

# In the long run we are all unemployed

**Karl-Friedrich Israel**  
GRANEM, Universit  d'Angers

septembre 2016

*Document de travail du GRANEM n  2016-04-050*

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Classification JEL : E14, E24, E31, E32

Mots-clés : inflation; chômage, courbe de Phillips, fluctuations conjoncturelles, distribution des revenus et des richesses, spirale interventionniste.

Keywords: inflation, unemployment, Phillips curve, business cycle, distribution of incomes and wealth, interventionist spiral.

**Résumé :** L'article contient une brève histoire de la courbe de Phillips. Les données empiriques sur l'inflation et le chômage en France, en Allemagne, au Royaume-Uni, et aux États-Unis pendant la deuxième moitié du XXe siècle sont analysées. Elles démontrent une relation positive entre le taux d'inflation et le taux de chômage. Afin de réconcilier les résultats empiriques avec la doctrine dominante, qui postule la neutralité de l'inflation à long terme, deux arguments sont formulés pour expliquer les effets pervers de l'expansion monétaire : 1) ses effets redistributifs ; et 2) les fluctuations conjoncturelles. L'analyse repose sur l'influence de ces deux effets sur certaines interventions publiques qui rendent le marché du travail plus rigide et donc augmentent le taux de chômage. Dans ce sens la relation entre le taux d'inflation et le taux de chômage au cours des 60 dernières années se présente comme le résultat d'une spirale interventionniste.

**Abstract:** In this paper a brief history of the Phillips curve is sketched. Empirical evidence from France, Germany, the United Kingdom and the United States during the latter half of the 20th century in support of a positive long-run relationship between price inflation and unemployment is presented. In order to reconcile the predominant theoretical view, which holds that inflation is neutral in the long run, with the observed data, two arguments are outlined, both of which build on unintended consequences of monetary expansion: 1) redistributive effects on incomes and wealth, and 2) business cycle fluctuations. The analysis hinges on further political interventions in response to these consequences, which tend to increase unemployment as they render labor markets less flexible. In this sense the relationship between price inflation and unemployment over the past 60 years can in part be interpreted as the outcome of an interventionist spiral.

Karl-Friedrich Israel

Faculté de Droit, Economie et Gestion

Université d'Angers

[kf\\_israel@gmx.de](mailto:kf_israel@gmx.de)

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## 1 Introduction

The term “neutrality of money”<sup>1</sup> captures the idea that, no matter how large the stock of money, the economy can work equally well. In a somewhat cruder version it holds that changes in the supply of money, on an aggregated macroeconomic level, only affect nominal variables such as prices, but not real variables like output and unemployment. This latter interpretation would of course imply that central bank policies - more precisely, the expansion and contraction of the money supply - are also neutral with respect to real economic variables. However, upon closer inspection one can say that it is generally accepted among economists today that there is at best a long-run dichotomy between real and nominal economy, and that monetary policy can indeed affect real variables, at least in the short run.

A case in point is the much discussed relationship between price inflation and unemployment, known as the Phillips curve. We will present a brief sketch of its history in Section 2 of this paper.

Over several decades, the voluminous literature on the Phillips curve has come to the consensus view that policy induced price inflation can help stabilize output and employment over the short run, but is largely neutral in the long run. This view has, probably more than any other idea in economics, shaped monetary policy from the 1960s to the present. For this reason alone it would be important to reconsider its validity.

Yet, as shown in Section 3, there is also strong empirical evidence for the importance of rethinking long-run neutrality of inflation. We analyze data on price inflation and unemployment from France, Germany, the United Kingdom and the United States over the second half of the 20th century. The data show positive correlations between present price inflation and future unemployment, which goes completely against the predominant theoretical view of an inverse short-run link and long-run neutrality. The purpose of this paper is to reconcile the economic theory behind the Phillips curve with the experience of recent history.

There are strands of economic thought that have been neglected in the literature on the Phillips curve so far and can potentially make a valuable contribution to improve

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<sup>1</sup>According to von Hayek (2008, p. 301) it was neoclassical economist Knut Wicksell who introduced the phrase “neutral money” into monetary theory. More precisely, Wicksell wrote about neutral interest rates, which are given when the *money rate of interest* (the actual interest rates payed on the financial markets) coincides with the *natural rate of interest* (Wicksell, 1962, ch. 8). For a more detailed investigation into the origins of terms, see Lutz (1969) and Patinkin and Steiger (1989).

our understanding of the underlying dynamics. In the main part of the paper, Section 4, some of the elements of non-neutral monetary theory are integrated into the theoretical considerations on the relationship between price inflation and unemployment. They can explain a positive link between the two variables with a considerable time lag.

An important aspect of the causal analysis presented in Section 4 is the distinction between price inflation, defined as an increase in the consumer price index, and inflation in the traditional sense of the word, defined as an expansion of money and credit. Inflation in the traditional sense is considered to be a causal factor for both price inflation and unemployment.

Thus, the proposed explanation does not attempt to draw a direct causal relationship between price inflation and unemployment, but rather an indirect one that hinges on public opinion and political responses to unintended consequences of monetary expansion. These consequences include business cycle fluctuations, and redistributive effects on incomes and wealth that increase inequality. Both economic recessions and rising inequality are factors that have induced political responses that tend to increase the level of unemployment.

As long-run unemployment is mostly determined by the institutional environment, which to a large extent is shaped by politics, long-run inflation-unemployment dynamics can only be understood properly if we incorporate the extra layer of political interventions into the analysis. In Section 5, we conclude that the relationship between price inflation and unemployment from the 1960s to the present can in part be interpreted as the outcome of an interventionist spiral.

## 2 A brief history of the Phillips curve

In 1926, economist Irving Fisher published a brief theoretical and empirical investigation of the link between inflation and unemployment, and went even so far as to postulate a causal relationship. Fisher ([1926] 1973, p. 502) analyzed data from the United States at the beginning of the 20th century and concluded:

But as the economic analysis already cited certainly indicates a causal relationship between inflation and employment or deflation and unemployment, it seems reasonable to conclude that what the charts show is largely, if not mostly, a genuine and straightforward causal relationship; that the ups and downs of employment are the effects, in large measure, of the rises and falls of prices, due in turn to the inflation and deflation of money and credit.

[...] If this conclusion be sound, we have in our power, as a means of substantially preventing unemployment, the stabilisation of the purchasing power of the dollar, pound, franc, lira, mark, crown, and any other monetary units.

Notice that Fisher here still uses the terms inflation and deflation in the traditional sense, meaning expansion and contraction of the supply of money and credit, respectively (von Mises, 1990a, p. 115), instead of mere increases or decreases of some price index, which would be the commonly accepted definition today (Salerno, 2010, p. 424). Although it

might be considered a useful shortcut, as price inflation has become the primary monetary policy target and monetary inflation, if only large enough, ultimately leads to price inflation, this shift in the definition amounts to a conflation of the aim sought and the means applied. Fisher proposed inflation and deflation of the money supply as the means to counterbalance decreases or increases in the price level, and hence to attain a stable purchasing power. In order to avoid semantic confusion, throughout the paper rises and falls in the price level will be referred to as price inflation and price deflation, respectively.

Fisher's finding seems to be of utmost importance. John Maynard Keynes probably had some relationship of this kind in mind when he formulated his policy recommendations in response to the Great Depression in the 1930s, although he always resolutely emphasized the complementary role of fiscal policy in order to stabilize and improve macroeconomic conditions.<sup>2</sup> Yet, Fisher's article remained widely unrecognized, and the relationship was not named after him, but more than 30 years later after statistician Alban W. Phillips.

In 1958, Alban W. Phillips of the London School of Economics published an empirical study on the relationship between the rate at which nominal wages change and the rate of unemployment for the United Kingdom from 1861 to 1957. The statistical evidence collected in his study suggests an inverse relationship, that is, unemployment tended to be relatively low during periods in which wages rose quickly. Phillips did not draw any political conclusions from his finding and merely hinted at an unemployment-price inflation relationship. By subtracting the long-term productivity growth from the rate of change of nominal wages, which is assumed to correspond to the rate of price inflation, Phillips (1958, p. 299) concluded that for "a stable level of product prices the associated level of unemployment would be a little under  $2\frac{1}{2}$  per cent."

Two years later Samuelson and Solow replaced the rate of change of money wages by the rate of price inflation with lasting impact (Samuelson and Solow, 1960). They popularized the empirical finding and explored its political implications. Assuming a causal relationship, just like Fisher did back in the 1920s, they argued that expansionary monetary policy would lead to lower unemployment rates. With their contribution the idea and the term of the Phillips curve was born and encouraged a lively intellectual debate. Gordon (2011, p. 13) describes its immense influence as follows:

So widely read and discussed was the Samuelson-Solow article that the term "PC" [Phillips curve] entered the language of macroeconomics almost immediately and soon became a lynchpin of the large-scale macroeconomic models which were the focus of research activity in the 1960s.

Samuelson and Solow investigated data for the U.S. from the turn of the century to the 1950s and found that the relationship did not hold during the two world wars and the Great Depression in the 1930s. During the three remaining periods, namely, before World War I, from the end of World War I until the end of the 1920s, and after World War II, they

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<sup>2</sup>See for example Keynes (1933) and Keynes (1936), in particular chapter 15 entitled *The psychological and business incentives to liquidity*. In the Keynesian framework monetary expansion can increase employment and output through investments stimulated by lower interest rates and increased aggregate demand. Increased demand, according to his rationale, will push production and the use of resources, including labor, to its full societal potential.

identified an empirical relationship between price inflation and unemployment that very much resembles Phillips' results. In addition, they point to the possibility of a shift of the Phillips curve:

What is most interesting is the strong suggestion that the relation, such as it is, has shifted upward slightly but noticeably in the forties and fifties. On the one hand, the first decade of the century and the twenties seem to fit the same pattern. [...] [W]age increases equal to the productivity increase of 2 to 3 per cent per year is the normal pattern at about 3 per cent unemployment. This is not so terribly different from Phillips' results for the U.K. [...] On the other hand, from 1946 to the present [1960] [...] it would take more like 8 per cent unemployment to keep money wages from rising. And they would rise at 2 to 3 per cent per year with 5 or 6 per cent of the labor force unemployed. (Samuelson and Solow, 1960, p. 189)

The authors assume a long-run productivity growth of 2 to 3 per cent. Hence, under the further assumption that the rate of price inflation corresponds to the rate of change of nominal wages minus productivity growth, we would have stable prices if wages rise at 2 to 3 per cent.<sup>3</sup> For the analysis of Samuelson and Solow, this means that prior to World War I prices had been stable at 3 per cent unemployment. After World War II the zero inflation unemployment rate had risen to 5 to 6 per cent.

Samuelson and Solow (1960, p. 193) represent the Phillips curve, whatever its position may be, as a "menu of choice", suggesting a trade-off that could be exploited by political authorities. The position of the curve in turn is determined by the institutional environment, that is, factors like the power of trade and labor unions, or labor laws. Subsequently, this alleged trade-off has found its way into political debates in various countries. In the case of the United States, for example,

[t]he policy advisors of the Kennedy and Johnson administrations, led by Walter Heller with support roles by Robert Solow and James Tobin, argued that the previous Republican administration had chosen a point too far south-east [high unemployment and low inflation] along the PC trade-off, and that it was time to 'get the country moving again' by moving to the north-west [low unemployment and high inflation]. (Gordon, 2011, pp. 15-16)

In 1972, German "Superminister" - minister of economic affairs, finance and defense - Helmut Schmidt of the Social Democratic Party famously stated that he would rather have 5 percent price inflation than 5 percent unemployment. According to former state secretary Otto Schlecht, Schmidt knew full well that this statement was technically false,

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<sup>3</sup>In general, as described in Blanchard and Fischer (1993, pp. 542-543), in order to arrive at an unemployment-price inflation relationship, a markup equation that connects price and wage developments is needed as an intermediate step. More precisely, prices are assumed to be a markup over unit labor costs, which are defined by wage rates and labor productivity. In this context, see also Tobin (1972) to whom the authors refer.

but he thought it was politically necessary.<sup>4</sup> It is no surprise that he was aware of the technical falsehood, since research conducted after Samuelson and Solow (1960) has shown that the relationship between unemployment and inflation is far from being a mechanistic and stable trade-off.

A speech delivered by Milton Friedman in 1967, which was subsequently published in the *American Economic Review* (Friedman, 1968), contained a twofold criticism of the prevailing contemporary opinions on monetary policy and what it allegedly can accomplish. First, he pointed to the fact that monetary authorities could not keep interest rates pegged for longer than a rather limited period. Second, he argued that they cannot peg the rate of unemployment for very long either. The reason for both restrictions lies in the following argument.

Imagine central bankers would like to lower interest rates. When they increase the rate at which the money supply expands through larger open market operations, interest rates will initially fall as a larger money supply generally leads to a larger supply of credit. Sooner or later, however, price inflation will adjust to this accelerated rate of monetary growth. As price inflation becomes higher, creditors will demand compensation in the form of higher interest rates. We see that Friedman brings in a distinction between short-run and long-run effects of monetary policy. In the short run it may well be possible to lower or increase interest rates by increasing or decreasing the rate of monetary expansion. Yet, in the long run nominal interest rates will increase or decrease again due to higher price inflation or deflation, respectively.

A very similar mechanism is at work in the case of unemployment. It has essentially the same source, but it was less acknowledged at that time. Friedman (1968, p. 7) writes:

The second limitation I wish to discuss goes more against the grain of current thinking. Monetary growth, it is widely held, will tend to stimulate employment; monetary contraction, to retard employment. Why, then, cannot the monetary authority adopt a target for employment or unemployment - say, 3 per cent unemployment; be tight when unemployment is less than the target; be easy when unemployment is higher than the target; and in this way peg unemployment at, say, 3 per cent? The reason it cannot is precisely the same as for interest rates - the difference between the immediate and the delayed consequences of such a policy.

The bridge between the short and the long run is built through *adaptive expectations* formation. More precisely, in Wicksellian spirit, Friedman introduces the concept of the *natural rate of unemployment* as being “consistent with equilibrium in the structure of *real* wage rates”, and as being mainly determined by institutional and political conditions.<sup>5</sup> He

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<sup>4</sup>In response to a critical remark by Schlecht, Schmidt said: “Daß dies fachlich falsch ist, weiß ich selbst. Aber Sie können mir nicht raten, was ich auf einer Wahlveranstaltung vor zehntausend Ruhrkumpeln in der Dortmunder Westfalenhalle zu sagen für politisch zweckmäßig halte.” (Schlecht, 1996) [That it is false I know full well, but you can’t tell me what I should say in front of ten thousand laborers in Dortmund during an election rally, if I deem something else politically necessary. (own translation)]

<sup>5</sup>Friedman (1968, p. 9) clarifies: “To avoid misunderstanding, let me emphasize that by using the term ‘natural’ rate of unemployment, I do not mean to suggest that it is immutable and unchangeable. On the contrary, many of the market characteristics that determine its level are man-made and policy-made.”



argues that in the long run an economy will return to this rate as price inflation expectations adapt to the actual rate of price inflation, even though unemployment can be pushed below that level temporarily by accelerating the rate of monetary expansion.

In the short run, increased sales revenues due to higher nominal demand may trigger an increase in the demand for labor. Yet again, as product prices increase, there will also be an upward pressure on nominal wages, eventually pushing the real wage structure back to equilibrium. This entails a return of the unemployment rate to its *natural* level. This theory of adaptive expectations led to the notion of the expectations-augmented Phillips curve.<sup>6</sup>

Consequently, Friedman's analysis led to a distinction between the short-run Phillips curve, which is downward sloping, and the long-run Phillips curve, which is just a vertical line, exhibiting no relationship at all. This corresponds to the representation that we find in most university textbooks today (Mankiw, 2012, pp. 769ff.; Samuelson and Nordhaus, 2007, p. 947).

A very similar, but more formal exposition of the same idea can be found in Phelps (1968a,b). That is why Gordon (2011, p. 11) refers to this contribution as the "Friedman and Phelps natural rate hypothesis". Lucas (1972) took a similar line of argument. He postulated long-run monetary neutrality by introducing *rational expectations* that adjust immediately in response to policy changes, and not only to observable macroeconomic variables.<sup>7</sup> This contribution can be interpreted in light of the more general Lucas critique, which holds that the effects of changes in policy cannot reliably be predicted on the basis of historical data as policy changes may entail fundamental changes of conditions under which economic agents form expectations and make decisions, and hence empirical relationships in economics are also subject to change (Lucas, 1983).

In fact, it was the New Classical critique of the 1970s that induced the transition from large-scale Keynesian models (Klein and Goldberger, 1955; Klein, 1964; Evans and Klein, 1967), which were essentially elaborated IS-LM models combined with the old Phillips curve (Webb, 1999), towards dynamic stochastic general equilibrium (DSGE) models, which are derived from microeconomic principles. These models have been developed in two directions: the New Classical (Lucas, 1982; Kydland and Prescott, 1982; Cooley and Hansen, 1989), and the New Keynesian (Roberts, 1995; Clarida et al., 1999; Woodford, 2003; Galí and Gertler, 2007; Galí, 2008), and they incorporate different mathematical specifications of the expectations-augmented Phillips curve for which Friedman and Phelps have delivered the theoretical benchmark (Mankiw, 2001, p. 52).<sup>8</sup>

The New Keynesian DSGE approach has become the "workhorse" of monetary policy analysis in recent years (Galí, 2008, p. 41). Models of this kind are used in the major central banks around the world (Smets et al., 2010; Del Negro et al., 2013). All of them incorporate some version of the New Keynesian Phillips curve, which is essentially a mathematical

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<sup>6</sup>Several years before, von Mises ([1924] 1953, pp. 218ff.) had already pointed out that the effects of monetary policy are contingent on the expectations of entrepreneurs and employees.

<sup>7</sup>For an interesting analysis and critique of adaptive and rational expectations, see Gertchev (2007).

<sup>8</sup>Friedman and Phelps's natural rate of unemployment has mostly been replaced by the very similar concept of the *noninflationary rate of unemployment* (NIRU), later termed *non-accelerating inflation rate of unemployment* (NAIRU), as introduced in Modigliani and Papademos (1975, p. 142): "It is defined as a rate such that, as long as unemployment is above it, inflation can be expected to decline."



specification of the expectations-augmented Phillips curve (Roberts, 1995). An important peculiarity is that in many cases price inflation is modeled as a function of the output gap (e.g. Galí, 2008, p. 49; Walsh, 2010, p. 258), that is, the “discrepancy between the actual and natural levels of output” (Woodford, 2003, p. 12), instead of the unemployment gap, defined as the difference between the actual and the natural rate of unemployment. The link to unemployment is drawn implicitly, by assuming a positive link between output and employment, or explicitly by modeling the dynamics of labor markets and incorporating them into the framework (Faia, 2008; Thomas, 2008). Blanchard and Galí (2010, p. 25) conclude that

strict [price] inflation stabilization does not deliver the best monetary policy. [...] Optimal monetary policy implies some accommodation of inflation, and limits the size of the fluctuations in unemployment.

Compared to Fisher’s proposition of the 1920s, there are two major differences. Not the price level itself should be seen as the target, but its rate of change, that is, the rate of price inflation. This target should not necessarily be stabilized but accommodated to the given situation. In general, money and credit should be expanded in response to economic downturns, which reiterates the idea of positive short-term effects of inflation.

From a theoretical point of view, the contemporary mainstream view is thus still very close to the Friedman-Phelps analysis. It is argued that we can lower actual unemployment around its natural level, and thereby improve economic conditions in the short run through monetary expansion, but that this very expansion is neutral in the long run. However, if we think of the long run as being a sequence of consecutive short runs, then we should be able to improve conditions in the long run as well, as we can improve conditions in each of the short runs. Unfortunately, this seems to be impossible as price inflation would have to be pushed to unexpected heights each time, which would rapidly lead to the destruction of the currency with obvious detrimental effects.

From an empirical perspective, it is also difficult to support the alleged long-run neutrality of price inflation (Niskanen, 2002; Reichel, 2004; Moghaddam and Jenson, 2008; Mulligan, 2011). The emergence of stagflation in the 1970s and 80s was instrumental in nursing doubts about the validity of the Phillips curve analysis. Usually, however, these periods are explained by reference to some sort of exogenous supply shocks (Blinder and Rudd, 2013), that shifted the Phillips curve towards more unemployment and price inflation.

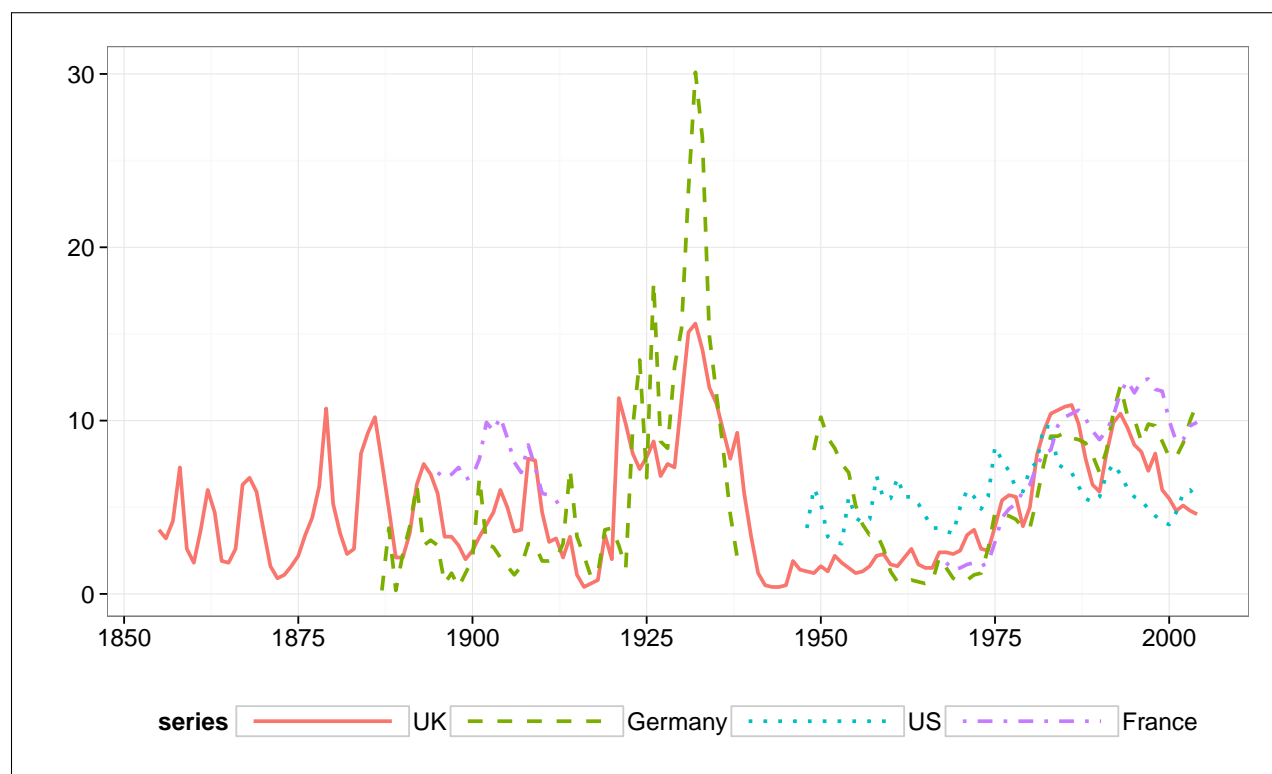
In the following section, we will analyze data from the United States, the United Kingdom, Germany and France over the past 60 years. The statistical analysis is entirely descriptive and should merely provide a clearer picture of the relationship that is to be explained in Section 4.

### **3 Some empirical evidence on price inflation and unemployment**

Figure 1 shows more or less fragmentary time series of unemployment rates for the United Kingdom, the United States, France and Germany covering roughly the past 150 years. We

can clearly observe the disturbing effects of the Great Depression during the 1930s with unemployment rates of up to 30 per cent in Germany and above 15 per cent in the United Kingdom. After the Second World War a convergence of unemployment rates towards a level which we might call *full employment* occurred. By 1960, unemployment rates were down to 1.7 per cent and 1.3 per cent in the United Kingdom and Germany, respectively. Until 1970, they remained below 3 per cent in both countries. In Germany unemployment was even below 1 per cent most of the time. Only in 1967 and 1968, was it at 2.1 and 1.7 per cent, respectively.

Figure 1: Unemployment rates in Germany (1887-1938; 1949-2004), France (1895-1913; 1968-2004), the United Kingdom (1855-2004) and the United States (1948-2004)



Sources of data: Mitchell (2007), for U.S. and French data see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

In the 1970s, unemployment rates initially remained at relatively low levels, but by 1976, they were up to 5.4 per cent in the United Kingdom and 4.6 per cent in Germany, which is still comparatively moderate by the standards of the decades to come. The unemployment rate in France at that time was around 4.4 per cent. However, subsequently we can observe a trend towards rates well above 10 per cent. In 1993, they are up to 10.4 per cent in the United Kingdom, 12.0 per cent in Germany and 11.6 per cent in France.<sup>9</sup>

The available data for the U.S. tell a slightly different story. Although one might argue that they follow the same overall pattern, that is, a rising trend over the 1970s and 80s

<sup>9</sup>The chosen countries are no exceptions. We can observe the same trend in almost any other European country. An extremely drastic example is Spain, where we had an unemployment rate of only 1.5 per cent in 1968. Yet, from 1994 until 1997 it has been above 20 per cent (Mitchell, 2007).

until the early 1990s, their amplitude is clearly smaller. Unemployment rates have neither been as low as in the U.K., France and Germany in the 1950s, nor have they been as high in more recent decades.

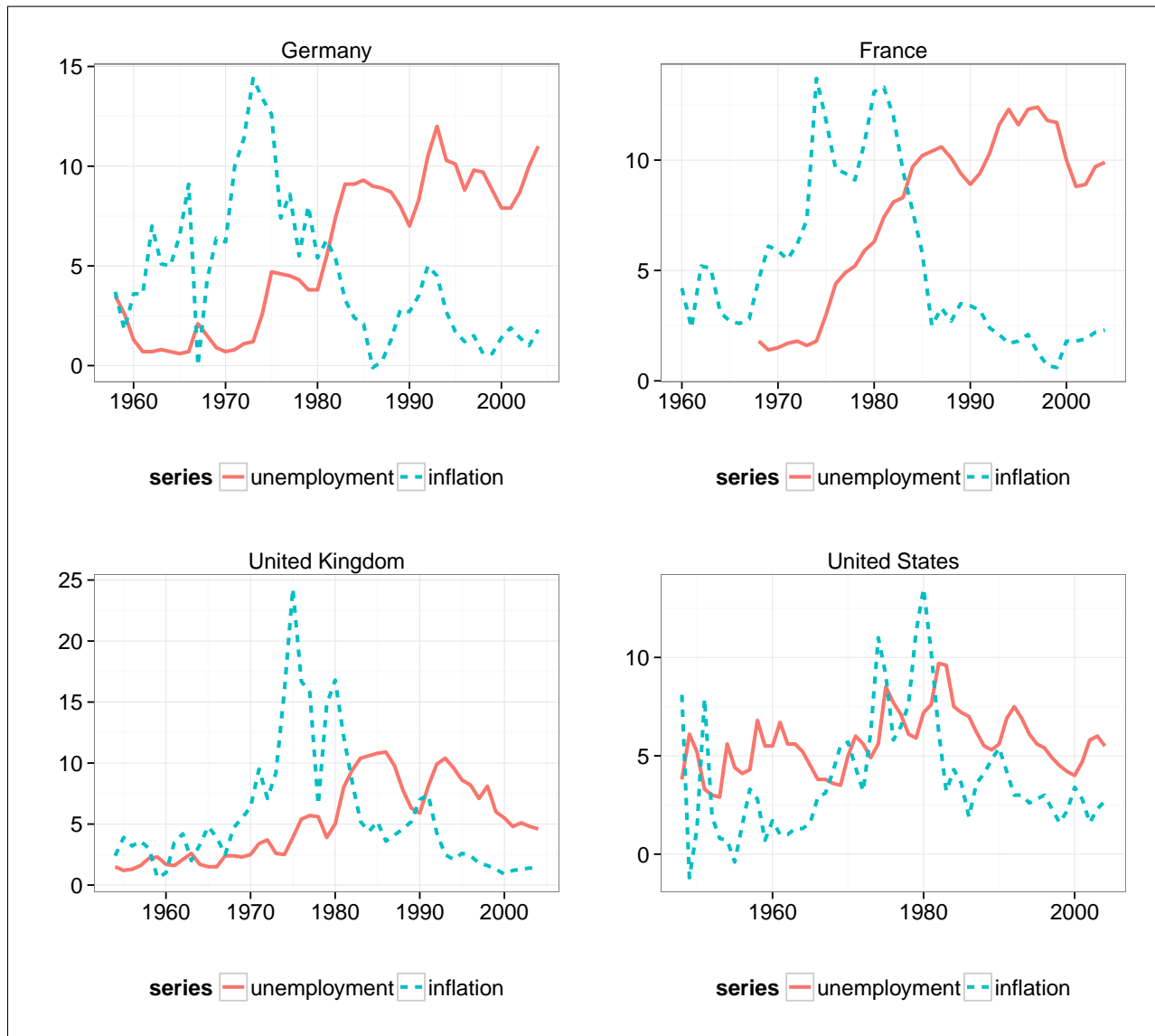
How do these more recent developments of unemployment compare to fluctuations of price inflation rates? The top left panel of Figure 2 shows unemployment and price inflation rates in Germany from 1956 to 2004. If we look carefully, some episodes which might vindicate the short-run Phillips curve analysis become visible. In particular, around 1973, 1981 and 1991, decreasing rates of price inflation coincided with increasing unemployment. From 1986 to 1990, price inflation rates increased and unemployment fell. Yet, those periods never lasted longer than five years. We also find years in which price inflation and unemployment rates move in the same direction, contradicting the short-run Phillips curve. After 1990, both series seem to follow almost synchronous paths.<sup>10</sup> Hence, the short-run relationship is empirically ambiguous, although it is negative overall (see Table 1 on page 12).

The top right panel shows the same plot for France. Again, we encounter various episodes in which unemployment rates and price inflation rates tend to move in opposite directions, as for example from 1981 to 1986, but also some in which they move in the same direction, like around 1973. Analogously, for the United Kingdom and the United States which are shown in the bottom panels of Figure 2, we find both, episodes vindicating and contradicting the short-run Phillips curve.

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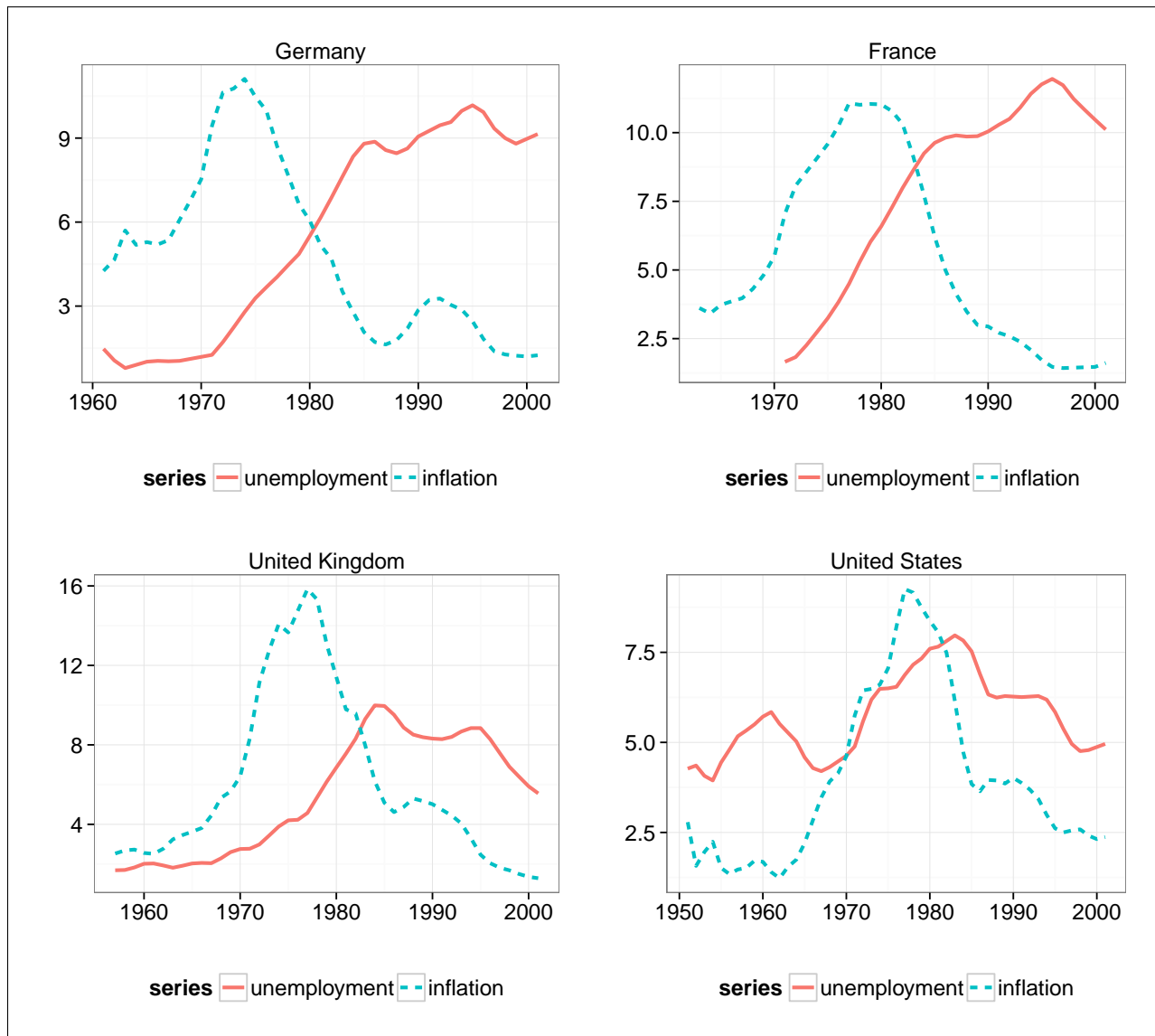
<sup>10</sup>The two series still fail a formal test for cointegration, both for the entire period as well as the sub-period after 1993. If we fit a linear model between both series and apply the augmented Dickey-Fuller test to the residuals, we cannot reject the null hypothesis of non-stationarity on the 10 per cent confidence level. The p-values are 0.34 and 0.91 for the entire series and the sub-period, respectively.

Figure 2: Unemployment rates and price inflation rates for Germany, France, the United Kingdom and the United States in the second half of the 20th century



Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

Figure 3: Unemployment rates and price inflation rates as seven-year moving averages for Germany, France, the United Kingdom and the United States in the second half of the 20th century



Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

We note that the overall pattern in all four countries is astonishingly similar. In Figure 3, short-run fluctuations have been smoothed out by computing seven-year moving averages of both series.<sup>11</sup> Far from being perfectly connected, it seems as if unemployment is following price inflation with a considerable time lag. Price inflation rates in Germany increased from 1960 to 1973. So did the rate of unemployment from 1970 to 1985. Price inflation rates after 1973 show a decreasing trend and unemployment remains rather stable, around 9 per cent, after 1985. The time lag thus lies between 10 to 12 years.

For France and the United Kingdom, each of the two smoothed series can likewise be separated into an upward sloping segment, followed by a downward sloping segment. There is again a time lag of about the same size as for Germany between the two peaks - roughly a decade. If we shift the moving average of unemployment rates ten years backward in time, it almost overlaps the moving average of price inflation rates. In the case of the United States, the pattern is not as clear-cut. In fact, the time lag between both series seems to be substantially shorter.

This is also reflected in Table 1 on page 12, where the correlation coefficients between unemployment and price inflation in the U.S. are maximized ( $> 0.6$ ) when unemployment is shifted two to three years backward in time, instead of ten to twelve years as for the other countries.

Table 1: Bravais-Pearson correlation coefficient for unemployment rates and price inflation rates in Germany, France, the United Kingdom and the United States for the second half of the 20th century; unemployment rates have been shifted backwards in time by the respective time lag.

time lag	Germany	France	U.S.	U.K.
0	-0.60	-0.61	0.25	-0.03
1	-0.49	-0.47	0.55	0.14
2	-0.41	-0.32	0.66	0.24
3	-0.36	-0.19	0.65	0.29
4	-0.34	-0.08	0.52	0.34
5	-0.33	-0.01	0.41	0.44
6	-0.31	0.05	0.48	0.56
7	-0.29	0.14	0.49	0.63
8	-0.22	0.20	0.37	0.62
9	-0.09	0.25	0.24	0.61
10	0.05	0.31	0.29	0.64
11	0.13	0.38	0.27	0.66
12	0.20	0.47	0.31	0.64

Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

Moreover, the table shows that for the United States and the United Kingdom there is

<sup>11</sup>Each observation has been replaced by the arithmetic average of the seven observations closest to it with respect to time, which includes the observation itself, as well as the three preceding and subsequent observations.

very little evidence for a short-run Phillips curve trade-off. The Bravais-Pearson correlation coefficient for the U.K. without shifting the unemployment series (time lag equal to 0) has a negative sign ( $-0.03$ ), being so close to zero that it is better interpreted as exhibiting no linear relationship at all. This is also shown in the bottom left panel of Figure 4. All other coefficients are positive and increase up to a certain point ( $0.66$  for a time lag of 11 years) as we shift the unemployment series backward in time.<sup>12</sup>

In contrast, the data for Germany and France reveal a negative short-run relationship between unemployment and inflation as shown in the top panels of Figure 4. From Table 1 we see that the correlation coefficients gradually increase as we shift the unemployment series backward in time. The effect is somewhat weaker for Germany. The correlation coefficient is just slightly above zero ( $0.05$ ) for a time shift of ten years and increases further for shifts of eleven and twelve years ( $0.11$  and  $0.20$ ).

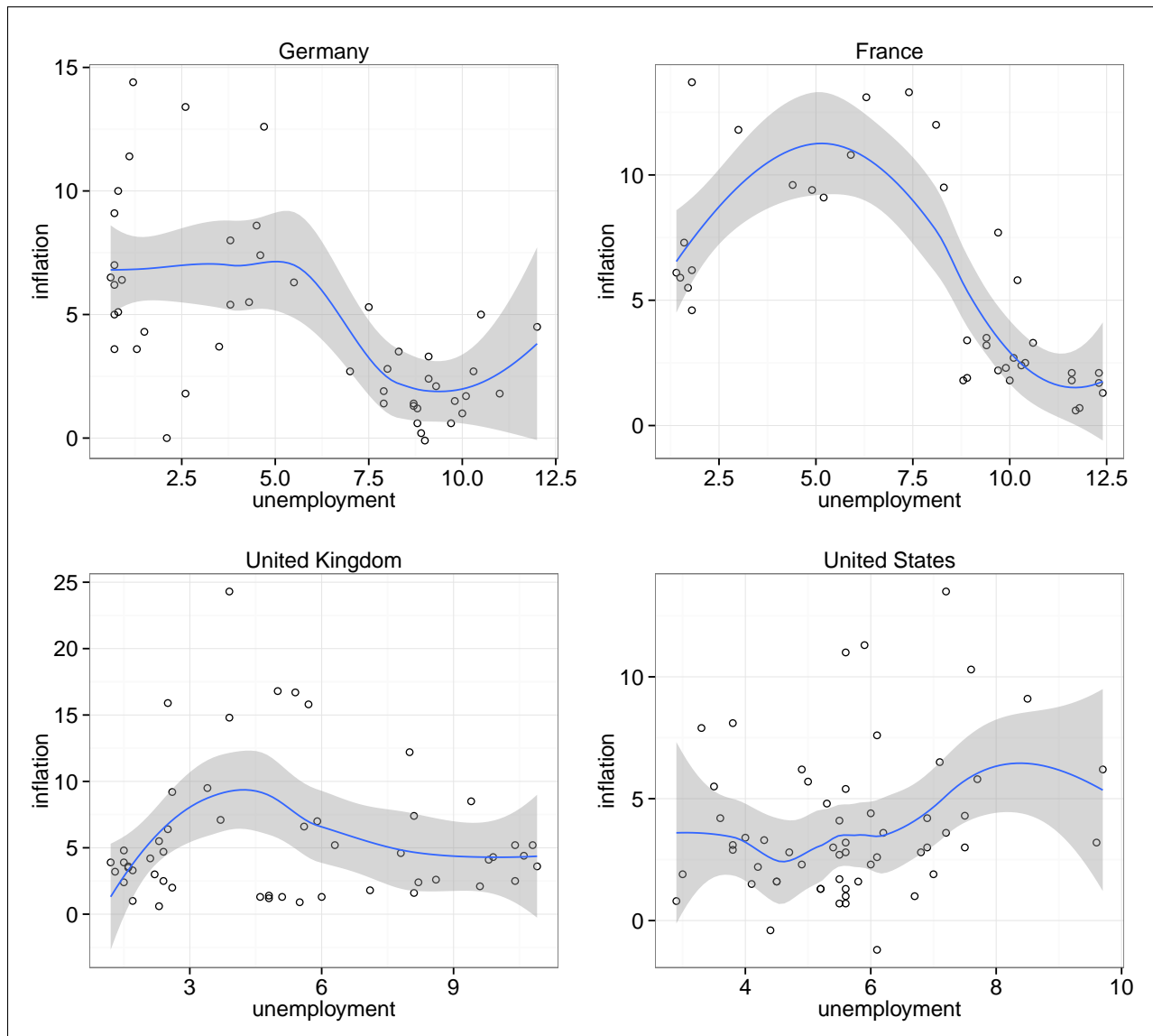
If we consider first order differences of the time series as shown in Figures 5 and 6, that is the changes of price inflation and unemployment rates from one year to the next, we also find evidence for a short-run Phillips curve trade-off in the U.K and the U.S. An accelerating rate of inflation is associated with decreasing unemployment.

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<sup>12</sup>Spearman's rank correlation coefficient for the U.K. increases up to values above  $0.7$  for shifts of ten to twelve years. This statistic has been considered for a very specific reason. Already Philipps argued that the relationship, on theoretical grounds, is "likely to be highly non-linear." (Phillips, 1958, p. 283). Investigating the relationship between the rate of change of money wages and unemployment, he argued that wages might be bid up rather quickly if very few workers are unemployed. Conversely, with a large number of workers being unemployed and the demand for labor being low, wages tend to fall slowly as workers are reluctant to offer their services at wages below the prevailing wage level. Under the assumption that the rate of change of money wages equals the increase of labor productivity minus inflation, the argumentation may well extend to the general price level within the economy. In this case, Spearman's coefficient would be a more appropriate measure as it looks for a monotonic, but not necessarily linear relationship. However, the differences between both statistics are not substantial and hence are not further discussed in the paper.

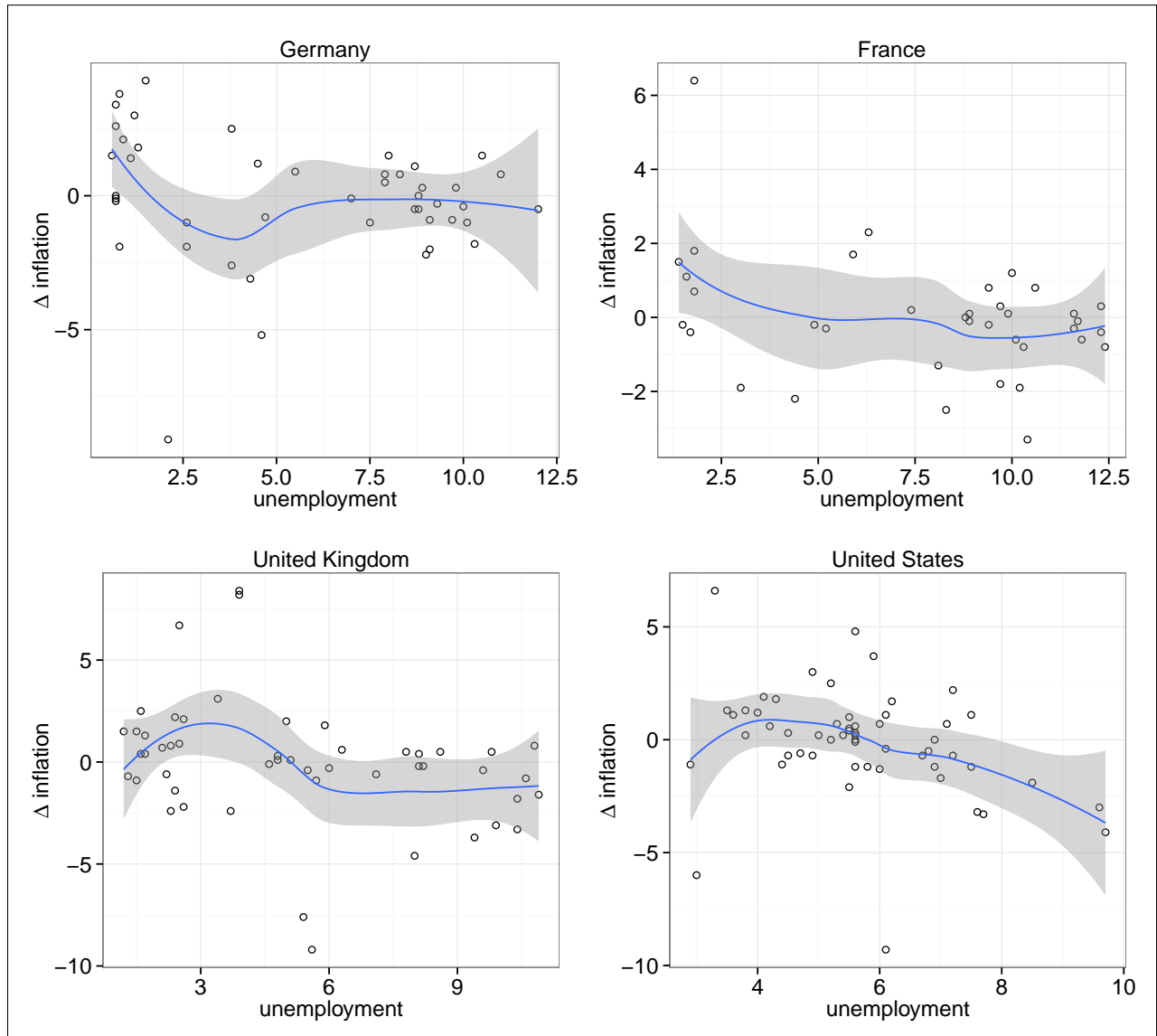


Figure 4: Scatterplots of unemployment rates and price inflation rates for Germany, France, the United Kingdom and the United States in the second half of the 20th century; loess smoother (blue) with 95 per cent confidence band (grey)



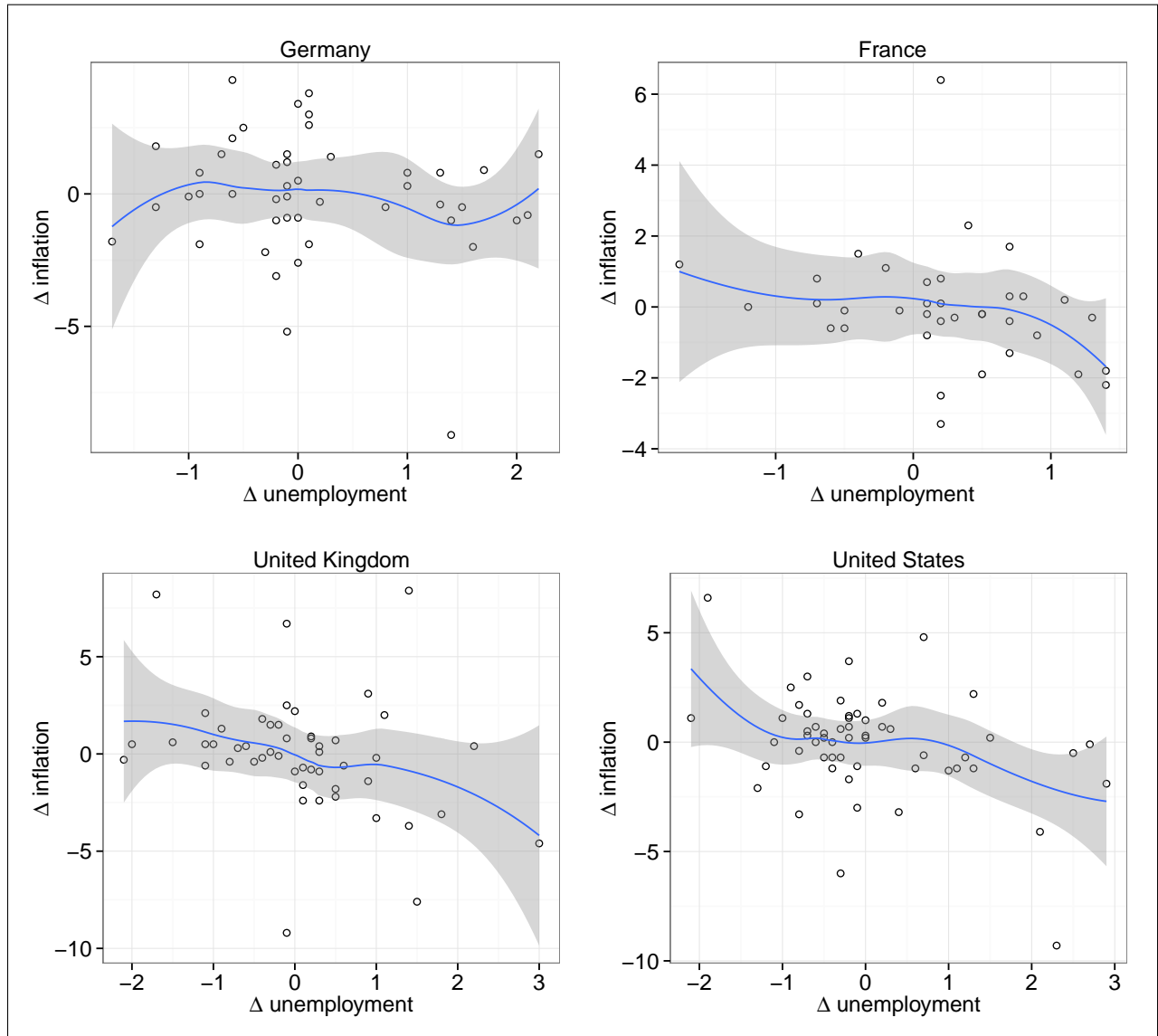
Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

Figure 5: Scatterplots of unemployment rates and first order difference of price inflation rates for Germany, France, the United Kingdom and the United States in the second half of the 20th century; loess smoother (blue) with 95 per cent confidence band (grey)



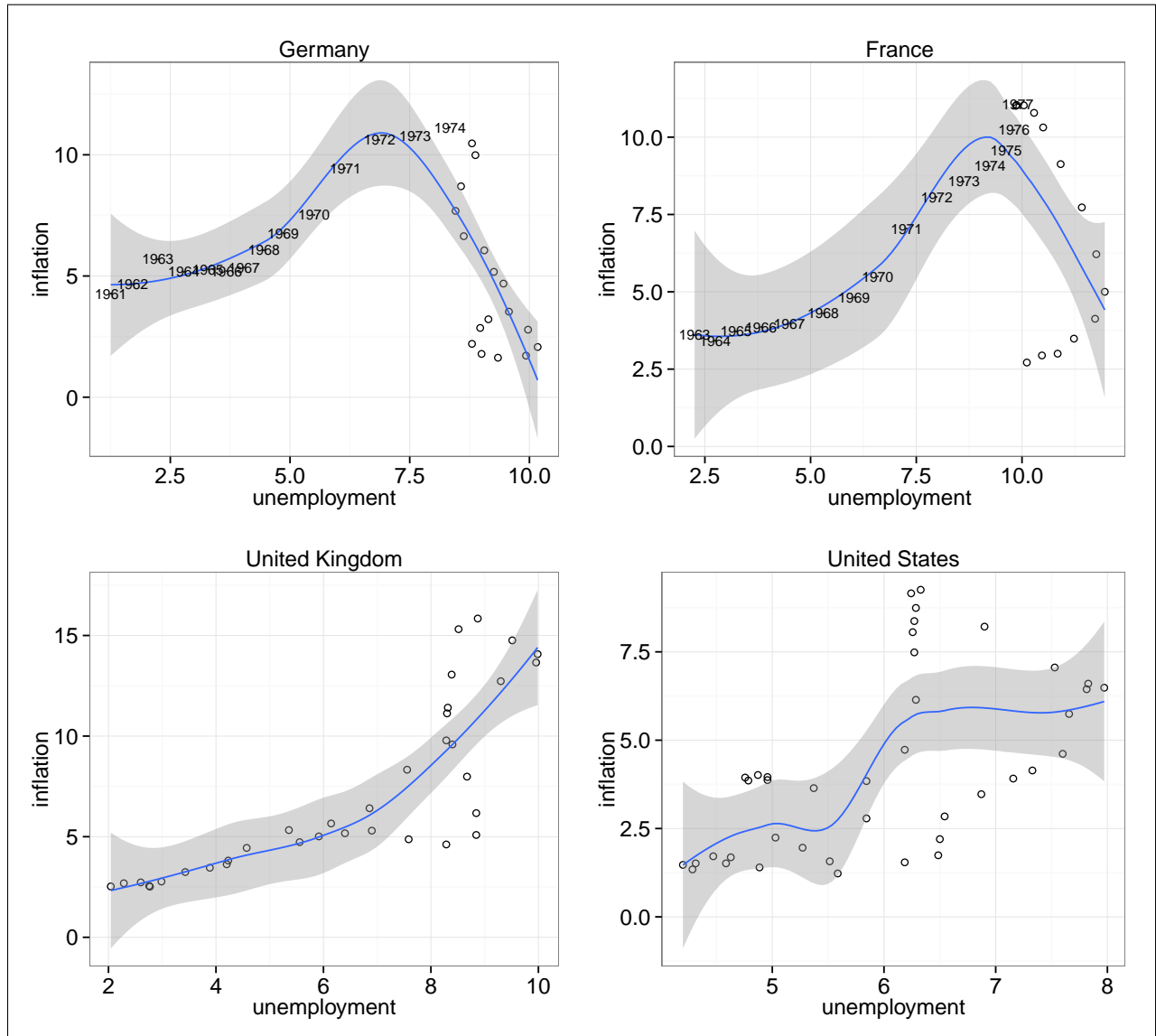
Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

Figure 6: Scatterplots of first order difference of unemployment rates and first order difference of price inflation rates for Germany, France, the United Kingdom and the United States in the second half of the 20th century; loess smoother (blue) with 95 per cent confidence band (grey)



Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

Figure 7: Scatterplots of unemployment rates and price inflation rates as seven-year moving averages for Germany, France, the United Kingdom and the United States in the second half of the 20th century; unemployment rates are shifted backwards in time by ten years; loess smoother (blue) with 95 per cent confidence band (grey)



Sources of data: price inflation rates from Reinhart and Rogoff (2009); for unemployment rates of the U.K. and Germany see Mitchell (2007); for U.S. and French data on unemployment see data bases of the *Bureau of Labor Statistics* (BLS) and the *Insee*

The scatterplots of the smoothed data for a time shift of ten years are given in Figure 7. Again, we find evidence for a positive long-run link between price inflation and unemployment for the United States and the United Kingdom, and somewhat weaker evidence for Germany and France. For the latter two countries the fitted loess smoother initially increases, suggesting a strong positive link, but for high unemployment rates, above 8 per cent in Germany and above 10 per cent in France, the positive link collapses. Interestingly, the observations of the upward sloping segments correspond in exact chronological order to the price inflation rates from the 1960s to the mid 1970s and accordingly to unemployment rates from the 1970s to the mid 1980s.

It would be rather presumptuous to try to explain every particularity of the data. However, the overall positive link between present price inflation and future unemployment stands out. In the following section, we will provide an explanation for why this empirical finding should not come as a surprise, and why it might be worth rethinking long-run neutrality of inflation.

## 4 Reconsidering long-run neutrality of inflation

The short-run effect of monetary expansion is well described by the Phillips curve. Although it is difficult to provide clear-cut empirical evidence, the initial stimulating effect is supported on theoretical grounds. Yet, the positive link between price inflation and long-term unemployment as illustrated in the previous section is so distinctive that several explanations have been proposed in order to rescue the natural rate hypothesis from simply being rejected. Most of these explanations refer to exogenous factors, such as supply shocks (Blinder and Rudd, 2013), demographics, the wages aspiration effect, or the impact of globalization (Stiglitz, 1997, pp. 6-7), that have shifted the natural rate of unemployment over time.

The idea of hysteresis in unemployment is an attempt to explain the development endogenously (Blanchard and Summers, 1986; Ball, 2009). It is argued that the deviation of the actual rate of unemployment from the natural rate might have an impact on the natural rate itself. When the actual rate is above the natural rate for an extended period of time, for example, then the natural rate might increase as the “unemployed become detached from the labor markets” (Ball, 2009, p. 6) and so the problem becomes perpetual. In a sense, this idea rejects long-run neutrality and can be interpreted as an even stronger argument for monetary inflation in order to stimulate aggregate demand and keep the actual rate of unemployment close to or even below the natural rate. However, very few economists concerned with the Phillips curve have asked the question of whether monetary inflation itself may set processes in motion which tend to increase the natural rate of unemployment in the long run.

Hence, in this section, two unintended consequences of monetary inflation that have been mostly neglected in the literature on the Phillips curve so far are incorporated into the framework: redistributive effects (Section 4.1), and business cycle fluctuations (Section 4.2). Strictly speaking, we do not attempt to establish a direct causal relationship between price inflation and long-run unemployment, but rather an indirect connection, which is contingent on further political interventions in response to these consequences. We may

thus interpret the following analysis as an application of the theory of interventionist spirals (von Mises, 1977).

Although the standard Phillips curve analysis attempts to draw conclusions for monetary policy in order to improve the real economy, it is the unemployment or output gap as a real variable that is usually presented as explanatory. The nominal variable of price inflation is presented as explained. This view is partly reversed in the following. Unemployment as well as price inflation are considered to be explained variables. The ultimate cause, from which our analysis proceeds, is expansionary monetary policy.

The first argument builds on redistributive effects of monetary expansion, and in particular the recent contributions contained in Hülsmann (2013, 2014). The second argument is based on the Austrian theory of the trade cycle that was introduced by von Mises ([1924] 1953) and further developed by von Strigl ([1934] 2000) and von Hayek ([1931, 1933, 1935] 2008).<sup>13</sup> It is thus an elaboration of the ideas indicated in Bellante and Garrison (1988), Mulligan (2011), and Ravier (2011, 2013).

#### 4.1 Redistributive effects of monetary expansion

Under the assumption that wages are more rigid than prices of final products, the positive short-run effects of monetary expansion on unemployment can be explained by diminishing relative labor costs. If output prices increase faster or earlier than the price for labor, entrepreneurs will have an incentive to hire more workers, which tends to lower unemployment. It is clear that when workers or labor union leaders, who act on their behalf, anticipate the rate of price inflation correctly, they will demand compensation in the form of higher wages and the effect collapses. If they overestimate the rate of price inflation, the effect on employment might even be negative. In any way possible, the effect can only be short-lived, since wages will sooner or later adjust to the actual purchasing power of the monetary unit, or alternatively, workers may adjust their labor productivity, which is not a constant given in nature. According to this rationale, monetary expansion can lower unemployment only for a rather short period of time, and if it does so, it is only possible because workers and labor unions are tricked by unexpected inflation (Ackley, 1983, p. 10).<sup>14</sup>

Employers and employees will in the long run adjust their contracts to the actual rate of price inflation. However, a persistent depreciation of the exchange value of money vis-à-vis other goods and services, induced through monetary expansion, has negative side-effects, at least for some groups in society.

First of all, we have to abandon the mechanistic view that all prices and wages within the economy grow synchronously under inflation (von Hayek, 2008, pp. 197ff.). There

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<sup>13</sup>Another work that essentially ingested this theory is Robbins (1934). Further contributions and another application of the theory to the Great Depression can be found in Rothbard ([1963] 2000). Huerta de Soto (2006) provides a contemporary exposition of the theory, which among other things contains contributions from a judicial point of view. See also Salerno (2012) for a reformulation and defense of the theory in light of the recent financial crisis.

<sup>14</sup>An alternative to the traditional sticky wages theory for explaining the short-run trade-off between price inflation and unemployment is the new Keynesian theory of monopolistic competition and sticky prices. See Mankiw (2001, pp. 49-50) for a brief overview.

will always be some wages and prices that increase faster and earlier than others. When money is created, it does not increase all cash balances and incomes in exact proportion to the cash balances and incomes as they existed before. Therefore, it will benefit some - those who receive disproportionately more - at the expense of others - those who receive disproportionately less. In particular, those who receive the newly created money first benefit, as they are able to make more purchases for still relatively low prices. As the additional money is spent, it gradually bids up prices. Those who have not yet received any of the newly created money or only receive their shares later are worse off, as they are confronted with rising prices but still constant or relatively low incomes. These distributional effects of monetary inflation have become known as Cantillon effects.<sup>15</sup>

Under modern central banking, commercial banks and other financial institutions are usually the first receivers of the newly created money. It is not astonishing that under a fiat money system, price inflation rates tend to be higher, as seen in the previous section, and financial markets tend to grow much faster than they would under commodity money standards with full reserve requirements (Levine, 2005). The first beneficiary of monetary expansion in the current system, therefore, is the financial industry itself. There are three main reasons why the growth of financial markets is triggered by monetary expansion:

- (1) because financial titles are particularly useful collateral in debt contracts;
- (2) because foreseeable price-inflation, a common consequence of fiat money systems, discourages money hoarding and encourages both the demand for, and the supply of, financial titles;
- (3) because the production of money through central banks is a matter of sheer human will and therefore creates moral-hazard problems leading to both an artificially high demand for financial titles, and an artificially big supply thereof. (Hülsmann, 2014, p. 130)

The growth of financial markets and the increase of the relative value of financial assets leads to a higher wealth to income ratio (Piketty, 2014, pp. 164ff.). This is not problematic for those who are already wealthy and possess assets, but for those who do not, it diminishes the chances of catching up. Consequently, monetary expansion decreases upward social mobility, and “thus contribute[s] to turning a free society into a caste society” (Hülsmann, 2014, p. 130).

An important leverage effect lies in the selective and discriminatory nature of granting commercial bank credit (Doumposa et al., 2002). Commercial banks create money on top of the base money supply through the extension of loans. Relatively wealthy people, who have stable streams of income, can service higher debts and they usually have to pay lower interest rates as they are more credit-worthy and exhibit lower default risks. Hence, they are able to acquire a larger share of the newly created money. The economics of Cantillon effects tells us that they benefit disproportionately, since they can purchase more goods,

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<sup>15</sup>They are named after the Irish-French economist Richard Cantillon (1755). It should also be mentioned here that these redistributive effects do not depend on the actual emergence of price inflation. As long as the money supply is expanded, prices will be higher than they would otherwise have been, and a redistribution of wealth from the late receivers to the early receivers of the new money takes place. For an attempt to explain the counterfactual nature of economic propositions like this, see Hülsmann (2003).



services, and real assets for still relatively low prices. We might interpret this effect as a redistribution from bottom to top.<sup>16</sup>

This unintended consequence of monetary expansion, namely the rising gap between rich and poor,<sup>17</sup> motivates further political interventions, especially in countries governed by egalitarian politicians, who are more likely to be voted into office when the redistributive effects of inflation foster egalitarian sentiments among the electorate (Brown, 1988).

For example, more power is given to trade and labor unions in collective bargaining. Labor laws are adjusted in order to protect and support employees, and in particular low wage earners. Minimum wage and job protection laws are cases in point. These interventions generally render labor markets less flexible and tend to increase the natural rate of unemployment (Hutt, 1954, 2011; Nickell, 1997).

On a much more fundamental level, the growing inequalities are instrumental in generating public support for a stronger welfare state. In the short run a growing welfare state might be financed by further monetary expansion and deficit spending. In the long run, however, it can only be sustained through tax increases. The corresponding political measures have of course numerous effects, but regardless of possible advantages, when it comes to employment, they can only have a negative impact.

Higher tax rates render businesses less profitable. There will be less investments and fewer workers will be employed (e.g. Rothbard, 1977, ch. 4; Reisman, 1998, chs. 9, 10 and 11; Hoppe, 2006, ch. 2; Salin, 2014). If labor laws increase the responsibilities and obligations of employers towards their employees, there are fewer incentives to hire people. Therefore, unemployment tends to increase, even more so, when the welfare state takes away incentives to work through unemployment insurance (Rueff, 1931).

Moreover, large firms and corporations that are well established and connected on the market are benefited by credit expansion and inflation, since they can refinance their activities much more easily on the financial markets than smaller firms and newcomers

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<sup>16</sup>It should be mentioned that recent empirical studies support the connection between credit expansion (or leverage) and inequality (Malinen, 2014; Kumhof et al., 2015). In contrast, these studies commonly assume that inequality is the causal factor that leads to higher leverage and ultimately to economic crises (Rajan, 2010). Credit expansion must however be seen as a tool of monetary policy, and hence excessive leverage as a political phenomenon. It is true that rising inequality tends to call forth political responses. Yet, these responses, as we will argue below, are mostly fiscal and not monetary.

<sup>17</sup>That there is a rising gap between rich and poor is generally accepted (Piketty, 2014). However, very little attention is given to the role of expansionary monetary policy in that development. Interestingly, Piketty writes at some point:

But when inflation remains high for a considerable period of time, investors will try to protect themselves by investing in real assets. There is every reason to believe that the largest fortunes are often those that are best indexed and most diversified over the long run, while smaller fortunes - typically checking or savings accounts - are the most seriously affected by inflation. (p. 214)

In this assessment Piketty is right, but he does not put much effort on elaborating on this point, although he recognizes that “[s]ince the 1970s, income inequality has increased significantly in rich countries, especially the United States, [...]” (p. 22) That the 1970s involve a fundamental change in the financial order after the Nixon Shock, which was followed by very high price inflation rates as we have seen above, is however not discussed in this context.

(Hülsmann, 2008, pp. 180ff.). This provides big businesses with the opportunity to operate under higher leverage ratios. Hence, credit expansion serves as a means to deprive themselves of unpleasant competition.

Higher tax rates are effective in the same way. A successful and innovative newcomer usually satisfies the needs of consumers better than his competitors because he improves an existing product or develops a completely new one that consumers demand. He therefore obtains relatively high revenues, at least temporarily while the competitors adjust their products. Yet, if a larger share of his revenues is taxed away, he partly loses his most important advantage that would help him to hold his ground and compete against well established firms and corporations for longer periods.<sup>18</sup>

To the extent that credit expansion benefits large firms and corporations at the expense of smaller firms and newcomers, it reduces competition among employers, destroys job opportunities and demand for labor, and hence tends to increase labor market rigidity and unemployment.<sup>19</sup> This effect may even be reinforced under a corporatist government, as opposed to the egalitarian version mentioned above. In recent years, corporatist inclinations have manifested themselves among other things in the *too big to fail* argumentation (Stern and Feldman, 2004; Ennis and Malek, 2005). Yet, it should be mentioned that corporatist and egalitarian governments are not mutually exclusive categories, as one and the same government could, for example, pursue corporatist measures when it comes to economic policies, and egalitarian measures when it comes to welfare policies.

Finally, the effect of the bracket creep under a system of progressive taxation should not be neglected (Heer and Süßmuth, 2013). When incomes are pushed into higher tax brackets through inflation, the private sector is deprived of a larger proportion of its income. This effectively diminishes the capacity and the incentives to save and invest, and thereby tends to lower output and increase unemployment.

## 4.2 Cyclical downturns from monetary expansion

The second argument that can help us trace a connection between price inflation and future unemployment builds upon the Austrian theory of the trade cycle as introduced by Ludwig von Mises. In essence, von Mises developed his theory out of three components

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<sup>18</sup>This problem has implicitly been acknowledged by some governments who introduced tax exemption schemes for start-up companies, like the Singaporean government in 2005.

<sup>19</sup>This view of course stands in sharp contrast to Schumpeter's take on credit expansion and inflation. He characterized it as a means to finance the ventures of bright entrepreneurs with innovative ideas who lack capital. In his view, it increases competition and innovation (Schumpeter, 1983, ch. 3). However, Hülsmann (2008, pp. 181-182) provides a suitable rebuttal:

Indeed, the economist Joseph Schumpeter has famously characterized fractional-reserve banks as being some sort of mainspring of economic development.[...] He argued that such banks may use their ability to create credit out of thin air (*ex nihilo*) to provide funding for innovative entrepreneurs. It is conceivable that in some cases they played this role, but the odds are overwhelmingly on the other side. As a general rule, any new product and any thoroughgoing innovation in business organization is a threat for banks, because they are already more or less heavily invested in established companies, which produce the old products and use the old forms of organization.

(e.g. Rothbard, 1988, pp. 21-22; Hülsmann, 2007, ch. 6).

First, he incorporated elements from the cycle theory of the *currency school*, which was basically a theory of liquidity shortages on international financial markets under fractional reserve banking, but did not extend to the real economy. Second, he made use of the differentiation between the *natural rate of interest* and the *money rate of interest* as introduced by Wicksell ([1898] 1962). The natural rate of interest is defined as the rate at which capital markets, in real terms, are in equilibrium, that is, a state in which demand for and supply of real savings are equal to each other. The latter is simply the nominal rate of interest that actually occurs on the market. The third component is the capital theory of von Böhm-Bawerk ([1888] 1930).

Eugen von Böhm-Bawerk emphasized the importance of the *structure of production* and its essential ingredient: capital, which is heterogeneous by nature. He separated production into different stages in which different kinds of capital goods are used. As more stages and capital goods enter the structure of production, output and productivity increase. In the course of economic progress, there is a transition to what von Böhm-Bawerk called *roundabout* methods of production.<sup>20</sup>

Von Böhm-Bawerk noticed that the transition to more roundabout methods of production can only be successful when there are the necessary means of subsistence for the time it takes to build up the new structure of production, in other words, when there is a sufficient amount of real savings (see also von Strigl, 2000, pp. 6ff.). They are the basis for the completion of investment projects. Von Mises recognized that it is in fact the role of interest rates to coordinate investment projects according to the available subsistence fund in the economy.

If people save more, that is, if they forego consumption opportunities today, interest rates tend to decrease, as more funds become available for investments. If people save less, interest rates tend to increase. It is the rate of time preference which determines the willingness to save. Interest rates paid on the financial markets can then be understood as an aggregate of individual time preferences, or a reflection of *societal time preference*. Hence, the crucial point of von Mises' theory is that interest rates are not arbitrary numbers that could and should be interfered with politically. They should be allowed to reflect the natural rate of interest, which accommodates investment projects, and hence the roundaboutness of production, to the amount of real savings available in the economy.

When central banks expand credit through artificially low interest rates, they essentially push the money rate of interest below the natural rate of interest. Under these conditions, investment projects that would have been unprofitable otherwise appear to be profitable

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<sup>20</sup>See for example von Böhm-Bawerk (1930, pp. 18-19), where he describes the concept of *roundaboutness* for the first time:

We either put forth our labor just before the goal is reached, or we, intentionally, take a roundabout way. That is to say, we may put forth our labor in such a way that it at once completes the circle of conditions necessary for the emergence of the desired good, and thus the existence of the good immediately follows the expenditure of the labor; or we may associate our labor first with the more remote causes of the good, with the object of obtaining, not the desired good itself, but a proximate cause of the good; which cause, again, must be associated with other suitable materials and powers, till, finally, - perhaps through a considerable number of intermediate members, - the finished good, the instrument of human satisfaction, is obtained.

and are undertaken. In particular, capital intensive long-term investments that include more stages and more roundabout methods of production are affected, since they are more sensitive to changes in interest rates.<sup>21</sup> This means that investments are undertaken that cannot be sustained given the amount of real savings available in the economy, because people do not necessarily consume less. They might even consume more, especially when money is also borrowed for consumptive purposes (Salerno, 2012). Although the economy lacks the necessary means of subsistence, a transition from the existing structure of production towards a more roundabout structure of production is set in motion.

Initially, this leads to an economic boom as more investment projects, particularly more roundabout ones, are started than would otherwise be the case. Consequently, the demand for labor tends to increase, which lowers unemployment. Hence, the relationship of the short-run Phillips curve can be explained using this theoretical framework (Bellante and Garrison, 1988; Mulligan, 2011; Ravier, 2011, 2013). If the expansion of money and credit exceeds a certain level that offsets possible price diminishing factors such as productivity gains, it will lead to price inflation that coincides with the boom period and increased employment over the short run.

However, sooner or later the mismatch between real savings and investments will become apparent, when relative prices adjust accordingly. This is when the heterogeneous nature of capital goods and their application in different stages of production come into play.

Through the investment projects that are stimulated, an accelerated bidding process for the available means of subsistence as well as non-specific capital goods that can be employed in many if not all stages of production begins. Yet, the means of subsistence and non-specific capital goods are scarcer than it is reflected by interest rates, since real savings have not actually increased. Higher demand will push prices further up and render the costs of investment projects higher than initially expected. It turns out that not all the investment projects can be finished given the amount of real savings in the economy.<sup>22</sup>

Labor and non-specific capital goods have however been attracted to those projects in order to produce specific capital equipment needed in certain stages of production. Necessarily, some of the projects have to be liquidated. Businesses go bankrupt and employees lose their jobs. The capital has to be redirected into productive and sustainable methods of production if possible. However, to the extent that specific capital goods

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<sup>21</sup>Imagine a rate of interest of 5%. If we have to lend 1000 euros for an investment project that enables us to repay the loan after one year, we have to bear costs of 50 euros due to interest payments. For an investment project that enables us to repay the loan only after 10 years, interest payments would amount to 629 euros. Yet, if the interest rate was only 2.5%, interest payments for both investment projects would be 25 euros and 280 euros, which corresponds to relative cost reductions of 50% and 55%, respectively.

<sup>22</sup>Hayek (2008, p. 272) compares this situation to a hypothetical scenario of a people on an isolated island:

The situation would be similar to that of a people of an isolated island, if, after having partially constructed an enormous machine which was to provide them with all necessities, they found out that they had exhausted all their savings and available free capital before the new machine could turn out its product. They would then have no choice but to abandon temporarily the work on the new process and to devote all their labor to producing their daily food without any capital. Only after they had put themselves in a position in which new supplies of food were available could they proceed to attempt to get the new machinery into operation.

have been produced, that cannot simply be used in other stages of production and other investment projects, and are now useless, society has been impoverished. It takes time to actually rebuild a sustainable production structure, during which unemployment will tend to be higher than prior to the initial monetary expansion, due to frictions in the movement of labor. This phase constitutes the economic bust.

Paul Krugman (2013) has drawn attention to the asymmetry problem of booms and busts: the phenomenon that increased unemployment occurs during the structural adjustments of the bust, but not during the structural adjustments of the boom, which he explains by reference to downward wage rigidity. During a boom period wages tend to rise, but during the bust they do not fall as much and as rapidly as they should in order to prevent increased unemployment.

An alternative explanation is provided by Andolfatto (2013), who argues that the most obvious cause for asymmetry is not to be found in nominal rigidities, but rather in the mass destruction of productive relationships, which takes place during the bust. In his view, the labor market is a market for productive relationships, or what he calls *relationship capital*. Just like physical capital, relationship capital is redirected onto unsustainable paths during the boom. Relationships are built up, intensified, replaced or adjusted during the boom, merely to get destroyed during the bust. In his own words:

The basic idea is very simple. [...] [T]he labor market is a market for productive relationships. It takes time to build up relationship capital. It takes no time at all to destroy relationship capital. (It takes time to build a nice sandcastle, but an instant for some jerk to kick it down.) (Andolfatto, 2013)

During the bust there is essentially a matching problem. It takes some time until new productive relationships emerge. If the bust comes along with credit defaults and disturbances on the financial markets, bank credit deflation may be a consequence, as banks refuse to extend loans further, due to increased economic risk and uncertainty (Salerno, 2003, pp. 86-87.; Bagus, 2011, pp. 3-4; Bagus, 2015, pp. 67ff.). Moreover, people tend to demand higher cash balances in response to increased economic risk and uncertainty, which might lead to cash-building deflation (Salerno, 2003, pp. 85-86.; Bagus, 2011, pp. 2-3; Bagus, 2015, pp. 42ff.). Hence, towards the end of the cycle increasing unemployment and price deflation, or at least very low price inflation, may coincide as indicated by the short-run Phillips curve relationship. However, the above explanation suggests that the cause of increasing unemployment is not to be found in the deflationary tendencies of the bust, but rather in the inflationary tendencies of the boom period which occurred before.

This, in and of itself, does not establish a positive link between price inflation and unemployment in the *long run*. Eventually, after the boom period with lower unemployment and the bust period with higher unemployment, the rate returns to its natural level as determined by the institutional environment (Bellante and Garrison, 1988), if all other factors are held constant.

Hence, starting from an economy in which the actual and natural rates of unemployment coincide, we can argue that the expansion of money and credit, over the course of the business cycle, pushes the actual rate of unemployment below the natural rate in the short run, but eventually causes unemployment to increase above the natural rate in the

medium run. After the business cycle, that is, in the long run, the actual rate returns to the natural rate of unemployment. The analysis is therefore compatible with the Friedman and Phelps natural rate hypothesis of a negatively sloped short-run Phillips curve and a vertical long-run Phillips curve, but adds a third element: a positively sloped medium run Phillips curve.

Interestingly, Ravier (2013) argues that there might be a permanent positive impact on unemployment. However, he does not make sufficiently clear that his argument is contingent on politics. He starts from a situation with minimum wage legislation, arguing that, due to capital consumption and destruction during the business cycle, labor productivity may have fallen so much that the existing minimum wages lead to increased unemployment. Yet again, in the long run, through a genuine process of capital accumulation based on real savings, labor productivity may reach and even exceed its prior level.

Moreover, nominal wages might have risen so much in the inflationary process that paying minimum wages, which are fixed in nominal terms, does not actually pose any problems for employers. Abstracting from minimum wages and unemployment benefits, it is even conceivable that employment increases after the business cycle, namely when capital destruction has impoverished society to such an extent that it precipitates lower wage elasticities of the supply of labor. To be fair, strictly speaking, in this scenario we would not be dealing with a reduction in unemployment of the kind that we are really concerned with, that is *forced* or *institutional unemployment* (von Mises, 1998, pp. 598ff.; Hutt, 2011, p. 73). What we would have here is a case in which *voluntary* or *preferred unemployment* (Hutt, 2011, pp. 38ff.) in a society that enjoys relatively high living standards has been transformed into *forced unemployment* in the impoverished society after the business cycle. On a free market for labor this would lead to increased employment (von Mises, 2000, p. 57).

These considerations show that it is a rather futile endeavor to establish a necessary, time and place invariant long-run relationship between price inflation and unemployment that is independent of further political interventions. Ultimately, the height of unemployment is determined by restrictions and rigidities that are politically forced upon labor markets (Sennholz, 1987). As von Mises (1990b, p. 125) points out: "At the equilibrium wage rate unemployment is only a transitory phenomenon." Long-term mass unemployment occurs when wage rates are not free to equalize supply and demand for labor, either directly through minimum wage legislation, or indirectly through pressure from labor and trade unions (Hutt, 1954). Rueff (1925, 1931) emphasized the role of unemployment benefits, which can themselves be interpreted as quasi minimum wages, below which incentives to work are drastically diminished.

In his Nobel Memorial lecture, Milton Friedman (1977, p. 460) showed some discontent with his earlier work on inflation-unemployment dynamics and gave an interesting outlook:

[T]he third stage [of the analysis of price inflation and unemployment] will, I believe, be greatly influenced by a third major development - the application of economic analysis to political behavior [...].

Thus leaving the realm of pure economic theory and adding the extra layer of politics, we can extend our analysis in very much the same way as we have done in Section 4.1.



Expansionary central bank policies, which lead to economic downturns and higher unemployment in the medium run, can be instrumental in nursing public support for higher taxes and more rigid interventions into labor markets.<sup>23</sup> These further interventions have the objective of preventing economic mischief. Yet, in general, they render labor markets less flexible and tend to increase unemployment and decrease output in the long run.

Again, we might say that inflation itself produces political incentives that tend to shift the Phillips curve, in the words of Milton Friedman, towards a higher *natural rate of unemployment*, or what Mises much more appropriately termed *institutional unemployment*. In other words, the political decision for a movement along the short-run Phillips curve towards more price inflation and less unemployment may inherently trigger a rightwards shift of the entire Phillips curve schedule through the political process of interventionism.

## 5 Summary and concluding remarks

In this paper we have provided a brief overview of the history of the Phillips curve, from its beginnings as a mere empirical relationship, its interpretation as a mechanistic trade-off between price inflation and unemployment and its alleged political implications, to the differentiation into short-run trade-off and long-run neutrality. Annual time series data from Germany, France, the United Kingdom and the United States over the latter half of the 20th century show evidence for the short-run Phillips curve trade-off, but give good reason to rethink the generally accepted long-run neutrality of price inflation in favor of a positive link to unemployment.

In Section 4 of this paper an attempt to provide a theoretical explanation for this empirical finding is undertaken. Two arguments are outlined.

First, it is argued that the unintended consequences of monetary expansion on the distribution of incomes and wealth that trigger a rising gap between rich and poor might increase public support for more restrictive regulations on labor markets as well as higher taxes and increased welfare spending. These political measures render labor markets less flexible and destroy incentives to invest and hire people and thereby tend to increase unemployment. The bracket creep under a system of progressive taxation reinforces this tendency.

Second, monetary expansion may cause cyclical fluctuations that temporarily lower but ultimately increase unemployment as the boom turns into a bust. One may argue that increased unemployment during economic crises is also only a temporary phenomenon that will cease in the long-run. Yet again, political measures to counter economic downturns and protect workers and firms are motivated in the course of the business cycle. Regardless of several other effects that these measures may have, they tend to increase the *natural* or *institutional* rate of unemployment.

In both cases, the unintended consequences of monetary expansion are considered to be inevitable on purely theoretical grounds. They form the incentive structure under which political decisions are made. Yet, at the point at which we rely on political reactions in

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<sup>23</sup>For the specific case of the United States see Higgs (1987), who provides a detailed documentation of how crises triggered further political interventions. For France, see in particular Maurin (2009), who lists several interventions into the labor markets and links them directly to economic crises.



order to establish ties between price inflation and unemployment, we are leaving the realm of economic theory and enter into historical interpretations of what the data show.

At the core of both arguments is the idea of interventionist spirals as developed in von Mises (1977). The initial intervention is an expansion of money and credit through central bank policies. Whatever the purposes of the expansion, it leads to unintended consequences that demand further interventions. It is the initial intervention that causes price inflation, and the further interventions that subsequently lead to increased long-run unemployment.

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