market allocation of resources. Therefore, we can state that though the inflation may, in a sense, cause innovative behavior, it would be innovation going in the wrong direction in comparison to the one that would have occurred in a reality deprived of monetary inflation.

result of restricting investment expenditures, including spending on research and development, in the face of inflation (Able, 1980). Moreover, monetary inflation reduces the supply of savings and increases uncertainty, negatively affecting the volume of investments (Horwitz, 2003, p. 78).

The reduction of the quality of goods and services may also result from other indirect effects of monetary inflation. First, monetary inflation decreases the real value of borrowings and thus discourages saving and prompts debtors, including consumers, to buy goods on credit. Consumers in such a situation, instead of saving for goods of higher quality, which would serve their functions for several years, may prefer to buy cheaper goods of shorter durability on credit.<sup>20</sup> In other words, “easy money” policy, which leads to higher prices and higher time preference, may prompt consumers to buy cheaper, less durable goods. Consumers in such economic conditions may prefer lower expenditures in the present day, even if over the years their decision will mean higher total costs for purchasing specific goods (because of their frequent replacement). It happens so because they pay less attention to the future. Such an attitude may be supported through the possibility of buying new products thanks to reduced-interest loans. In this context, it is worth pointing out that the relatively loose monetary policy run by the Federal Reserve System contributed to the development of consumer credit in the 1920s and after the Second World War (Eichengreen and Mitchener, 2003, pp. 36–42; Huerta de Soto, 2006, pp. 487–493).

Second, monetary inflation leads to disturbances in a correctly functioning price mechanism (Horwitz, 2003). Increases in prices resulting from a higher money supply disrupt information conferred through prices, which can unbalance the structure of consumption and the allocation of production factors between goods of higher and lower quality. High price for consumers often stands for high quality (Leavitt, 1954). Therefore, consumers may interpret higher prices resulting from monetary inflation in an

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<sup>20</sup> Encouraging borrowing would be enhanced if monetary inflation took place through credit expansion, which lowers (*ceteris paribus*) interest rates. The credit expansion (especially if recurrent) does not only cause a market rate below the natural level resulting from time preference, but can also lead to an increase in time preference, which encourages consumption.



incorrect way as an indication of high quality. In fact, they may buy more expensive products of lower quality, which can negatively affect the profitability of companies producing goods of high quality and in this way reduce the supply of high-quality goods.

Third, an increase in prices along with lower variety and lower quality of products may stimulate individuals to self-production. What we can currently observe is the growing popularity of the movement called *do-it-yourself* (Wolf and McQuitty, 2011). Such a movement reduces innovation as it decreases the division of labor as well as efficiency of production.

## 6. CONCLUSIONS

In this article, we have challenged the common view that monetary inflation automatically leads to increases in prices of consumer products. Changes in prices are always a result of conscious actions of entrepreneurs who, in response to the rising prices of means of production—and according to the Cantillon effect, an increase in money supply does not affect all prices uniformly and simultaneously—may apply other strategies, consisting in decreasing the quantity of product or reducing its quality, keeping the nominal prices unchanged.

Thus, monetary inflation is a factor passed over in the literature that may be partially responsible for downsizing and decreasing quality of some products. From this perspective, the above-mentioned actions taken by entrepreneurs do not have to result from their ill will or inherent greed, but from their effort to remain in business in inflationary and competitive environment. Therefore, it seems that the Austrian theory of inflation should be extended to incorporate non-price effects of monetary inflation.

The non-price effects of increases in the money supply clearly show that the impact of monetary inflation on innovation is negative. Instead of promoting products of higher quality, entrepreneurs spend scarce resources to hide the increase in an effective price through changing packaging or reducing quality, which is detrimental to innovation. That impact does not have to be direct, but can result from cutting costs through limiting expenditures on investments.

This paper does not exhaust the subject, but it contributes to further research, perhaps of a quantitative nature. We believe that the presented considerations on non-price effects of monetary inflation have a solid foundation and contribute to the literature on inflation and business strategies adopted in an inflationary environment.

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## INTEREST AND THE LENGTH OF PRODUCTION: A REPLY

MATEUSZ MACHAJ

*ABSTRACT:* The article responds to the main points raised by Howden (2016) in his comment on Machaj (2015). Most of them appear not to argue against the model developed in my paper, but argue in favor of most likely scenarios to happen in empirical reality and therefore most probable events to be depicted in the model.

*KEYWORDS:* capital theory, interest, production structure, labor intensity

*JEL CLASSIFICATION:* B13, B53, D24, E43

I would like to thank Dr. David Howden for appreciating my article and attempting to criticize its extension of the Rothbardian framework of monetary approach to the production structure. Howden's polemical comments allow me to clarify my initial article on the issue. The response below generally acknowledges relevant points, as I believe most of the quibble comes from my unclearness of presenting the framework.

Before I move to specific points, let me briefly summarize what has been done in the first article. The Austrian tradition for a long

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time assumed that increased savings leading to lower interest rate increase length of production. In the recent years two important scholars illustrated that under equilibrium the production actually shrinks with lower interest rates (although increased savings are prolonging it). In my extension of Rothbard's framework—at the same time fully compatible with Fillieule (2007) and Hülsmann (2011)—it is shown that decreased interest rate cannot be tied in a monotonic manner to the length of production either way. When interest falls, the production can get shorter or longer, depending on the additional variable called intertemporal labor intensity (ILI). Each of the important Austrian contributions to capital theory, among others, e.g., Rothbard (2004), Hülsmann, Huerta de Soto (2006), Fillieule, Skousen (1990), Hayek (1931), assumes a specific height of this variable. The aim of my graphs was to show that depending on how big or small ILI is, a lower interest rate may lead to longer or shorter processes. Moreover, I also showed that putting a specific *ceteris paribus* clause on ILI variable is challenging and debatable either way. Additionally, I am not questioning the fact that interest rate falls because of a higher amount of savings.

My work is hardly anything new. Most of it stems from Rothbard's trapezoid and other Austrian approaches. I merely noticed that all those methods, or actually *examples*, simply differ in the spending pattern on labor (with originary factors) and capital goods. With that in mind I would like to address some of the key points raised by Howden.

1. *Does it matter for the length of production who saves the money?* (Howden 2015, p. 346)

In the extension of the Rothbardian framework I did not place an assumption—which would be very limiting—about the sources of increased savings. As Howden states, it simply does matter who saves the money invested in the productive structure, whether the savings is on the part of capitalists or workers. The confusion stems possibly from the fact that in the model it is assumed that workers are pure consumers, therefore *by assumption they cannot save*. Such an assumption is made for simplicity. Once any of the workers decides to save his income, he immediately becomes part of the capitalist-entrepreneur group. By assuming that under equilibrium workers (and original owners) spend all of their income I was merely following Rothbard and Böhm-Bawerk's tradition.

Yet if required, the assumption could be abolished without any problems for the model.

I am therefore in total agreement with Howden that total savings are important for the structure, and the exact composition is of secondary issue. I did not claim otherwise.

2. *Can total savings increase with total consumption staying at the same level?* (Howden 2015, p. 348)

Here is perhaps my biggest objection to Howden's statements, for he seems to be denying the possibility of increased total savings with no corresponding decrease in total consumption. The solution is fairly easy and has been demonstrated in Rothbard's framework too. The intertemporal circular flow, Rothbard's trapezoid, is built in such a way (as is any circular flow actually) that one person's spending is someone else's income. In equilibrium, capitalists' spending on consumption is their net income. All monetary surpluses that they earn are spent fully on consumption (such is the state of equilibrium). Now, assume that capitalists suddenly (*for whatever reason*<sup>1</sup>) decide to save all of that income and spend it fully on higher wages of workers.

Does their decision of decreased consumption change the amount of total savings? Absolutely, additional money is withheld from consumption and spent in the production structure for higher wages. Does this lead to a decrease in total consumption? Absolutely not, since wages are then in turn fully spent on consumption. To use a numerical example as simple as possible: assume that total profits of capitalists are equal to one million monetary units, and in equilibrium they are fully spent on consumption. If they decide to not consume and save all that income, total savings go up by one million dollars. The immediate effect would also be a decrease in consumption by one million dollars. But wait a minute—the money saved by capitalist is not hoarded in their cash balances; it is being invested in the productive structure. Assume now that all

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<sup>1</sup> Reasons could be multiple. One non-controversial example is: decreased time preference on the part of capitalists, so that they are ready to accept lower returns with the same waiting time and overall output. Lower time preference lowers the "D" (discounting) factor in DMVP, Discounted Marginal Value Product, so overall DMVP gets higher (with MVP being the same). In other words, wages are higher for doing exactly the same thing.



of that money goes for higher wages of workers, who then in turn spend it fully on consumption. Wages are higher by one million dollars, and so is consumption. Decreased consumption on the part of capitalists by one million dollars is balanced by increased consumption of workers by one million dollars. At the same time that total savings (productive expenditures) are higher, so is the wage fund. And the interest rate is also lower despite the same levels of total consumption in the economy.

Notice that I am not claiming that such scenario is likely. Naturally all of the additional savings by capitalists do not have to be spent on higher wages: it can be hoarded (something which I did not analyze, because like Rothbard I assume a form of monetary equilibrium), or spent on capital goods or both capital goods and labor (something I do analyze in the paper briefly discussing possible scenarios and their likelihood).

3. *Is there no causal explanation of why the interest rate falls?* (Howden 2015, p. 350)

Despite the limited scope of the paper, my answer to the question would be very simple, as it poses no great challenge. The interest rate falls, because capitalists decide to save more of their income and invest it in the structure of production. I did not deny that interest rate depends crucially on savings decisions. It does. What was questioned was the idea that particular movements in the interest rates (up or down) because of changes in savings have to always be transferred in a monotonic manner into necessary longer (Rothbard, Huerta de Soto etc.) or shorter production structure (Fillieule, Hülsmann). Both of the sides seem to have missed the importance of intertemporal labor intensity.

Henceforth the interest rate falls, because capitalists decide to save more. Something what Howden believes, and I am in complete agreement with him on this.

4. *Is there no explanation of why the intertemporal labor intensity shifts occur?* (Howden 2015, p. 353)

I have not studied extensively how shifts in labor spending occur in the production structure just as the economist drawing demand-supply schedules does not have to fully and extensively discuss causes for the curve-shifts. Nevertheless, in the last section of the article I have claimed that it is an empirical question. I also

suggested that with increased production of capital goods, relatively more labor is to be hired in the later stages of production in the service sector.

The shifts in spending occur, because they are done by capitalist-entrepreneurs *for some reason*. They believe they have found increased value, wrong factor prices which do not reflect discounted output value. Such a belief in profit opportunity leads to changes in the spending pattern. Theoretically shifts can happen either way, although historical experience suggests to us that allocation of labor would dominate in favor of the later stages of production.

In the later part of his comment Howden is approaching more general problems, which are addressed towards the much broader issue of *how exactly* one should measure the “length” of production. I believe it to be something discussed outside of the simple model I presented in my initial paper. I am open to further advancements, since the exact empirical dimension for “length” has been haunting the Austrians since Böhm-Bawerk. My aim there was to extend the existing Austrian framework wonderfully constructed by Rothbard.

There the explanation for changing of the spending pattern is also not difficult: it is a conscious decision on part of the entrepreneurs/capitalists. I fully follow Rothbard in that line.

#### *Additional thoughts*

I would also like to refer to the side issue—which does not concern the major aspect of the model—about Howden’s suggestion that higher wages are to be paid out only when the “capital stock” is increased (Howden, 2015, p. 354). If he means some amount of capital goods, then the statement is true under three very crucial assumptions (putting aside the quite important Lachmannian dimension problem of measuring capital stock!): fixed knowledge, some form of homogeneity of labor, and fixed time preferences. With such limiting assumptions, bidding for higher wages would happen only with more capital stock. But are we not going too far? After all, time preference may change, the discounting factor may fall, so that DMP gets higher—that is the whole point of Rothbard’s trapezoid (see footnote 2). Even without an increased “capital stock,” more savings may simply lower interest rates, because capital owners are ready to accept a lower reward for Rothbardian waiting in the trapezoid.

As I also argued in my paper, we do not have to limit Rothbard's important contribution with such features. We can easily abolish both of the first two assumptions. First of all, additional knowledge—leading, for example, to better management or to technological advancement—can favor increased wages even without an increased stock of capital goods (a case always tied to the real-world capitalist processes<sup>2</sup>). Second of all, and perhaps a derivate of the former, the same worker does not have to have the same marginal productivity in each sector, or each stage. Even without investing in “human capital” and training the worker, the entrepreneur may simply discover higher potential for the specific factor of production elsewhere. Again, even without increased capital stock. Of course we can introduce the third assumption under equilibrium: that it has to be the best of all possible worlds. But then we limit the framework further and also completely disarm ourselves to discuss the process of change, since no change would be initiated in the best possible world. It is also important to keep in mind that wages in Rothbard's trapezoid are nominal, not real.

At the end of the article, Howden attempts to move deeper into the capital issues by trying to address the concept of “capital intensity.” In general he seems to believe that the whole concept of “length” of production should be treated with caution, and perhaps even abolished in favor of his examples of capital intensiveness. I have no problem with the arguments and I believe this to be a promising future research possibility, which in no way contradicts my sketching of the Rothbardian trapezoid (apart from the fact that calling higher capital intensity as “lengthening” may be stretching the meaning of the word). If any of his suggestions stand in the way of my graphs, then he is in reality addressing the Rothbardian framework in general, not my broader presentation of it, as I only provided supplementary examples of how additional savings may alter the structure. Actually, anyone can experience the same thing by simply trying to invent their own trapezoids with unique numerical examples, and not just repeating the already existing ones. The simple pedagogy of the Rothbardian framework is actually very illuminating.

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<sup>2</sup> Economic history of the West clearly shows that increases in wages and overall output greatly surpass increases in the capital stock.

Howden could argue that the structure empirically can only move the way described in *Man, Economy, and State*. This is something I believe is hard to do, though not impossible. Yet even under such a strict generalization the illustration from my article would serve some purpose: to show that something is impossible, or hardly possible. This is a notion I am not denying, but actually softly arguing for as empirically labor is being reallocated into the service sector. Hence, in the end, Rothbard is generally focusing on empirically relevant cases in which a lower interest rate (caused no doubt by increased savings) does lead to longer processes after all. My argument, however, is that this movement is not the result of lowered interest, but of building more of the capital structure supplemented by reallocation of labor into later stages of production (a decrease in the intertemporal labor intensity). In other words, it appears that somewhat contrary to Filleiule (2007) and Hülsmann (2011), Rothbard was right, but for the wrong reasons.

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## VALUE INVESTING'S COMPATIBILITY WITH AUSTRIAN ECONOMICS—TRUTH OR MYTH? A REJOINDER

CHRIS LEITHNER

**ABSTRACT:** In four ways, say Rapp, Olbrich and Venitz (2017), “the seeming compatibility between value investing and Austrian economics must be characterized as a myth.” I disagree. The authors’ major contention—namely that “value investing’s definition of value is fundamentally at odds with the Austrian value concept”—is demonstrably false. Using fundamental sources, none of which Rapp, Olbrich and Venitz cite, it is easy to draw a direct intellectual line from the “marginal revolution”—in which Carl Menger figured prominently—to the founder and today’s most prominent practitioner of value investing. It is quite possible that Warren Buffett has never heard of Menger or the Austrian School. Yet Buffett’s actions as an investor, like Benjamin Graham’s, demonstrate the diametric opposite of what Rapp, Olbrich and Venitz claim. It is not a myth, it is a fact: value investors’ conception and assessment of value are congruent with the Austrian School’s.

**KEYWORDS:** Austrian School, Warren Buffett, Benjamin Graham, value, value investing

**JEL CLASSIFICATION:** B12, B13, G11, G12

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## A MISSTATEMENT AND CRITICAL OMISSION

In three respects, say Rapp, Olbrich and Venitz, value investors and the economists of the Austrian School share “some basic findings.” Yet in four ways “value investing also contradicts some fundamentals of Austrian economics.” For these four reasons, “the seeming compatibility between value investing and Austrian economics must be characterized as a myth.” I disagree. Indeed, what I regard as the authors’ major contention—namely that “value investing’s definition of value is fundamentally at odds with the Austrian value concept”—is demonstrably false.<sup>1</sup>

At the heart of the authors’ description of value investing is a misstatement and an omission. “In essence,” they say, “value investors compare an asset’s intrinsic value to its market price and recommend investing in the asset as long as the value exceeds the price; ... Therefore, the concept of ... intrinsic value is key to the value investing strategy.” This statement accurately describes many value investors’ (sloppy) description of what they do; alas, it misstates what they actually do. Further, another “key to the value investing strategy” is the concrete method by which the investor *measures* a given security’s value—yet the authors say little concrete about any such method. Without a valid and reliable measurement, the investor cannot compare value to price and thus cannot make any investment decisions. Perhaps the authors do not address this misstatement and omission because if they did then they would undermine their key contention.

By my experience of more than 20 years, the typical professional value investor (i.e., the Chief Investment Officer of an investment company, managed fund, etc., who calls himself a

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<sup>1</sup> Because I regard them as subsidiary, in what follows I will ignore the authors’ other three points of alleged incompatibility. But it is worth emphasizing something that the authors overlook: economists of the Austrian School are scholars and value investors are practitioners; as a result, it is hardly surprising that the former use language more carefully and precisely than the latter. Yes, scholars distinguish between appraisal and valuation; certainly value investors disregard this distinction. It is also true that value investors’ use of terms like “irrationality” and “intrinsic value” is, to put it mildly, careless and imprecise. But do concatenated thinking and unscholarly use of language *really* render value investing incompatible with the Austrian School? Simple common sense counsels us to doubt it.

“value investor”) measures value by one of two methods: first, he values a company according to the external prices of its assets. He observes, for example, that X Ltd. owns quantity Y of land, and that such land has a market price of \$Z per hectare. Second, the value investor makes plausible (based, perhaps, upon past experience) assumptions about a company’s future cash flows and, using some rate, discounts them to the present. He might do these calculations in his head (as Warren Buffett reportedly does) rather than on a spreadsheet as I do; the point is that he does them.

## THE FOUNDATION OF THE CONGRUENCE BETWEEN THE AUSTRIAN SCHOOL AND VALUE INVESTORS

Marginalism—to which Rapp, Olbrich and Venitz refer only obliquely—is a basis of mainstream economics and finance; it is also a logical deduction from first principles of praxeology. It explains the values of goods and services by reference to their marginal utility. A diamond’s value, for example, typically exceeds that of a given quantity of water. Although water’s total utility is greater than a diamond’s (it is, after all, a necessary condition of life, whereas a diamond is not), a diamond’s marginal utility usually exceeds water’s. The “marginal revolution” has been commonly—that is, by today’s Keynesians, etc., as well as Austrians—attributed to W.S. Jevons, Carl Menger and Léon Walras. Eugen von Böhm-Bawerk, whom the article’s authors also disregard, extended and elaborated Menger’s conception of marginalism. He devised a theory of interest and profit—which the authors also overlook, but surely of signal relevance to investors—based upon the interaction of diminishing marginal utility with diminishing marginal productivity of time (and of time preference). Knut Wicksell adopted and developed Böhm-Bawerk’s ideas; so too, albeit with major modifications, did Irving Fisher.

Rapp, Olbrich and Venitz repeatedly use the term “neoclassical” in a vague—and in a critical respect incorrect—manner. During the late-19<sup>th</sup> and early-20<sup>th</sup> centuries, the economists who were later regarded as founders of the Austrian School were, as central actors in the “marginal revolution,” largely orthodox. Only later were they spurned as outsiders. *Accordingly, Austrians’ conception of value was (and in important respects remains) mainstream.* Both theoretical

economists and practical investors should recognize this point; alas, it is not clear that Rapp, Olbrich and Venitz do.

## THE HINGE BETWEEN THE THEORY OF VALUE AND THE PRACTICE OF VALUE INVESTING

John Burr Williams—whom the article’s authors overlook—wrote the first treatise that systematically applied the insights of the marginal revolution to the conceptualisation and measurement of securities’ values. In the preface to *The Theory of Investment Value* (North-Holland, 1938), Williams states

Investment value, defined as the present worth of future dividends, or of future coupons and principal, ... is the critical value above which [the investor] cannot go in buying or holding, without added risk (pp. vii–viii).

The definition and assessment of value in terms of DCF is, Williams writes, “the main thesis” (p. 55) of his book. In Chap. 3 (“Marginal Opinion and Market Price”) he adds

*With bonds, as with stocks, prices are determined by marginal opinion ... Concerning the right and proper interest [that is, discount] rate, however, opinions can easily differ, and differ widely. ... Hence those who believe in a low rate will consent to pay high prices for bonds, ... while those who believe in a high rate will insist on low prices ... Thus investors will be bullish or bearish on bonds according to whether they believe low or high interest rates to be suitable under prevailing economic conditions. As a result, the actual price of bonds, ... will thus be only an expression of opinion, not a statement of fact. Today’s opinion will make today’s rate; tomorrow’s opinion, tomorrow’s rate; and seldom if ever will any rate be exactly right as proved by the event* (italics added; pp. 16–17).

Which part of this passage is incompatible with Austrian thinking? Could Ludwig von Mises or Murray Rothbard not have written it? I infer that (1) the underlying logic of DCF analysis follows easily from the conception—including Menger’s conception—of marginality and (2) the investor must, in order to conduct DCF analysis, supply his own discount rate and estimate of future cash flows. But I need not infer because Williams makes this point explicitly:



Concerning [a stock's] true worth, every man will cherish his own opinion; as to what price really is right, time only will tell. Time will not give its answer all at once, though, but only slowly, ... as the years go by ... [Hence] right now, ... investors can merely estimate, and none can surely know, what their stock will prove to be worth in the end—the market can only be an expression of opinion, not a statement of fact. Today's opinion will make today's price; tomorrow's opinion, tomorrow's price; and seldom if ever will any price be exactly right as proved by the event (pp. 11–12; italics added).

What value investors sloppily label “intrinsic value” is, both conceptually and empirically, actually subjective. The concept of value and the action of valuation is a matter of an individual investor's aims, choices and actions; it is certainly not a question of mechanistic or dependable statistical relations. In other words, the value of a good—or a stock or bond—does not stem from any inherent property of the good or security, but instead by the importance an acting individual places upon the good (security) for the achievement of his desired ends.

## GRAHAM AND BUFFETT ON WILLIAMS AND DCF

What did Benjamin Graham, the founder of value investing, think of Williams' conception of value and conduct of DCF analysis? He *did not dispute Williams' logic; he did, however, doubt whether investors could usefully apply it.*<sup>2</sup> “The rub,” writes James Grant<sup>3</sup> in the 6<sup>th</sup> edition of *Security Analysis* (McGraw-Hill, 2009, p. 18), “was that, in order to apply Williams's method, one needed to make some very large assumptions about the future course of interest rates, the growth of profit, and the terminal value of the shares when growth stops.” Warren Buffett, on the other hand, has accepted Williams' logic and downplayed the difficulties that necessarily accompany DCF analyses. To what extent has Williams influenced Buffett? Three passages from Robert Hagstrom (2005) answer this question:

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<sup>2</sup> See Benjamin Graham (1939).

<sup>3</sup> The authors' research and reference list contains yet another glaring omission: if anybody epitomizes the essential compatibility of value investing and the Austrian School, it is Jim Grant. Yet they simply disregard him.

Warren Buffett's approach to investing ... rests on the bedrock of philosophies absorbed from four powerful figures: Benjamin Graham, Philip Fisher, John Burr Williams, and Charles Munger. Together, they are responsible for Buffett's financial education, both formal and informal. ... All have had a major influence on Buffett's thinking; they have much to offer modern day investors as well (p. 11).

*The Theory of Investment Value* is a genuine classic. ... Warren Buffett calls it one of the most important investment books ever written (pp. 20–21).

John Burr Williams provided Buffett with a methodology ... which is a cornerstone of [Buffett's] investing approach (p. 27).

How, then, does Warren Buffett define and measure value? In his 1994 Letter to Shareholders he writes:

We [Charlie Munger and I] define intrinsic value as the discounted value of the cash that can be taken out of a business during its remaining life. *Anyone calculating intrinsic value necessarily comes up with a highly subjective figure that will change both as estimates of future cash flows are revised and as interest rates move.* Despite its fuzziness, however, intrinsic value is all-important and is the only logical way to evaluate the relative attractiveness of investments and businesses [italics added].

Notwithstanding Buffett's inapt use of "intrinsic," if the gist of this passage is not compatible with the Austrian School then I do not know what is. Yet Rapp, Olbrich and Venitz reject this compatibility by creating a straw man: "Unfortunately," they assert, "value investing exclusively focuses on [modern mainstream] finance theory's assumptions and the implications flowing from them...." That's just plain wrong: if it were true, then value investors' analyses would avail nothing and—as the advocates of "strong form" efficiency contend—they should abandon any attempt at valuation and embrace macro-level indexing. Something closer to the opposite of the authors' contention is true: value investors worthy of the label simply *ignore* mainstream finance theory's assumptions and implications. Rapp, Olbrich and Venitz add:

Indeed, some value investors may disagree, arguing that intrinsic value takes into account subjective features ... Obviously, Buffett does not aim to calculate a subjective value but instead characterizes subjectivity as a troublemaker that hinders the calculation of intrinsic value. Apparently, the idea of an objective value prevails.

That's neither obvious nor apparent to me. What *is* clear—he has said so repeatedly for decades—is that Buffett is a practical man whose purpose is, through his actions in the market, to earn a profit. As means towards this end, he famously forms and acts according to his own assessments—and regardless of others' opinions and actions. Buffett—and, aping him, most value investors—"talks objective" but "acts subjective." Adapting a famous quote from John Maynard Keynes, Buffett is a practical man who regards himself to be quite exempt from the intellectual influences of deceased economists; but when it comes to valuation he is actually (and probably unknowingly) a faithful follower of Menger. Value investors unfortunately use key terms carelessly and sometimes incorrectly (Graham's use of "irrational" and Buffett's use of "intrinsic" are major examples); nonetheless, they think and act in a manner congruent with the precepts of the Austrian School. That is obvious and apparent to me.

## CONCLUSION

Using fundamental sources, none of which Rapp, Olbrich and Venitz cite, it is easy to draw a direct intellectual line from the "marginal revolution"—in which the founder of the Austrian School figured prominently—to the founder and today's most prominent practitioner of value investing. It is quite possible that Warren Buffett has never heard either of Carl Menger or any of his followers. Yet Buffett's actions, like Benjamin Graham's and other value investors', demonstrate the diametric opposite of what Rapp, Olbrich and Venitz claim. It is not a myth, it is a fact: value investors' conception and assessment of value are congruent with the Austrian School's.

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## BOOK REVIEW

### *JUSTICE IN THE MARKETPLACE IN EARLY MODERN SPAIN: SARAVIA, VILLALÓN, AND THE RELIGIOUS ORIGINS OF ECONOMIC ANALYSIS*

MICHAEL THOMAS D'EMIC  
NEW YORK: LEXINGTON, 2014, 276 + XX PP.

ERIC CLIFFORD GRAF

For anyone wondering why the School of Salamanca is said to have founded the modern study of economics, tremendous insight is provided by D'Emic's study of Cristóbal de Villalón's *El provechoso tratado de cambios y contrataciones de mercaderes y reprobación de usura* (Valladolid, 1541) and Luis Saravia de la Calle's *La instrucción de mercaderes muy provechosa* (Medina del Campo, 1544), the latter with its important subsection, *Tratado de cambios*. The reason is the deep interest taken by everyone from academic

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theologians to street-level confessors in the thoughts and behaviors of Castilian merchants circa 1550. From a broad perspective, the new financial and commercial reality meant that business activity now attracted the attention of religious authorities worried about the souls of their congregants. Medieval trade in wool and wheat at seasonal fairs had become early modern trade in everything under the sun, involving complex international operations and calling for methodical moral evaluation. From a broader perspective, the new, impersonal and money-based bourgeois capitalist society was beginning to outpace the older agrarian one (163–164).

D’Emic wades straight into the financial details of mid-sixteenth-century Castile. The fact that modern merchants and financiers were forced to submit to moral authorities, who, for their part, maintained medieval perspectives on business, made for curious social feedback mechanisms. As one example, the instinctive antipathy toward usury on the part of religious and intellectual authorities—who were usually the same, and who usually appealed to Aristotle’s and Aquinas’s awkward, abstract view of the “unnaturalness” of making money with money—forced merchants to resort to elaborate financial instruments. And as these financial instruments became more elaborate, the churchmen entrusted with deciding whether or not they were moral labored to produce detailed accounts of their use. That is how D’Emic’s book is about the early modern birth of the field of economics in mid-sixteenth-century Spain.

An example of one of these elaborate financial instruments was the *cambio seco*, or “dry exchange,” which D’Emic calls loansharking (33). It allowed aggressive lenders to interact with desperate borrowers, the latter usually smaller or out-of-town merchants who had less access to credit. The interest payments on these contracts indicate a clear understanding of risk premium. Moreover, in order to pull off the trick, lenders leveraged the services of deceptive judges, lawyers, and factors in remote cities. Basically, the *cambio seco* allowed interest that was to be paid locally to masquerade as fees for service and transport. In the process of demonstrating that Villalón understood a range of financial arrangements, D’Emic deftly culls out the different types of instruments at issue. And, as he honorably and charitably points out, although Villalón displays some faulty reasoning

when evaluating the ethics of these contracts, he was diligent when investigating the ways that they worked.

Further examples of the financial sophistication faced by theologians and confessors in sixteenth-century Castile include: merchants navigating a complex monetary landscape in which different interest rates reflected differences in the availability of currency between places like Valencia and Seville (30–31); derivatives markets, complete with swaps, puts, calls, collars, forwards, and futures (183); an early form of interest rate option (58); an understanding of how money changers arbitrated different currency markets (208); overdraft protection as a banking service (76); and the use of credit guarantee contracts (40). By the way, this last displays a hint of early blockchain thinking. It is simply a quest for additional security, i.e., a desire for something like the counterseals described by Elaine Ou which Chinese and Japanese merchants used to verify the silver content of Mexican coins.

Although D’Emic does not articulate it as such, perhaps because it is an uncomfortable thought, his study also provides evidence that the impetus for the birth of the modern study of economics came from the conversions and exiles of around 350,000 Jews and upwards of 500,000 Moors, as mandated by the Catholic Kings at the end of the fifteenth century. As the sixteenth century drew on, religious authorities had to attend to the commercial activities of the new converts to Christianity as well as a growing population of Old Christian merchants, both of whom rushed to fill the vacuum left by those who emigrated. Previously, say before the beginning of the sixteenth century, and especially in Reconquest Spain, commercial and financial activities were largely left to Jews and Moors. Since business was thought inherently sinful, Christians truly worried about the fate of their souls did not assume the moral hazard.

A great feature of D’Emic’s book is his concise review of the debates surrounding the School of Salamanca. Just how modern were these thinkers? And to what degree can we even speak of them as an organized school of thought? In his introduction, D’Emic traces the connection between the Salamancans and Austrian economists like Bernard Dempsey, Joseph Schumpeter, Marjorie Grice-Hutchinson, Raymond de Roover, Murray Rothbard, and Jesús Huerta de Soto. He also orients readers in the debates over whether or not the Salamancans advocated free

markets, understood the perils of fractional banking, influenced the likes of Adam Smith, or anticipated modern-day libertarian principles. To his credit, and displaying his own scholastic tendencies, D'Emic presents the contrarian views of skeptics like Odd Langhlo, Francisco Gómez Camacho, Raúl González Fabre, and Diego Alonso Lasheras.

But Dempsey, Schumpeter, Grice-Hutchinson, Hoover, Rothbard, and Huerta de Soto are all borne out here. We cannot discard the existence or influence of a school of economic thought in early modern Spain. We know, for example, that the political and monetary theories of a late scholastic like Juan de Mariana (1536–1624) reached the likes of Cromwell, Locke, and Jefferson. As D'Emic points out, Saravia himself holds the distinction of a 1561 Italian translation of his *La instrucción de mercaderes* under the title *Institutione de' mercanti che tratta del comprare et vendere et della usura che puo occurrere nella mercantia insieme con un trattato de' cambi*. It stands to reason, then, that an intellectual giant like Martín de Azpilcueta (1492–1586), the first to state both a quantity theory of money and a purchasing power equilibrium theory of exchange rates, probably loomed much larger, both after the Renaissance and outside of Spain, than has been recognized previously.

What D'Emic does most brilliantly is lay to rest any doubts regarding the sophistication and social reach of the early economic discourse of the School of Salamanca. In his dual case study of Villalón and Saravia, he shows, for example, how ideas like objective value theory were pitted against utility and subjective value theories in their debate over whether markets or authorities should set the just price of goods and services. Furthermore, he shows how regarding usury, they undertook empirical studies of complex financial instruments and interviewed the parties involved. As a result, D'Emic throws down a new marker: “at the dawn of modern capitalism, men were already debating the choice between individual freedom in the economic sphere and a collective dependence upon the state” (xxv). It is an early modern version of the liberal debating the statist. At which point, it also becomes clear that the School of Salamanca has not received sufficient attention. D'Emic rightly calls for reassessment of the traditional sociological explanation of capitalism as originating in the “Calvinist work ethic” as per Max Weber.



In chapter one, D'Emic establishes the ideological, economic, demographic, and social context with precision. Villalón represents Valladolid, essentially the capital of the Catholic Monarchy; whereas Saravia represents Medina del Campo, a major center of Iberian finance and commerce with international connections across Europe. The fifteenth century had been deflationary; so, although mild by today's standards, the fourfold increase in prices from 1501 to 1600 was a shock. The population of Castile grew from 3.9M to 6.7M between 1530 and 1591. The entire urban middle class amounted to three to five percent of the population, and merchants shared that status with physicians, lawyers, notaries, and clergy. Still, they wielded enormous influence and were deeply involved in the general struggle to climb the social hierarchy.

D'Emic then traces the intellectual roots of the School of Salamanca back to the nominalism at the University of Paris at the end of the fifteenth century. In particular, the Scottish Dominican John Mair (1469–1550) modeled a new, more pragmatic approach to life's problems. Francisco de Vitoria (c. 1483–1546) and Domingo de Soto (1494–1560) then established the new method in Spain. D'Emic also shows little anxiety when acknowledging the probable influence of the humanism of Erasmus (1466–1536).

D'Emic further orients us for his contrast between Villalón and Saravia by describing the overarching incentive provided by the new economic reality, a world in which a radical increase in trading, lending, and borrowing spawned theological debates about what constituted just prices and usury. Moreover, Villalón and Saravia both display admirable clarity and faithfulness in their reporting of the commercial and financial activity of the day. They represent a very real revolution in style, which anticipated the frankness of later manuals. Occasionally, there are even moments of brilliance. The insights of Saravia, in particular, "signified the moment of transition from one way of thinking about business to another" (159). Saravia echoed more permissive attitudes toward interest in Northern Europe advanced by the likes of Henry VIII (1491–1547) and John Calvin (1509–1564). In Spain, his more informed and liberal attitude toward interest anticipated the views of Tomás de Mercado (*Suma de tratos y contratos*, 1569), Luis de Molina (*De jure et justitia*, 1609), and Felipe de la Cruz Vasconcillos (*Trato único de intereses sobre si puede llevar dinero por prestado*, 1637). Vasconcillos

puts the epistemological dagger in the anti-usury laws by recognizing, as D'Emic puts it, "the fundamental injustice of expecting to borrow money for free" (159). In Spain, a more relaxed legal view of usury began around 1598 and became official under Philip IV in 1642 (248).

Chapters two through four are then case studies of the different mindsets and logics of Villalón and Saravia respecting a range of financial contracts. As he proceeds, D'Emic deftly connects the ideas and terminology of sixteenth-century Spain with their modern analogues, speculating about other parallels when appropriate. He walks readers through the elements of the various contracts discussed by Villalón and Saravia: the *cambio seco*, the *cambio real*, the *cambio de feria en feria*, the *cambio por letras*, the *cambio por menudo*, the *parturas*, the *mutuum*, the "triple contract," and the dreaded *censo*. All of this is supplemented by their sophisticated accounting analyses and complex opinions on things like markets, equity investments, oligopolies, subprime lending, commodities contracts, and deposit banking.

As per the subtitle of his book, D'Emic emphasizes Villalón's and Saravia's moral opinions. He does this marvelously by showing both men's blind spots. Villalón, in particular, remains unable or unwilling to see finance as an additional cost of production or to see lent money as money saved by individuals who deserve compensation. He esteems charity so much that he cannot conceive of a business loan. If somebody needs money, then the moral person gives it to him without any expectations. Nevertheless, D'Emic also allows both men to voice remarkable insights. Saravia, for example, affirms that market forces determine production costs, countering Villalón's vision of them as determined by production costs. For his part, Villalón has modern advice against personal debt and in favor of a healthy work ethic. My personal favorite is Saravia's momentary hellish vision of all commercial transactions as essentially "lemon" markets in which all buyers and sellers are unethical in their quests for advantage (126–127).

D'Emic's conclusions are generally sound. I am not convinced, however, that the differences between Villalón and Saravia are as divisible into today's right and left political categories as he would have them. For example, from a modern perspective, the conservative Saravia's support for social status might still make sense; but

the statist Villalón's emphasis on work would be counterintuitive. Villalón might simply be signaling that the pensions for the *hidalgo* caste are a fiscal drag. Still, D'Emic is probably onto something in that the controversy over usury that he describes followed political contours by pitting the state in Valladolid against a merchant class in places like Medina del Campo, Seville, and Valencia.

In passing, I note that D'Emic seems more optimistic than most Austrians and libertarians are regarding the benefits of financial regulations and legal frameworks. To his credit, he is up front about his views. He insists, for example, that aggressive credit card marketing, the sale of financial instruments like annuities, and the general abuse of asymmetrical information across the financial industry remain problems (see 114 n130).

D'Emic's study also has implications for comparative history. For example, a stereotypical view holds that Christians in medieval Iberia grew overly accustomed to amassing wealth through conquest and tribute during the Reconquest period. Then the radical amounts of wealth generated at the beginning of the sixteenth century by the conquest of America reinforced a culturally inherited bias against labor and business. Writers like Montesquieu, and more recently Thomas Sowell, have indicated that this is the key to understanding both Spain's and Latin America's economic retardation.

But D'Emic's study challenges this view. On one hand, he shows that, thanks to men like Saravia, Mercado, Molina, and Vasconcellos, the laws against usury were not a serious problem after the middle of the seventeenth century. He also notes the shift in Western European banking activity, which began in Italy and the Low Countries in the thirteenth century, spread to Florence in the fifteenth century, and became a regular feature across all of Europe in the sixteenth century. Public deposit banks were established at Barcelona in 1401 and Valencia in 1407. He cites historian Ian Blanchard's claim that, due to the importation of so much silver into Spain, by the middle of the sixteenth century, "the fairs at Medina del Campo became the focus of a new financial network in Western Europe" attended by "as many as two thousand merchants who were served by fifteen or so bankers for the settlement of transactions" (221). Serious economic upheaval was already occurring; and if it did not take hold in Spain as deeply as it did elsewhere, well, that is a serious question.

Carroll Johnson has written of early seventeenth-century Spain as a case of “stillborn capitalism”; D’Emic shows us the “stillborn finance” that accompanied it. As opposed to some mythical conquering mindset, however, both Johnson and D’Emic are suggesting later, more subtle or traumatic causes for the repression of capitalism and finance in Spain. Saravia himself might have had a hand in the collapse. He got his way on one issue via a royal decree in 1554 which prohibited deposit bankers from lending. From a monetarist point of view, that was a bad idea given the economic growth at the time. Or might the lag in Spain and Latin America owe to the fact that some groups repressed others? Could it be as simple as the Counterreformation’s domestic rigidity after Philip II became King in 1559? Or did the religious wars across Europe bankrupt Spain too many times? Taxation? Monopolies? Ethnic cleansing?... Pirates?

Although D’Emic modestly leaves the point implicit, the fact that Villalón and Saravia produced the first two treatises written on these topics in Spanish indicates a culture in the process of prioritizing commerce and banking. Their sophisticated content indicates that a mature bourgeois mindset was thriving in mid-sixteenth-century Spain. As historical artifacts, the treatises are related to the two chapters on the history of money that got translated into Spanish for Diego de Covarrubias’s *Veterum collatio numismatum* (1550). Additionally, the 1561 Italian translation of Saravia’s *La instrucción de mercaderes* indicates a market outside Spain for neo-scholastic thinking on these topics. This is all “demand-side” evidence of Salamanca as a school of thought.

D’Emic’s book is fantastically informative, a tremendous resource for understanding the School of Salamanca as well as a model for how much insight can be gained by case studies of this sort. The book, for example, is terrific as secondary material for the study of Spanish Golden Age literature. Many of the concepts D’Emic discusses are found in vignettes in *Don Quijote de la Mancha* (1605, 1615). Cervantes alludes to monetary policy, currency exchange rates, monopolies, taxation, etc., even the murky *censo*. Also useful is D’Emic’s socioeconomic presentation of the *hidalgo* caste and its jealous concern for *honra* and *ocio*.

I will go further. Given the demographic reality of a major influx of Hispanics into states like California and Texas, any self-respecting

high-school or college-level economist in the U.S. should take a crack at D'Emic's book. It has the potential to engage students in the study of a number of important economic concepts. It is also an excellent way of demonstrating that Hispanic culture played its part in the development of early capitalist theory. And, *vice versa*, specialists in early modern literature or culture will ignore D'Emic's findings at their peril.

Finally, as a literature specialist myself, I greatly appreciated the guidance regarding vocabulary that would have been beyond my comprehension. D'Emic's pursuit of the precise meanings of the terms deployed by Villalón and Saravia is exemplary. D'Emic is also to be thanked for his eminently readable, engaging, and provocative style. For example, explaining that Villalón deploys Aquinas's and Aristotle's odd natural-law objection to usury, he says, "They make no more sense in his formulation than in that of more erudite authors" (18). This commonsensical tone makes D'Emic a pleasure to read. He also produces some provocative sidebars: his argument for an earlier dating of the arrival of double-entry accounting in Spain (79); the possible relation between the sixteenth-century price revolution and the proliferation of bills of exchange (55); the existence of a yield curve that was space-based rather than time-based (216); and Saravia's apparent discovery of modern discounted cash flow analysis (176).

D'Emic provides the reader with a sense that the complexity of financial instruments circa 1550 reflects our own very natural desires to reduce risk and maximize return against the backdrop of complicated regulatory environments, in this case an early phase of the Counterreformation in Spain. Getting a glimpse of how this complexity evolved and functioned makes D'Emic's book well worth the effort.

The sole complaint I have concerns the huge number of typos. I hope Lexington Books can figure out a way to produce texts that are easier to read.

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## BOOK REVIEW

### *THE MAN WHO KNEW: THE LIFE AND TIMES OF ALAN GREENSPAN*

SEBASTIAN MALLABY

NEW YORK: PENGUIN, 2016, 800 PP.

DAVID GORDON

Sebastian Mallaby is the Paul A. Volcker Senior Fellow for International Economic Relations at the Council on Foreign Relations. One can be sure, then, that his new comprehensive book, *The Man Who Knew: The Life and Times of Alan Greenspan*, reflects an Establishment point of view. As if this were not enough to tell us where the book is coming from, Mallaby informs us that he had Greenspan's full cooperation in writing it. "This book is based on almost unlimited access to Alan Greenspan, his papers, and his colleagues and friends, all of whom were generous in their collaboration."

Though the book is hardly a panegyric to Greenspan, Mallaby views his subject with considerable favor. Nevertheless, the book

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contains ample material for a more severe verdict: Greenspan abandoned the free market convictions he effectively defended early in his career as an economist. To uphold economic truth was not the path to the power and influence Greenspan sought; and he readily adjusted his beliefs to fit with his ambitions.

Greenspan attached himself to Ayn Rand's inner band of disciples; but his adherence to free-market economics did not stem from his alliance with Objectivism. Greenspan learned economic theory from Arthur Burns at Columbia University. For Greenspan, like his mentor Burns, statistics had primary importance: economic theory emerged from discerning patterns in the data and was strictly subordinate to its empirical sources.

Burns was the chief heir to Wesley Mitchell's empiricist tradition, and his influence restrained any enthusiasm that Greenspan might have felt for the new trends that had begun to stir in economics. ... Even the cleverest econometric calculation was limited because yesterday's statistical relationships might break down tomorrow; by contrast, finer measures of what the economy is doing are more than just estimates—they are facts.

From his studies of the data, Greenspan arrived at an important conclusion. Financial markets played a crucial role in the genesis of the business cycle:

Squarely confronting the notion that financial markets are merely a casino of meaningless side bets, he laid out an insight for which Nobel laureate James Tobin would later capture the credit. Stock prices drive corporate investments in fixed assets. ... In turn, these investments drive many of the booms and busts in a capitalist economy.

Greenspan applied his insight to Fed policy in a way that resembles the Austrian theory of the business cycle. During the 1920s,

...the Fed's key error was to underestimate its own contribution to the stock bubble. The rise in the market had set off a rise in investment and consumer spending, which in turn had boosted profits and stoked animal spirits, triggering a further rise in the stock market. The 1920s Fed had been the enabler of this feedback loop—in order for investment and consumer spending to take off, companies and consumers needed access to credit. Faced with a jump in the appetite to borrow, the Fed had [wrongly] decided 'to meet the legitimate demands of business,' as Greenspan put it.



Greenspan drew from his analysis

...a radical position: the United States should return to the gold standard of the nineteenth century. By tying money and credit to a fixed supply of gold, the nation could prevent toxic surges in purchasing power.... "The pre-World War I gold standard prevented speculative 'flights from reality'—with their disastrous consequences," Greenspan insisted.

Nor was this the only area where Greenspan adopted a radically free-market stance. Defying the mainstream,

Greenspan followed up with an attack on government efforts to rein in monopolies with antitrust laws. ... He pointed out that it was not just corporate managers who would want to challenge monopolists; the financial system would demand that they do so. If a monopoly extracted fat rents from its customers, its share prices would soar; that would give entrepreneurs an incentive to create rivals to the monopoly, and it would give financiers an incentive to ply those rivals with abundant capital.

Mallaby views this "crude" view with evident distaste, noting that both Friedrich Hayek and Milton Friedman adopted a more "nuanced" position.

What then became of this free-market radical? Unfortunately, his desire for "power and pelf," in Murray Rothbard's phrase, led him to alter his views. A firm commitment to freedom would never gain him entry to the inner sanctum of government, and Greenspan soon learned to temper his views.

In his radical days, Greenspan had opposed government bailouts to failing firms: the discipline of failure was essential to the operation of the free market. In 1971, he defied his teacher Arthur Burns, who favored bailing out Lockheed.

Testifying before the Senate, Greenspan refused to back his mentor. "I am in fundamental disagreement with this type of loan guarantee," he began. Government-directed lending "must inevitably lead to subsidization of the least efficient firms," damaging productivity and therefore living standards. ... What the economy really needed was for weak companies to go bust, so that capital and workers would move to better-run establishments.

Once close to the levers of power, matters were different. He wished to become Paul Volcker's successor as Fed chairman, and he knew that firm opposition to Fed policy would hurt his chances for the job. Going against his earlier analysis, he supported the "largest bank bailout in U.S. history," the rescue in 1984 of the Continental Illinois National Bank. He admitted the dangers of the bailout, but it was, as Mallaby summarizes his position, "necessary and appalling." Appalling, one suspects, because of its effects on the free market; but necessary to advance Greenspan's career. By the time he became Fed Chairman, the transformation was complete. By 1989, his "libertarian rejection of bailouts was long gone; what he wanted above all was the space to fight inflation."

Greenspan wanted to fight inflation; but the best way to do it was no longer acceptable. A gold standard, he had long ago recognized, would bring with it monetary stability; but to replace the Fed with a commodity standard not subject to control by the government would erode his power. Accordingly, the gold standard had to go.

He cast aside the gold standard with a transparent sophism: "A necessary condition of returning to a gold standard is the financial environment which the gold standard itself is presumed to create. ... But, if we restore financial stability, what purpose then is served by a return to a gold standard?" (quoting Greenspan). Why a gold standard cannot help create a stable financial environment, but instead presupposes it, Greenspan left unclear. Even less clear was how the Fed was supposed to preserve stability in the absence of the gold standard. Evidently we were to rely on his supreme powers of judgment in steering the economy.

Greenspan in his long career as Fed chairman gained the power and acclaim he coveted; but the crash of 2008, two years after the end of his tenure in office, led to a sharp decline in his reputation.

In their attitude toward compromise, Greenspan is the polar opposite to Murray Rothbard. Rothbard could have tailored his views to win the favor of Arthur Burns, who was a family friend, but he refused to do so. He never abandoned his principles, and he took the measure of Greenspan. Writing about him in 1987, Rothbard observed:

Greenspan's real qualification is that he can be trusted never to rock the establishment's boat. He has long positioned himself in the very middle

of the economic spectrum. He is, like most other long-time Republican economists, a conservative Keynesian, which in these days is almost indistinguishable from the liberal Keynesians in the Democratic camp.

In looking over Greenspan's fall from free-market grace, the melancholy first lines of Browning's *The Lost Leader*, addressed to Wordsworth, come to mind: "Just for a handful of silver he left us, / Just for a ribbon to stick in his coat...."

## BOOK REVIEW

### *THE INTERNATIONAL MONETARY SYSTEM AND THE THEORY OF MONETARY SYSTEMS*

PASCAL SALIN

NORTHAMPTON, MASS.: EDWARD ELGAR, 2016, 261 PP.

CARMEN ELENA DOROBĂȚ

The present volume is an accomplished theoretical inquiry into the workings of the international monetary system. As the author himself explains in the introduction, the book is intended to provide readers with a good understanding of the economic principles and economic problems of international monetary economics, while drawing on sound general economic theory. Salin fully succeeds in painting a clear and concise picture of the current issues in international monetary relations, and of the theoretical discussions and proposed solutions surrounding them.

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Adopting an almost exclusively theoretical point of view, Salin guides his readers in textbook-like fashion through the intricate core propositions of international monetary economics. The first two parts of the book discuss the basic statements and analyses in the field, such as the theory of exchange, the demand for money, the exchange rate, and the fundamental principles of balance of payments analysis. Part III delves into the issue of international monetary equilibrium, touching on the concepts of inflation and devaluation, the formation of international prices, and a range of exchange rate systems including fixed and flexible exchange rates. In Part IV, Salin concludes his investigations with a brief analysis of monetary policy, monetary crises, and monetary integration.

From the beginning, the building blocks of Salin's arguments are excellently set up, and together they form an almost self-contained and complete system of thinking about monetary problems. But the strength of the book comes primarily from the fact that this system is grounded in general economic theory. While particular discussions are specialized, and thus somewhat narrow, the overall volume adds to the big picture of the workings of monetary macroeconomics, with a solid foundation in microeconomic theory. Each chapter neatly draws a conclusion on which Salin builds further arguments, but which also constitutes a valuable lesson in itself. Eventually, his analyses lead up to a refreshing overarching remark: "a surprising paradox in monetary theory: people debate about the best monetary policy, although the best solution would be not to have any monetary policy. This was the case in a pure gold standard (that is, without central banks)" (p. 245).

In relation to this welcome insight, three of the valuable lessons that Salin's short volume offers warrant particular attention. In each case, the author sews up a competent critique of the widespread misunderstandings that surround these issues in modern literature.

First, Salin completes the discussion in Part II with a pointed analysis of the balance-of-payments—or external equilibrium—policies. He shows that such policies are "doomed to failure because [they are] based on an a priori and arbitrary definition of equilibrium and disequilibrium" (p. 100) with regard to individual cash-balance decisions. In consequence, he argues, attempting to equilibrate balance of payments accounts often leads to disequilibrium in the market, "since it is forbidding individuals to allocate

their resources over time in a way which would be optimal for them" (p. 100). With regards to the disputed relationship between the balance of payments and the exchange rate, Salin also correctly points out that, contrary to popular belief, "the exchange rate is not the price of the balance of the trade balance, which would obviously be meaningless... [and since] a deficit is not a symptom of disequilibrium, it therefore has no reason to cause a change in the exchange rate" (p. 102).

Second, Salin devotes an entire chapter (chapter 12) to a detailed explanation of why inflation is a monetary phenomenon (pp. 112–118), in the case of a closed economy, as well as in an international setting with imported inflation. This discussion is not only relevant on its own, but ends up excellently supporting Salin's subsequent analysis of the international transmission of money creation across national borders in varying currency and exchange rate regimes (ch. 16, pp. 137–149) and its congeneric impact on international monetary equilibrium (ch. 17, pp. 150–163). Third, the same chapter contains an almost taboo opinion in monetary economics, i.e. that deflation is not only unproblematic, but actually beneficial (pp. 118–119). Salin returns to this point throughout the book (pp. 41–42; 157–158; 226), reiterating the idea that "contrary to widely held ideas, deflation is preferable to inflation."

Other similarly discerning analyses are found throughout, and towards the end of the volume, Salin offers some highly quotable turns of phrase: for example, in discussing monetary integration in Europe, he argues that "the euro is the outcome of an approach which mixes monetary nationalism, politicization of money, substitution of pseudo-independence to an external control by competition, and the use of a compulsory and constructivist process instead of a spontaneous one" (p. 241).

It should come as no surprise that this volume resonates with classical and Misesian monetary theory, and is often at odds with the great majority of modern monetary models and their conclusions. And yet, Salin's system of monetary analysis does contain a few idiosyncrasies. Some are due to the author using his own terminology in perhaps unnecessary situations, such as substituting 'coercion' for 'government intervention,' or introducing 'hierarchy' in discussions of money creation (p. 102) to refer to the existence of a central bank.

Other idiosyncrasies, of greater weight, are I believe remnants of the author's familiarity with mainstream economic analysis. One such instance is the chapter on the demand for money, which contains a discussion of the roles of money and the definition of money. Divergent views between monetary schools of thought originate from these aspects: modern analyses effectively downplay the function of money as a medium of exchange in relation to its role as a store of value or unit of account when constructing models based on a barter economy in which a *numéraire* is later introduced. Mises (1953, pp. 30–37), however, considered the two latter roles of money as secondary functions which can only derive from a currency's primary function as medium of exchange, and often drew attention to the dangers of the "barter fiction" (Mises, 1998 [1949], p. 202), as he called it, for sound economic analysis.

Salin, however, is rather unconventional in his approach: while espousing the importance of money functions, he avoids differentiating between the role of money as medium of exchange and that of store of value over time. Historically, he argues, "it is likely that these roles have emerged gradually and more or less simultaneously, so that it is not possible to consider that one clearly preceded the other" (p. 30); and he suggests that theoretically, "the role of a standard of value [*numéraire*] is not necessary for a good to be considered currency, unlike the other two roles" (p. 30). However, this discussion is followed by a rather confusing account of how money, if introduced as only *numéraire*, would leave relative prices unchanged compared to a state of barter. Salin does not specify though whether this is a useful abstract exercise, or rather a fictitious assumption contrary to economic reality.

Later in the volume, this precarious analysis seems to taint the discussion on real growth and monetary growth under fixed exchange rates, for which Salin uses the example of communicating vessels (p. 162). This hydraulic view of balance-of-payments adjustment—often seen in business cycle theories as well—disregards the Cantillon effects of monetary inflation responsible for the gradual and irreversible changes in prices and wealth distribution that money creation inevitably produces in a closed or open economy. More to the point, such a view actually contradicts Salin's overall monetary analysis in terms of individual cash-balance decisions. At best, the author's views on these points are

confusing and thus easily misunderstood; at worst, they detract from the otherwise strong case he makes against monetary and balance-of-payments policies.

These issues notwithstanding, this little volume is overall a pleasure to read. Fluent in the language of modern monetary economics, Salin makes ample use of equations and graphs in a pertinent and user-friendly way: coupled with clear and concise explanations, these mathematical elements usually provide rigor and structure to the analysis. While they may not be indispensable, they do enhance some of the arguments, and are carefully weighed not to hinder the overall flow of the narrative. Some readers may also find that Salin's sole focus on monetary theory has perhaps deprived some of the discussions of their historical color—in particular Chapter 20, which analyzes the long-term evolution of monetary systems. Joseph Salerno's collection of monetary essays (2010), which focuses on the history of monetary systems, the development of monetary and balance-of-payments policies, and the history of monetary thought, can be a welcome companion to Salin's volume.

In conclusion, *The International Monetary System and the Theory of Monetary Systems* is replete with well-grounded arguments and thought-provoking insights. It is thus both a useful and distinctive resource for economics scholars and students, and an intellectually compelling journey into the principles of domestically sound currencies, and into how to build sound international monetary systems.

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