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Reply to Economics Reviewers'
Comments on
« Exchange Rate Pass-Through and Inflation
Dynamics in Tunisia: A Markov-Switching Approach »
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REPORT 1

1. Reviewer #1

Point 1: The econometric analysis rests on a Markov switching approach. Such a regime switching methodology is convenient to tackle the questions the authors raise. The authors distinguish between two specific techniques, namely a fixed transition probability (FTP) approach and a time-varying transition probability (TVTP) approach. The FTP approach reveals less flexibility as it does not allow for time varying transition probabilities. I would thus suggest that the authors concentrate more on the TVTP approach and less on the FTP approach.

Reply: Using **FTP analysis** as a benchmark, we can first observe in Table 3a that the first state is characterized by a low inflation, with a monthly inflation rate intercept of 0.174 percent and a high inflation regime with a monthly inflation rate intercept of 0.275 percent, with T-statistics equal to 3.642 and 4.288 respectively, which far exceeds the 5% critical value (1.96). Furthermore, we test for price stability: the results support the existence of two regimes for volatility: low inflation volatility with an average inflation's variance of 0.033, associated with the low inflation regime, and high inflation volatility with an average inflation variance of 0.111, associated with the high inflation regime. This provides further support to the argument asserting the existence of two regimes for inflation levels (low and high inflation rates).

In a second step, time-varying transition probabilities (**TVTP**) and indicator coefficients are estimated for Tunisia to provide important information concerning the mechanisms underlying shifts from a high inflation regime to a low inflation regime and vice versa. This Markov-switching methodology has also been motivated by the respective patterns of inflation. Although these parameters vary a little in TVTP estimations, they are always highly significant and close to these FTP benchmark estimates. This is an evidence of the robustness of the methodology used in this paper.

In addition, an important result of the **FTP** approach is shown in the figure 1 that plots the probability of being in a low inflation regime at each date in the sample; i.e, it depicts the evolution of the smoothed probabilities of state 1. The inference is based on the full sample and the estimated maximum likelihood parameters (table 3-a). The switching between regimes is sudden, deep and sporadic. The economy stays in a low inflation regime most of the time. This confirms the shorter duration of high inflation episodes in Tunisia. Thus, the preliminary estimation of the fixed transition probabilities (FTP) confirms the difference in inflation dynamics, since the probability of being in a low inflation regime remains generally very high.

As a result, these preliminary results are important to motivate the TVTP methodology that is estimated to explain shifts in inflation regimes.

Point 2: Some studies show that the stability of pass-through into disaggregated import prices appears more robust than the stability into aggregate import price series. This apparent stability helps provide a deeper understanding of the sources of fluctuations in pass-through into aggregate import prices. Indeed, the aggregate import price series could potentially evolve over time because of changes in the composition of the import bundles, rather than because of changes in the underlying pass-through elasticities on component products. It would thus be interesting to formally test for the stability of these pass-through elasticities by country.

Reply: Since the collapse of the Bretton Woods system, numerous studies have analyzed the relationship between the exchange rate movements and prices of imported and domestic goods, commonly known as Exchange Rate Pass-Through (ERPT). These studies can be classified into three groups. The first group focuses on the pass-through into aggregate import prices (for example, Campa and Goldberg (2002), Parsley (2003), and Campa and Minguez (2002)). The second group of studies focuses on the pass-through into import prices of specific industry or products (for example Knetter (1993), Menon (1993), Feenstra, et al. (1996), Stanley and Stollery (1998, 2001), Yang (1997), Olivei (2002), and Pollard and Coughlin (2003). The last group is the studies that analyze the effects of exchange rate fluctuations on the domestic prices, specifically Consumer Price

Index (CPI) and Wholesale Price Index (WPI) (for example, Leigh and Rossi (2002)). Our present study can be included in this last group. Although we fully agree with reviewer 1 that It would thus be interesting to formally test for the stability of these pass-through elasticities by country, we would like to emphasize the aim of our paper is to test the effects of exchange rate fluctuations on the inflation level in Tunisia and for several reasons including for example the data availability for Tunisia upon the sample period, we prefer to left this point to a future work.

Point 3: In Section 5 of the paper the authors aim to identify macroeconomic and policy related variables that explain inflation dynamics in Tunisia over the investigated sample period. To this end, the authors focus on four specific economic fundamentals including interest rate, industrial production, exports and imports. There are other variables that could have an impact on inflation dynamics but are strangely omitted from the analysis. For example, to what extent can changes in monetary aggregates and the output-gap affect inflation dynamics? These issues merit further investigation.

Reply

In choosing the variables to be included in the empirical model, we paid attention to the following:

■ First, we aimed to identify the macroeconomic and policy-related variables to highlight the mechanisms underlying the dynamics of inflation in Tunisia over the period of study. For this reason, in our study, we use the interest rate (TMM), the industrial production index (IPI), the exports unit values (X) and the imports unit values (M) as economic fundamentals. The choice of these variables is motivated with details in the section 4 data and variables description. We fully agree with the reviewer 1 that other variables could have an impact on inflation dynamics. However:
In the section 5 of our paper (TVTP), we present a brief literature review of these variables: A preliminary large set of explanatory variables as described in this section was used to explain shifts in inflation regimes, but for the sake of conciseness, only the most significant variables are shown. For example, Table 1 (above) reports the estimation results of a TVTP model where **Money aggregate M2** explains the transition from a high inflation regime (st=1) to a low inflation regime (st=2). It is important to note at this stage that the coefficients λ_{11} and λ_{21} as presented in equation 1 of this reply are not significant at conventional level.

$$\Pr(s_t = 1 \setminus s_{t-1} = 1) = \frac{\exp(\lambda_{10} + \lambda_{11} Z_{t-1})}{1 + \exp(\lambda_{10} + \lambda_{11} Z_{t-1})} \tag{1}$$

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$$\Pr(s_t = 2 \setminus s_{t-1} = 2) = \frac{\exp(\lambda_{20} + \lambda_{21} Z_{t-1})}{1 + \exp(\lambda_{20} + \lambda_{21} Z_{t-1})}.$$

Table 1. Outcomes of TVTP-Markov Switching Model
(Money aggregate M2-based estimation)

	Regime 1		Regime 2	
λ	λ_{10}	λ_{11}	λ_{20}	λ_{21}
coefficient	2.008	0.789	2.497	-0.172
std.error	0.9777	0.441	0.826	0.417
t- student	2.048	1.790	3.023	-0.413

■ The second reason that motivates the choice of our variables is that we tried and kept the empirical specification as simple as possible in order to make the channels of regime shifts clear, while at the same time avoiding the misspecification of the model and insuring the convergence of the EM algorithm. It is worthy to note that, in the seminal paper of Filardo (1994), the TVTP model using various series selects at most 4 variables explaining the transition from one regime to the other.

Point 4: Finally, the paper would strongly benefit from a cross-country perspective. In particular, it would be interesting to see how the authors' results hold up when examining countries with similar macroeconomic structures (albeit with a slightly different monetary policy set-up), such as Algeria and Morocco.

Reply: We agree that a cross-country perspective would be interesting. Indeed, some studies with a cross – country perspective have already been conducted (see for example, Loungani and Swagel (2001), Dropsy and grand (2008)). However, conducting such a perspective for the exchange rate pass-through and inflation in Tunisia would lead to a completely different paper that can be left for future work. In the present paper, we think that using a cross-country perspective would just confuse the matter and makes the results less clear cut.

REPORT 2

■ Pg 15, "Bo are statistically different and significant". Poor English and it's not clear what you mean by "statistically different".

Reply: We mean by statistically different that there is an economic and significant difference between the magnitude of the coefficients across the regime which provides further support to the argument asserting the existence of two regimes for inflation levels (low and high inflation rates) . In the manuscript, we included a footnote taking into account this point.

■ Change the presentation. It does not look nice. Include additional notations at the bottom of the table to clarify some of the statistics appearing in the table. Same for Table 3-b (why 3-b?? I do not see table 3-a).

Reply: the point is well taken. In the revised manuscript, we changed the presentation of the tables and added additional notes explaining the variables. We changed Table 3 by table 3-a.