



# Disinflation in steps and the Phillips curve: Israel 1986–2015<sup>☆</sup>



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## ABSTRACT

A Phillips curve (PC) framework is utilized to study the challenging post-1985 disinflation process in Israel. The estimated PC is stable and has forecasting power. Based on endogenous structural break tests we find that actual and expected inflation are co-breaking. We argue that the step-like development of inflation is in line with shocks and monetary policy that changed inflationary expectations. The disinflation process was long, and a long-term commitment by both the Central Bank and the government was required. Credibility was achieved gradually and the transition from the last step of 10% to 2% inflation was accomplished by introducing an inflation targeting regime.

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## 1. Introduction

This paper uses a forward-looking Phillips Curve (henceforth PC) to study the disinflation process in Israel since 1986.<sup>1</sup> The PC has become a widespread tool to study inflation dynamics and is one of the most important components of New-Keynesian macroeconomic theory. The seminal contributions of Friedman (1968) and Phelps (1967) added expected inflation to the Phillips curve version of Samuelson and Solow (1960). The theoretical developments that followed provided a micro foundation for the forward-looking PC (see e.g., Clarida et al., 1999 and Woodford, 2003). Today, the PC is considered a principal economic relationship in monetary policy practice.

In the academic literature, there has been an ongoing debate about the empirical validity of the PC (see e.g., Galí and Gertler, 1999, Lindé, 2005, Rudd and Whelan, 2005, and Galí et al., 2005). More recently, the stability and forecasting performance of the Phillips curve are at the center of the discussion. For instance, Ball and Mazumder (2011) argue that there is a conundrum because post-crisis U.S. inflation did not fall as much as predicted by a PC estimated over 1960–2007.

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<sup>1</sup> This is the period, which followed the 1985 stabilization program, briefly described in Appendix B, see also Bruno (1993), Bruno and Piterman (1988) and Liviatan and Melnick (1999).

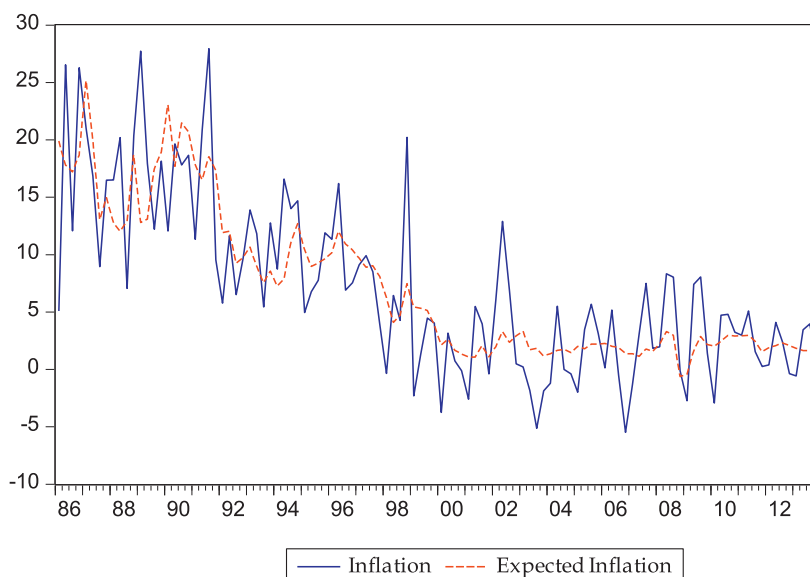


Fig. 1. Actual and expected inflation 1986Q1 - 2013Q4 (Quarterly percent change at annual rates).

Stock (2011) finds, however, that accounting for moderate time variation in the PC equation can resolve this puzzle. Gordon (2011, 2013) challenges the view of some skeptical economists that “The Phillips Curve is widely viewed as dead, destined to the mortuary scrapyard of discarded economic ideas”, showing that the PC properly explains the U.S. inflation rate and thus “is alive and well”. When Ball and Mazumder (2014) assume perfectly anchored inflation expectations, they are able to produce a stable PC relationship for the U.S., resolving the puzzle. Mavroeidis et al. (2014) discuss numerous econometric issues related to the identification and the estimation of the PC. A major conclusion of their survey is that “new datasets are needed to reach an empirical consensus”.

Studying the disinflation process of Israel, we provide new evidence for a stable and reasonably well forecasting forward-looking PC. The estimation is based on financial market data for inflation expectations and different measures of real economic activity focusing on the period of disinflation after the 1985 stabilization program. Our empirical strategy, adjusted to the case of Israel, involves two stages. Prior to the PC estimation, we use a number of endogenous structural break tests (see Perron, 2006) to investigate the time series properties of actual and expected inflation in a purely statistical way. We show that the time series exhibit similar step-wise behavior and are actually co-breaking. The inflation steps discussed in Liviatan and Melnick (1999) are found in actual and expected inflation. We then turn to the structural analysis and estimate the forward-looking PC by instrumental variables and GMM. We find that over a set of alternative specifications the coefficient for inflation expectations always has the right sign, is highly significant and takes on a value very close to unity. This is in line with economic theory. Similarly, the coefficient of real economic activity always has the right sign, and is significant in the majority of cases. The estimated PC proves to have stable coefficients and turns out useful for forecasting inflation. We do not encounter a puzzle of a missing fall or rise in inflation.

Our results suggest that the Israeli disinflation experience is in line with the theoretical implication of the forward-looking PC. An interpretation consistent with the PC and the timing of the breaks in expected and actual inflation is related to the conduct of monetary policy, distinct exogenous shocks and the introduction of inflation targeting. These events, discussed in detail after the empirical part of the paper, structurally changed inflationary expectations of economic agents in Israel and through that channel they have also changed the course of actual inflation.

Our paper is structured as follows. Section 2 explores the data on actual and expected inflation, followed by statistical testing for structural breaks in the two series. In Section 3 we turn to the structural analysis where we estimate the PC in Israel for the period of 1986–2013. We test for the stability of the PC and evaluate its forecasting performance out of the estimation sample in 2014–2015. In Section 4 we connect the econometric results with Israeli economic developments and policy. Conclusions and policy implications are discussed in Section 5.

## 2. Data

### 2.1. Inflation and inflation expectations after Israel's 1985 stabilization program

According to the forward-looking PC, inflation dynamics are driven by inflation expectations. Fig. 1 displays actual and break-even expected inflation (henceforth BEI) from 1986Q1 to 2013Q4. The rate of inflation is the quarter-on-quarter per-

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