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The choice of monetary regimes in emerging market economies: Inflation targeting versus its alternatives

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ABSTRACT

This paper examines the macroeconomic, financial, and institutional factors that affect the adoption of inflation targeting vis-a-vis alternative monetary policy strategies for 44 emerging market economies during 1990–2017. We employ a multinomial logistic regression with inflation targeting and exchange rate pegs as treatment groups, and intermediary monetary strategies as the baseline group. The main findings from our study are as follows: higher average inflation is associated with lower probability of adopting inflation targeting; while both output growth and its volatility make the adoption of inflation targeting less likely. Concerning the effects of the control variables, financial sector development, central bank independence, greater exposure to capital flows, and the level of economic development are all associated with higher likelihood of adopting inflation targeting, whereas higher public debt, trade openness, and money growth have the opposite effect. Macroeconomic conditions seem to have different impact on the choice of inflation targeting and exchange rate pegs, whereas similar institutional conditions are conducive to the implementation of both regimes. Finally, the effects of macroeconomic and institutional conditions do not depend on the type of inflation targeting.

1. Introduction

In 1990, New Zealand adopted inflation targeting (IT) as a new framework for conducting monetary policy, followed by Canada (1991), the United Kingdom (1992), and several other industrialized countries. By 2020, IT has been implemented in 45 advanced countries and emerging market economies (EMEs), such as Albania, Ghana, Mexico, Russia, South Africa, Sweden, and the UK (IMF, 2022). In contrast to monetary and exchange rate targeting, IT does not rely on intermediate targets. In these regards, Bernanke & Mishkin (1997) describe IT as a "rule-like strategy" or "constrained discretion", which enables the central bank to focus on price stability while simultaneously addressing short-run macroeconomic fluctuations. The practical implementation of IT involves the following common features: announcement of numerical inflation targets, an institutional commitment to price stability as the primary monetary policy objective, short-term flexibility, and central bank independence accompanied by accountability and transparency (Bernanke & Mishkin, 1997; Mishkin, 2004).

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Although an increasing number of EMEs have adopted IT during the past two decades, most of them still rely on other strategies for maintaining price stability. Therefore, it would be fruitful to investigate the most important factors that induce policymakers in EMEs to choose IT vis-a-vis other monetary policy regimes. The early literature points to a number of economic and institutional factors which influence the choice of IT, such as: fiscal discipline, strong external position, relatively low inflation, developed financial markets, central bank independence, the absence of *de facto* exchange rate targets, and well-developed technical infrastructure. However, these preconditions are not stringent, as they have not been fulfilled in many EMEs (Amato & Gerlach, 2002; Batini & Laxton, 2007; Carare & Stone, 2006; Eichengreen et al., 1999; IMF, 2006; Mishkin & Schmidt-Hebbel, 2002, pp. 171–219). Consequently, it is obvious that the importance of the above macroeconomic and institutional factors for the choice of IT can be resolved only on empirical grounds.

Working with a panel of 44 EMEs over the period 1990–2017, we investigate the most important factors behind the choice of IT as opposed to other monetary strategies. Unlike the existing empirical evidence, which is generally based on binary choice models, we employ a multinomial logistic regression, with IT and exchange rate pegs as the treatment groups, and intermediary monetary strategies as the baseline group. Given that policymakers in EMEs are usually faced with a set of choices for monetary strategies, including currency pegs, IT, and intermediate regimes, the use of a multinomial instead of a binary choice model allows for a more robust modelling framework with respect to the set and complexity of available choices. Moreover, since economic theory provides only a tentative list of the main prerequisites for adopting IT, it does not preclude the possibility that these factors might be equally relevant for adopting other monetary regimes as well. In these regards, our approach can differentiate between the factors that are specific to the adoption of IT from those factors whose relevance is more general, namely those that are important for the successful implementation of any monetary strategy. Indeed, this is one of the main findings from our empirical investigation.

Our empirical model incorporates most of the macroeconomic and institutional variables used in the empirical research in this field, such as macroeconomic performance (inflation and output growth as well as their volatilities), public debt, financial sector development, central bank independence, financial openness, trade openness, and money growth. Since there are several instances in our sample in which other monetary policy strategies have been implemented simultaneously with IT, we consider the potential correlation between IT and fixed exchange rates. To this end, we also employ a bivariate probit model, which further supports the suitability of our multivariate logistic framework. In addition, we check the robustness of the main results in several directions: by adding additional explanatory variables, by working with the *de facto* instead of the *de jure* IT, by extending the period to include more recent observations, and by addressing potential heterogeneity in the sample of EME's. The obtained results from all these extensions provide strong support to our baseline findings.

This study contributes to the existing empirical literature in this field by obtaining several novel findings: first, regarding the likelihood of adopting IT, our results suggest that macroeconomic conditions play a significant role in the decision-making process. Specifically, we find that higher inflation reduces the probability of adopting IT, which conforms to the well-observed fact that both advanced economies (for instance, New Zealand, Canada, and the UK) and EMEs (e.g., Brazil, Chile, Poland, South Africa) have introduced IT only after bringing inflation down to some relatively low level (Masson et al., 1997; Mishkin, 2000; Mishkin & Posen, 1997; Mishkin & Savastano, 2002; Mishkin & Schmidt-Hebbel, 2002, pp. 171–219; Roger, 2009; Roger & Stone, 2005; Schaechter et al., 2000). In addition, in contrast to the existing empirical literature, we find that both output growth and its volatility decrease the likelihood of adopting IT, suggesting that in countries experiencing strong output growth rates, the potential advantages of IT, in terms of the possibility to combine inflation targets with output growth objectives, become less obvious. Second, regarding the control variables, in contrast to most of the empirical literature we show that higher public debt is associated with a lower likelihood of adopting IT, thus confirming the role of fiscal discipline as one of the basic requirements for adopting IT. Third, comparing the estimates from the IT and exchange rate peg regressions implies that macroeconomic conditions (inflation, output growth, and their volatilities) seem to have different implications for the choice of these two monetary regimes, respectively. Additionally, our estimates suggest that similar institutional conditions (financial development, and central bank independence) are conducive to the adoption of both IT and currency pegs. These findings provide a valuable contribution to the existing empirical evidence, suggesting that stronger institutional setup is a prerequisite regardless of the monetary regime adopted. Fourth, we challenge the existing empirical evidence by showing that monetary authorities base their decision-making process on the same macroeconomic indicators, regardless of the type of IT regime adopted.

The remainder of this paper is organized as follows: Section 2 reviews the relevant empirical literature; Section 3 describes the data and estimation issues; Section 4 discusses the main results and robustness checks, while the final section concludes the study.

2. Literature review

In this Section, we provide an overview of the existing literature related to our study. The focus is on the methodological approaches used in the literature, and the main findings obtained. We motivate the specification of the empirical model in equation (1), by discussing the foundation for including each of the variables. The existing empirical literature generally follows an eclectic approach by specifying a general list of the main factors that affect the choice of IT as a monetary regime. Finally, the contribution of our study is positioned with respect to the related literature.

A majority of the early studies use binary choice models to approximate the central banks' decision process for adopting monetary regimes. Following Ismailov et al. (2016), Rose (2014), Samarina and De Haan (2014), and Yamada (2013), we adopt a multinomial logit framework. Since policy-makers in EMEs are faced with a range of alternative monetary strategies, including currency pegs, IT, and intermediate regimes, we rely on the multinomial framework to model the choice of IT vis-à-vis the alternative policy options. In addition to these studies, our approach is more general, including a multitude of control variables, and using IT and exchange rate pegs

as the treatment groups, and intermediary monetary strategies as the baseline group. Furthermore, Ardakani et al. (2018), Fry-McKibbin and Wang (2014), Ismailov et al. (2016), Samarina and De Haan (2014), Samarina et al. (2014), and Thornton and Vasilakis (2017) show that different macroeconomic variables influence the adoption of monetary strategies in different countries. In light of these differences in the relative importance of macroeconomic and institutional factors for the choice of IT, our paper focuses exclusively on EMEs.

In a large number of studies, the effect of output growth on the adoption of IT is either statistically insignificant or non-robust (Fouejieu, 2017; Lin, 2010; Lin & Ye, 2007, 2009; Pontines, 2013; Samarina & De Haan, 2014; Thornton & Vasilakis, 2017; Wang, 2016). A different group of studies address the association between the implementation of IT and output volatility. Mukherjee and Singer (2008), Samarina and De Haan (2014), Samarina and Sturm (2014) and Stojanovikj and Petrevski (2019) find ambiguous relationship between the stability of economic conditions (as measured by output volatility) and the implementation of IT. In contrast to the existing empirical literature, our study finds that both output growth and its volatility decrease the likelihood of adopting IT, suggesting that in countries experiencing strong output growth rates, the potential advantages related to IT diminish. In addition, macroeconomic conditions in EMEs (inflation, output growth, and their volatilities) seem to have different implications for the choice of IT and exchange rate pegs, respectively,

Further on, the existing empirical evidence suggests that higher inflation rates make the introduction of IT less likely (Ardakani et al., 2018, Arsić et al., 2022, Hu, 2006, Lin, 2010, Lin & Ye, 2007, Lin & Ye, 2009, Minea & Tapsoba, 2014, Minea et al., 2021, Pontines, 2013, Samarina & Sturm, 2014, Thornton & Vasilakis, 2017). Higher inflation rates might fall beyond the realm of control of the central bank, which would in turn provide difficulty in setting and achieving the inflation targets in the medium-run. On the opposite end of this spectrum, the findings in Gonçalves and Carvalho (2009) and Vega and Winkelried (2005) suggest a positive association between inflation rates and IT adoption, while the results in Fry-McKibbin and Wang, 2014, Samarina and De Haan (2014), Samarina et al. (2014), and Wang (2016) are either statistically insignificant or the effect of IT is quite sensitive to the sample being used (industrialized countries versus EMEs).

Among the variables that might affect the adoption of a monetary strategy, fiscal discipline seems as an important candidate. Theoretically, fiscal discipline in correlation with IT is a necessary precondition for maintaining low inflation rates. Across the empirical literature, the findings point to an ambiguous relationship, either rejecting the importance of fiscal discipline for adopting IT (de Mendonca and de Guimaraes e Souza, 2012; Pontines, 2013) or providing mixed evidence (Carare & Stone, 2006; Leyva, 2008; Lin & Ye, 2007; Mishkin & Schmidt-Hebbel, 2002, pp. 171–219; Samarina & De Haan, 2014; Vega & Winkelried, 2005). Trade and financial openness are relevant factors for the choice of monetary policy strategies, in particular in the case of EMEs which are particularly vulnerable to supply side shocks. The empirical evidence in general fails to provide support to this proposition (Arsić et al., 2022, de Mendonça and de Guimarães e Souza 2012, Fouejieu, 2017; Fry-McKibbin & Wang, 2014; Hu, 2006; Lucotte, 2012; Lin, 2010; Lin & Ye, 2007; Lin & Ye, 2009; Minea et al., 2021; Minea & Tapsoba, 2014; Rose, 2014; Samarina & De Haan, 2014; Samarina et al., 2014; Thornton & Vasilakis, 2017; Vega & Winkelried, 2005). Furthermore, the available empirical evidence suggests that higher level of financial development is necessary for successful implementation of IT (Carare and Stone, 2006, de Mendonça and de Guimarães e Souza 2012; Leyva, 2008; Samarina & Sturm, 2014; Samarina et al., 2014; Thornton & Vasilakis, 2017; Vega & Winkelried, 2005). In contrast to the existing literature, our study provides conclusive empirical evidence that higher public debt is associated with a lower likelihood of adopting IT, thus confirming the role of fiscal discipline as one of the basic requirements for adopting IT.

By definition, IT is accompanied with a flexible exchange rate. In other words, the presence of a fixed exchange rate is expected to decrease the likelihood of adopting IT, while greater exchange rate flexibility works in the opposite direction. Indeed, the available empirical evidence unanimously confirms that fixed exchange rates are not conducive to IT (Ardakani et al., 2018; Arsić et al., 2022; de Mendonca and de Guimaraes e Souza, 2012, Fouejieu, 2017, Fry-McKibbin & Wang, 2014, Lin, 2010, Lin & Ye, 2007, Lin & Ye, 2009, Minea & Tapsoba, 2014). In addition, studies that measure the effect of exchange rate variability on the adoption of IT, uncover strong evidence that adopting IT requires a higher degree of exchange rate flexibility (Ismailov et al., 2016; Lucotte 2010, 2012; Minea et al., 2021; Mukherjee & Singer, 2008; Pontines, 2013; Samarina & De Haan, 2014; Samarina et al., 2014; Thornton & VasilakisU; Vega & Winkelried, 2005). Undoubtedly, central bank independence appears to be one of the most important institutional factors necessary for successful implementation of IT. Indeed, this proposition seems to have a widespread empirical support (Fouejieu, 2017; Lin & Ye, 2007; Lucotte, 2010, 2012; Minea & Tapsoba, 2014; Mishkin & Schmidt-Hebbel, 2002; Samarina & De Haan, 2014). Several studies focus on the importance of political institutions for adopting IT. For instance, Rose (2014) shows that IT is a preferred monetary regime in countries with more advanced democratic institutions. Mukherjee and Singer (2008) show that the adoption of IT is more likely when the government and the central bank share the same preferences for tight monetary policy. Specifically, the combination of a right-leaning government and a central bank without a bank regulatory authority is more likely to be conducive to IT. Ismailov et al. (2016) show that political stability does not affect the choice of IT for both low-income and high-income countries. Lucotte (2010, 2012) suggests that a multitude of political factors, namely the number of veto players in the political system and political stability, increase the likelihood of adopting IT. Our study adds to this discussion, by showing that strong institutional support is a necessary condition for the adoption of any monetary regime, including IT.

Finally, the importance of various factors for the likelihood of adopting IT might differ with respect to the type of IT regime. For instance, Carare and Stone (2006) review the global experience with IT by focusing on the factors affecting the evolution between various variants of this regime ("lite", eclectic, and full-fledged). Based on the experience of EMEs, they show that the likelihood of moving from "lite" to full-fledged IT is predominantly influenced by the level of financial development, government debt, and central bank restrictions on government financing. In their comprehensive study, Samarina and De Haan (2014), too, show that the most important factors behind the adoption of IT differ between "soft" and full-fledged inflation targeters. Specifically, they find that flexible exchange rate regimes, exchange rate volatility, central bank independence, and external debt are relevant for adopting "soft" IT,

whereas inflation, output growth, and public debt are the most important factors for adopting full-fledged IT. Once again, these findings from the empirical literature serve as a motivation to investigate the effects of various macroeconomic and institutional factors on the adoption of "soft" versus "full-fledged" IT. Our findings show that monetary authorities base their decision-making process on the same macroeconomic indicators, regardless of the type of IT regime adopted.

3. Data issues and estimation strategy

Our empirical analysis is based on estimating the following multinomial logistic regression:

$$y_{k,it} = \beta_{o,k} + \beta_{1,k}X_{1,it} + \beta_{2,k}X_{2,it} + \ldots + \beta_{j,k}X_{j,it} + \varepsilon_{it} \quad (1)$$

where $y_{k,it}$ is a discrete categorical variable composed of the outcomes $k = 0$, 1, and 2, indicating intermediary monetary regimes, IT, and fixed exchange rate arrangements, respectively. In differentiating between the monetary regimes, we rely on the classification in Ilzetzki et al. (2019). In the general specification of the empirical model, $\beta_{o,k}$ is the constant term, while $\beta_{1,k}$, $\beta_{2,k}$, …, $\beta_{j,k}$ are the regression parameters associated with the j-th explanatory variable and the k-th outcome, respectively. In this respect, $X_{1,it}$, $X_{2,it}$, …, $X_{j,it}$ stand for the control variables. We are primarily interested in the potential factors behind the choice between IT and the fixed exchange rate regimes, relative to the intermediary monetary strategies. In other words, we identify IT and fixed exchange rate as the treatment groups, while all other monetary strategies (intermediary regimes) form the reference group. Consequently, all the results from our empirical analysis should be interpreted with respect to the intermediary regimes. For instance, the finding that inflation lowers the probability of adopting IT implies that higher inflation makes adopting IT less likely relative to intermediary monetary regimes.

We estimate two variants of the baseline specification: one including inflation and real output growth, and another with inflation and growth volatilities as regressors. In both specifications we introduce the same control variables, such as: fiscal discipline, financial market development, net capital flows, and central bank independence. With regards to the choice of control variables, our specification tends to be similar to those commonly employed in the empirical literature, referred to in Section 2. However, we also explore the possibility that inflation and growth volatilities might have separate impacts on the choice of monetary regimes in EMEs in light of the historical experience of these countries (more volatile macroeconomic conditions).

Multinomial logistic regression allows for a more complex probabilistic setup, as opposed to the binary logit/probit framework, which has been commonly employed in the existing empirical literature. Within our approach, we simultaneously model the impact of the independent variables on the two outcomes of the categorical variable. Our estimation procedure rests on the assumption that the outcomes of the dependent variable are independent. This assumption certainly holds for the countries included in our sample, as there has not been a single case of a country simultaneously implementing both monetary regimes (IT and fixed exchange rate regime). Hence, we can safely assume that the presented modelling framework is suitable for the analysis put forth in this paper. However, there have been several cases in which the IT regime has been implemented in its "lite" form, while simultaneously following other policy objectives. During the initial phase of introducing IT, several countries, including Chile, Poland, Israel, and Hungary, combined IT with exchange rate targets (IMF, 2006). Therefore, we also model equation (1) from our model by using a bivariate probit model to examine the potential effect of such simultaneity. Again, we estimate two equations separately for IT and the fixed exchange rate regime, respectively, while assuming their correlation. The results presented in section 4.2.1 clearly indicate that this interaction has a very small impact on our estimates; therefore, we proceed with the multinomial logistic regression model.

In our baseline specification, we work with annual data for a panel of 44 EMEs during 1990–2017, but we also re-estimate the model for the extended sample covering the 1990–2021 period. Due to data availability, we work with an unbalanced panel. Before conducting the empirical analysis, we transformed all the data into three-year moving averages. Though this is not a conventional approach in the empirical literature, we provide the following rationale for this procedure: the decision to adopt a particular monetary strategy is usually based on macroeconomic performance over a certain period. In this respect, it is quite reasonable to assume that policymakers do not put too much weight on transitory macroeconomic fluctuations in the decision-making process. For instance, if inflation is unusually high in a particular year, it is unrealistic to expect that policymakers would decide to switch to another monetary regime based on that particular outcome. Instead, when assessing the appropriateness of a given monetary strategy, policymakers would rather look at the average macroeconomic performance, neglecting transitory outcomes. Hence, we believe that working with moving averages provides a reasonable approximation to the actual decision-making process implemented by the policymakers. Furthermore, moving averages smooth out the potential adverse effects of excessive short-run fluctuations associated with the untransformed yearly observations. At the same time, we are aware that the above transformation has at least two shortcomings: first, it reduces the number of available observations, which might have an impact on the precision of the estimates; and second, it may bias the estimates by arbitrarily increasing the likelihood of adopting IT.[2] Consequently, we have re-estimated our empirical model based on the untransformed yearly observations, i.e., without any data transformations and provide the results in Table 6.

[2] We thank the anonymous Referee for suggesting this issue.

Table 1
Adopting inflation targeting in selected emerging market economies.

Country	Year of Adoption
Brazil	1999
Chile	1999
Colombia	1999
Czech Republic	1998
Hungary	2001
Israel	1997
Mexico	1999
Peru	2002
Philippines	2002
Poland	1998
South Africa	2000
South Korea	1998
Thailand	2000
Turkey	2006
Ghana	2007
Indonesia	2005
Serbia	2009

Our sample consists of 17 inflation targeters and 27 EMEs with alternative monetary regimes (See Table 1).[3] Out of the remaining 27 EMEs, 10 countries currently implement monetary regimes that fall under the definition of fixed exchange rate arrangements, while 17 operate intermediary regimes. Furthermore, 22 of the countries in the sample have implemented fixed exchange rate regimes for at least some period since 1970. Since the group of EMEs is heterogeneous, we take an eclectic approach and include all the countries that have been characterized as EMEs in the empirical literature in this field. Concerning the specific dates of adopting IT, we rely on the classification provided by Hammond (2012). In addition, as IT can be implemented in a flexible form, we follow Calvo and Mishkin (2003) in dating the switch to full-fledged IT. The difference in selecting soft and full-fledged IT lies in the official announcement of the regime by the respective central bank. Therefore, a soft-fledged IT regime is when the central bank implements IT and sets inflation targets in the medium-run, without officially declaring its strategy as IT. Such occurrence might be characteristic in the period when the central bank switches the monetary strategy, in order to adjust the expectations of the agents in the economy, and reduce the effect of the potential shock. One such source for the particular type of IT is Hammond (2012). Furthermore, we have used the websites of central banks, and their news and communications to the public to check for the adoption dates of the soft IT regime. Therefore, the rule for starting soft IT coincides with the action when a respective central bank introduces inflation targets, without an official announcement of changing the monetary strategy. Once an official announcement is present, the soft IT transitions into a full-fledged IT.

Our sample begins in 1990 when IT was officially adopted by the Central Bank of New Zealand. Therefore, we treat the pre-1990 period as irrelevant for our empirical analysis. We find this assumption reasonable given that, before 1990, the central banks in EMEs were not in a position to decide whether or not to adopt IT as a monetary strategy. As a result, including the pre-1990 period in the analysis would only bias the estimation results by increasing the likelihood of not adopting IT. However, in order to alleviate the potential concerns related to the arbitrariness of our choice, in the robustness section, we also report the results for the post-1970 period, but in this case our sample ends by 2017, due to the following reasons: first, recently there was no significant shift in exchange rate arrangements throughout the world, while the number of countries implementing IT increased only slightly (IMF, 2022). Consequently, it is reasonable to assume that these changes should not have a major impact on our main findings. Second, the most recent period corresponds to the COVID-19 pandemic with the associated large turbulence in economic activity, which might contaminate the results obtained from the empirical analysis.

Addressing the description of the variables included in our empirical model, we work with CPI-based annual inflation rates (INF). High inflation rates prevailing in the early years of our sample represent a potential source of concern due to their potential adverse impact on the estimation results. Therefore, following Cukierman et al. (1992, 2002), we adopt the approach commonly employed in the empirical literature and transform the inflation rate by the following formula: $infltr = infl/(1+ infl)$, where *infl* denotes actual inflation rate. It is expected that this approach will reduce heteroskedasticity, thus improving the efficiency of the estimates from equation (1). In addition, this procedure largely reduces the impact of potential outliers, thus serving as a substitute for the alternative techniques, such as trimming or winsorizing. Output growth (GROWTH) is expressed as the annual growth rate of real GDP, while both inflation volatility (INF VOL) and output growth volatility (GROWTH VOL) are measured by the standard deviation of transformed inflation rate and real GDP growth rate, respectively. Net capital flows (NCF) are measured in billions of US dollars, whereas both public debt (DEBT) and credit to private sector (CREDIT) are expressed as shares in GDP. In the robustness checks, we include several

[3] The sample consists of the following countries: Argentina, Algeria, Brazil, Botswana, China, Costa Rica, Cote d'Ivoire, Chile, Colombia, Czech Republic, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Ghana, Guatemala, Hungary, Israel, Indonesia, India, Jordan, Lebanon, Malaysia, Morocco, Mexico, Nigeria, Pakistan, Panama, Peru, Philippines, Poland, Russia, Serbia, Singapore, South Africa, South Korea, Tanzania, Thailand, Turkiye, Tunisia, Uruguay, Ukraine, and Venezuela.

other variables which are commonly used in the empirical literature, such as terms of trade changes (TOT), political polarization (POL), real GDP per capita (GDPPC) using 2005 as the base year, foreign trade/GDP ratio as a proxy for trade openness (TRADE), and annual broad money growth rate (MONEY).

All the variables have been extracted from the World Bank's World Development Indicators database, except for the variables representing the monetary regimes, central bank independence (CBI), and political polarization. The data for monetary regimes was obtained from two sources: Hammond (2012), who provides the dates of adopting and Ilzetzki et al. (2019) who provide the data for fixed exchange rate arrangements and intermediary monetary strategies. Furthermore, using the dataset in Ilzetzki et al. (2019), we have been able to confirm the consistency of the switch between the different regimes in our sample. We use the weighted index of central bank independence provided by Gariga (2016) as a proxy for central bank independence, while the data on political polarization is obtained from the Polity IV Project. Descriptive statistics and simple correlation coefficients are presented in Table 2.

Table 2 provides descriptive statistics and partial correlation coefficients for the main variables used in the empirical analysis. Except for the partial correlation coefficient between inflation (INF) and inflation volatility (INF VOL), all remaining correlation coefficients are relatively low. Additionally, we have checked for the presence of multicollinearity within the dataset by calculating the Variance Inflation Factor and the determinant of the correlation matrix. Since we estimate a multinomial logit model, our regression framework is based on a probabilistic setup treating the sample as if drawn from a logistic distribution. Therefore, the correlation coefficients presented in Table 2 are not fully informative about the expected results from our empirical analysis. The presentation of partial correlation coefficients (both their magnitudes and signs) serves only as an illustration of linear statistical relationships between the main variables which, in turn, could be useful for potential comparison with the early literature in this field, which predominantly focused on linear regression models. Furthermore, by comparing the magnitudes and the signs of correlation coefficients with the marginal effects presented in Table 3, it is evident that all the variables retain the same signs and approximately comparable magnitudes, while being significant at the 5% level of statistical significance. However, once again we emphasize that, although most partial correlation coefficients are statistically significant, the probabilistic nature of the multinomial logistic regression departs from the linear statistical relationships presented in Table 2.

In what follows, we provide a brief explanation of the control variables included in the baseline specification. Inflation, output growth, inflation volatility, and output growth volatility are included in the empirical model as proxies for macroeconomic conditions. As mentioned above, we estimate two variants of the empirical model – one including inflation and output growth, and another one with inflation and output growth volatility as the regressors. Usually, central banks tend to choose their monetary strategy in response to macroeconomic performance. In theory, inflation and output are the standard elements in the central bank loss function. In practice, although inflation control is the primary goal of monetary policy, central banks often pay attention to economic activity, too. In this regard, in a country experiencing unsatisfactory economic performance, such as low growth rates or high output volatility, the central bank might consider switching to IT as a strategy which enables policymakers to focus on economic economy, too. This argument might be especially relevant for EMEs, which traditionally have witnessed worse performance than advanced economies due to the unfavorable macroeconomic environment (Fraga et al., 2003). Similarly, the central bank might choose its monetary policy strategy based on its experience with past inflation rates. Here, the literature suggests that introducing IT is not feasible at high inflation rates, when there is a considerable degree of inertia in nominal variables, and monetary policy is largely accommodative. Therefore, a country should first reduce inflation to a relatively low level before adopting this monetary regime (Carare et al., 2002; Masson et al., 1997; Mishkin, 2000). Given the consensus view of inflation as a monetary phenomenon in the long-run, excessive money growth, too,

Table 2
Descriptive statistics and correlation, 1990–2017.

Descriptive statistics									
	IT	INF	GROWTH	GROWTH VOL	INF VOL	CBI	NCF	DEBT	CREDIT
Mean	0.244	0.088	0.040	0.004	0.0004	0.540	−0.18	0.528	0.475
Standard deviation	0.43	0.113	0.032	0.004	0.0015	0.209	2.155	0.303	0.356
Minimum	0	−0.009	−0.164	0.002	0.0000	0.121	−34.6	0.046	0.017
Maximum	1	0.936	0.308	0.047	0.021	0.904	3.71	1.90	1.559
Correlation matrix									
Variable	IT	INF	GROWTH	GROWTH VOL	INF VOL	CBI	NCF	DEBT	CREDIT
IT	1								
INF	−0.24**	1							
GROWTH	−0.07**	−0.29**	1						
GROWTH VOL	−0.14**	0.26**	−0.10**	1					
INF VOL	−0.03	0.75**	−0.39**	0.37**	1				
CBI	0.32**	−0.13**	−0.11**	0.01	−0.06**	1			
NCF	0.07**	0.02	−0.13**	−0.01**	−0.07	−0.02	1		
DEBT	−0.12**	0.10**	−0.11**	−0.01	0.07**	−0.1**	0.02	1	
CREDIT	0.23**	−0.30**	0.07**	−0.06**	−0.08**	−0.17**	−0.20	−0.06	1

Notes: Descriptive statistics and Pearson correlation coefficients are provided for the main variables in the empirical analysis: inflation targeting (IT), inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). ** indicates that correlation coefficients are statistically significant at the 5% significance level.

Table 3
The Choice of Monetary Regimes: Multivariate evidence, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.98*** (0.37)	−0.32*** (0.04)	INF VOL	1.07 (0.99)	0.24* (0.13)
GROWTH	−1.69*** (0.50)	−0.24*** (0.06)	GROWTH VOL	−1.96*** (0.54)	−0.29*** (0.07)
DEBT	−1.08** (0.49)	−0.15** (0.06)	DEBT	−0.64 (0.43)	−0.10* (0.06)
CREDIT	1.46*** (0.45)	0.10** (0.05)	CREDIT	3.02*** (0.43)	0.31*** (0.05)
CBI	3.69*** (0.66)	0.35*** (0.07)	CBI	3.96*** (0.60)	0.47*** (0.08)
NCF	0.59*** (0.15)	0.07*** (0.02)	NCF	0.49*** (0.14)	0.07*** (0.02)
Constant	−0.58 (0.73)	0.21*** (0.01)	Constant	−3.74*** (0.58)	0.21*** (0.02)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.27*** (0.42)	−0.04 (0.05)	INF VOL	−1.82** (0.96)	−0.33** (0.13)
GROWTH	0.50 (0.54)	0.16** (0.07)	GROWTH VOL	0.14 (0.47)	0.11* (0.07)
DEBT	0.13 (0.42)	0.07 (0.06)	DEBT	0.19 (0.40)	0.06 (0.06)
CREDIT	1.73*** (0.45)	0.19*** (0.06)	CREDIT	2.62*** (0.42)	0.26*** (0.05)
CBI	2.54*** (0.64)	0.19** (0.09)	CBI	2.10*** (0.62)	0.13 (0.09)
NCF	0.11** (0.05)	−0.01 (0.01	NCF	0.08* (0.04)	−0.01 (0.01)
Constant	−2.54*** (0.73)	0.21*** (0.02)	Constant	−3.52*** (0.58)	0.21*** (0.02)
Pseudo R^2	0.20 0.20		Pseudo R^2	0.12 0.12	
Log likelihood	−433.45–433.45		Log likelihood	−478.70–487.70	
Observations	556 556		Observations	558 558	

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

is not conducive to adopting IT. Accordingly, these arguments imply that both high inflation and money growth make introducing IT less likely.

The inclusion of public debt as a control variable is motivated by the notion that fiscal discipline represents one of the basic requirements for adopting IT. Clearly, unsustainable fiscal policy undermines the central bank's efforts to keep inflation low, potentially affecting the credibility of announced inflation targets negatively. In EMEs, capital flows appear to be an important factor influencing the choice of monetary policy regime. Strategies like IT enable the central bank to counteract exogenous capital flows through exchange rate depreciation, whereas other strategies, such as exchange rate pegs, lack this flexibility. Undoubtedly, central bank independence is one of the most critical institutional factors required for the successful implementation of IT. It is well established that the central bank should have a clear mandate to pursue price stability with all the other objectives being subordinated to the inflation target (Agénor, 2002). Here, the literature typically refers to the concept of instrument independence, which denotes the autonomy of central banks in selecting their instruments to achieve the announced inflation targets. Moreover, financial sector development is considered a prerequisite for the successful implementation of IT. A well-developed financial system not only enables the central bank to employ market-based instruments, but it has a central role in the monetary policy transmission mechanism. Therefore, we include bank credit to the private sector (as a share of GDP), as a proxy for financial sector development.

4. Empirical analysis of the choice of monetary regimes

This section presents the results from the multinomial logit regression, estimated by the maximum likelihood estimator. Since the adoption of IT and fixed exchange rate arrangements are of our main interest, they represent the treatment groups, while intermediary monetary regimes form the reference group. In Tables 3–4, we present the main results from our baseline specification, while in Table 5 we drop the assumption of independence among the outcomes of the dependent variable and reassess the sensitivity of main conclusions by estimating a bivariate probit regression. Tables 6–11 provide additional robustness checks with respect to different sampling periods, inclusion of additional explanatory variables, and working with "soft" instead of full-fledged IT. In the Appendix we present additional results which address the sensitivity of our baseline results with respect to: the specification of equation (1), the transformation of the data used in the regressions, heterogeneity issues in the sample as well as the issues related to autocorrelation. At the bottom of each table, we provide the relevant test statistics indicating the fit of regressions.

Table 4
Determinants of Monetary Regimes: Multivariate evidence, 1990–2021 period.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−3.14*** (0.38)	−0.34*** (0.04)	INF VOL	1.12 (0.89)	0.18* (0.10)
GROWTH	−2.08*** (0.50)	−0.30*** (0.06)	GROWTH VOL	−1.96*** (0.54)	−0.33*** (0.09)
DEBT	−1.03** (0.48)	−0.14** (0.06)	DEBT	−0.54 (0.42)	−0.11* (0.08)
CREDIT	1.64*** (0.44)	0.12*** (0.05)	CREDIT	3.12*** (0.41)	0.34*** (0.04)
CBI	3.74*** (0.65)	0.36*** (0.07)	CBI	4.11*** (0.61)	0.51*** (0.08)
NCF	0.66*** (0.15)	0.08*** (0.02)	NCF	0.54*** (0.13)	0.09*** (0.03)
Constant	−0.42 (0.73)	0.23*** (0.01)	Constant	−3.87*** (0.58)	0.22*** (0.01)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.25*** (0.42)	−0.21 (0.05)	INF VOL	−2.38** (0.97)	−0.42*** (0.15)
GROWTH	0.54 (0.53)	0.19*** (0.07)	GROWTH VOL	0.27 (0.36)	0.10** (0.06)
DEBT	0.16 (0.42)	0.08 (0.06)	DEBT	0.25 (0.39)	0.10 (0.08)
CREDIT	1.70*** (0.44)	0.17*** (0.05)	CREDIT	2.75*** (0.44)	0.34*** (0.07)
CBI	2.50*** (0.63)	0.17** (0.08)	CBI	2.16*** (0.64)	0.17* (0.09)
NCF	0.11* (0.06)	−0.02* (0.01)	NCF	0.09 (0.07)	−0.01 (0.01)
Constant	−2.54*** (0.73)	0.21*** (0.02)	Constant	−3.60*** (0.56)	0.22*** (0.02)
Pseudo R^2	0.22	0.22	Pseudo R^2	0.15	0.15
Log likelihood	−440.29	−440.29	Log likelihood	−497.37	−497.37
Observations	571	571	Observations	573	573

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2021. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

4.1. Baseline results

The estimates from the baseline specification of equation (1) are shown in Table 3. Specifically, the left-hand side of Table 3 presents the estimates from the empirical model with the variables denoting macroeconomic performance (inflation and output growth), while the results from the regression with macroeconomic volatility (inflation and output growth volatility, respectively) are presented on the right-hand side. Otherwise, both regressions contain the same set of control variables. The rationale for estimating the right-hand side specification stems from the common observation that EMEs are usually exposed to higher macroeconomic fluctuations in comparison to advanced economies.

As shown in the left-hand panel of Table 3, higher average inflation lowers the probability of adopting IT, which conforms to the well-observed fact that both advanced economies and EMEs have introduced IT only after bringing inflation down to a relatively low level. This phenomenon can be rationalized by the low central bank credibility in an inflationary environment. In addition, our finding is in line with the rest of the empirical literature (Ardakani et al., 2018; Arsić et al., 2022; Fry-McKibbin & Wang, 2014, Hu, 2006, Lin, 2010, Lin & Ye, 2009, Minea et al., 2021, Minea & Tapsoba, 2014, Pontines, 2013, Samarina et al., 2014, Thornton & Vasilakis, 2017). On the other hand, as can be seen in the right-hand panel, higher inflation volatility increases the likelihood of adopting IT relative to intermediary monetary regimes. Here, note that this regression coefficient is not statistically significant, while its marginal effect is statistically significant at the 10% level of significance. This is an intriguing result given that inflation volatility usually comes hand in hand with average inflation. In other words, one would expect that both higher average inflation and inflation volatility would make the introduction of IT less feasible. Furthermore, we find that both output growth and its volatility lower the probability of adopting IT, which conforms to the a priori expectations: on the one hand, when a country experiences sound output growth, the potential benefits of IT in terms of the possibility to combine inflation targets with output objectives become less obvious; on the other hand, this finding suggests that the introduction of IT becomes less likely under volatile macroeconomic conditions. This result is in line with the findings in Ardakani et al. (2018), Hu (2006), and Samarina and Sturm (2014), though, as discussed in Section 2, there is no uniform consensus in the empirical literature about the role of these factors.

Regarding the effects of control variables, we find that financial sector development, central bank independence, and greater exposure to capital flows are all associated with a higher likelihood of adopting IT relative to intermediary monetary strategies. Note that the marginal effects of these variables are significant at the 1% level of significance. Therefore, we can conclude that our results support the recommendations concerning the common prerequisites for adopting IT in EMEs (Batini & Laxton, 2007). This is equally true for the role of public debt, which decreases the likelihood of adopting IT. The regression coefficient of public debt is negative and

Table 5
The Choice of Monetary Regimes: Bivariate Probit evidence, 1990–2017.

	(1)	(2)	(3)	(4)	(5)	(6)
	Inflation targeting	Fixed Exchange rate				
	Coefficient	Coefficient	Marginal effect	Marginal effect	Marginal effect	Marginal effect
			1 1	1 0	0 1	0 0
INF	−1.63*** (0.17)	−0.41*** (0.09)	−0.11 (0.16)	−0.24*** (0.03)	−0.10*** (0.03)	0.35*** (0.03)
GROWTH	−1.22*** (0.22)	0.47*** (0.18)	−0.04 (0.06)	−0.19*** (0.03)	0.13*** (0.05)	0.06 (0.04)
DEBT	−0.57** (0.23)	−0.17 (0.17)	−0.004 (0.006)	−0.09** (0.03)	−0.05 (0.04)	0.13*** (0.05)
CREDIT	0.49*** (0.18)	0.27* (0.17)	0.004 (0.006)	0.07** (0.03)	0.07 (0.04)	−0.14*** (0.03)
CBI	2.02*** (0.30)	0.10 (0.25)	0.01 (0.02)	0.31*** (0.04)	0.01 (0.07)	−0.33*** (0.06)
NCF	0.27*** (0.07)	0.02 (0.02)	0.001 (0.002)	0.04*** (0.01)	0.003 (0.006)	−0.05*** (0.01)
Constant	−0.44 (0.36)	−0.78*** (0.27)				
Log likelihood	−563.8	−563.84				
Observations	830	830				
	Coefficient	Coefficient	Marginal effect	Marginal effect	Marginal effect	Marginal effect
			1 1	1 0	0 1	0 0
INF VOL	1.47*** (0.49)	−3.33*** (0.99)	−0.007 (0.006)	0.27*** (0.09)	−0.90*** (0.27)	0.64** (0.28)
GROWTH VOL	−1.56*** (0.34)	0.63*** (0.18)	−0.003* (0.001)	−0.27*** (0.06)	0.17*** (0.05)	0.10 (0.07)
DEBT	−0.48*** (0.18)	−0.18 (0.16)	−0.002 (0.001)	−0.08*** (0.03)	−0.04 (0.04)	0.13*** (0.05)
CREDIT	1.37*** (0.18)	0.61*** (0.16)	0.007 (0.005)	0.23*** (0.03)	0.16*** (0.04)	−0.40*** (0.04)
CBI	2.66*** (0.30)	0.16 (0.25)	0.009 (0.006)	0.46*** (0.05)	0.03 (0.07)	−0.50*** (0.07)
NCF	0.19** (0.09)	0.005 (0.02)	0.0006 (0.0006)	0.03** (0.01)	0.0007 (0.006)	−0.03** (0.02)
Constant	−2.37*** (0.25)	−1.27*** (0.20)				
Log likelihood	−631.67	−631.67				
Observations	835	835				

Notes: The estimates from the bivariate probit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

significant at the 5% level of significance. As the policy mix may be important for the successful implementation of the IT regime, it is expected that higher public debt reduces the likelihood of adopting IT. Overall, our results regarding the effects of control variables on the likelihood of adopting IT are in line with the evidence provided in de Mendonca and de Guimaraes e Souza (2012), Fouejieu (2017), Ismailov et al. (2016), Lucotte (2010, 2012), Minea and Tapsoba (2014), Mishkin and Schmidt-Hebbel (2002, pp. 171–219), Carare and Stone (2006), Leyva (2008), Samarina and De Haan (2014), Samarina and Sturm (2014), and Thornton and Vasilakis (2017).

The estimation results regarding the probability of adopting fixed exchange rates do not provide strong evidence on the effects of macroeconomic variables. For example, it is observed that both inflation and its volatility reduce the likelihood of implementing fixed exchange rate arrangements compared to intermediary monetary strategies. However, although the coefficient of inflation is negative and statistically significant, the marginal effect is insignificant. This finding presents a challenge in interpretation: on one hand, it contradicts the common observation that exchange-rate pegs are frequently introduced as disinflation tools in high-inflation countries; on the other hand, it could be explained by the issue of real exchange-rate appreciation, which undermines the sustainability of exchange-rate pegs, ultimately leading to their abandonment. Furthermore, there is evidence suggesting that both output growth and growth volatility increase the likelihood of adopting fixed exchange rates relative to intermediary regimes. Regarding the effects of control variables, it is found that financial sector development, higher central bank independence, and larger net capital flows are all associated with a higher likelihood of adopting exchange-rate pegs relative to intermediary monetary strategies.

Although the results presented in the upper and lower panels of Table 3 are not directly comparable, they suggest that macroeconomic conditions (inflation, output growth, and their volatilities) seem to have opposite effect on the adoption of the two monetary regimes of interest, namely, IT and exchange rate pegs. Conversely, similar institutional conditions (financial development and central bank independence) are conducive to the implementation of both IT and fixed exchange rates.

When interpreting these findings, it is important to consider a significant caveat: the relationship between IT and some macroeconomic and institutional variables included in the empirical model is not free from the issue of endogeneity. While it may be true that macroeconomic performance (e.g., inflation rate or inflation volatility) affects the decision to adopt IT, there may also be reverse causality, where the adoption of IT affects macroeconomic performance. However, in line with the existing empirical literature, we do not address possible endogeneity due to the main goal of our empirical study being to assess which macroeconomic and institutional factors (or "determinants" as they are often termed) are relevant for adopting IT. This assessment is conducted by estimating a

Table 6
The Choice of Monetary Regimes: Multivariate evidence, 1970–2017.

Inflation targeting					
	(1)			(2)	
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.94*** (0.32)	−0.22*** (0.03)	INF VOL	1.17 (0.84)	0.31*** (0.11)
GROWTH	−1.40*** (0.38)	−0.14*** (0.03)	GROWTH VOL	−2.02*** (0.53)	−0.22*** (0.05)
DEBT	−1.34*** (0.48)	−0.10** (0.04)	DEBT	−0.97*** (0.34)	−0.08** (0.03)
CREDIT	1.70*** (0.41)	0.12*** (0.03)	CREDIT	3.45*** (0.38)	0.28*** (0.03)
CBI	4.39*** (0.60)	0.34*** (0.05)	CBI	4.96*** (0.55)	0.45*** (0.05)
NCF	0.64*** (0.17)	0.05*** (0.01)	NCF	0.57*** (0.16)	0.05*** (0.01)
Constant	−1.29** (0.64)	0.14*** (0.01)	Constant	−4.61*** (0.50)	0.14*** (0.01)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.16*** (0.24)	−0.07** (0.03)	INF VOL	−6.56*** (2.20)	−1.05*** (0.34)
GROWTH	0.53 (0.38)	0.13** (0.06)	GROWTH VOL	0.90*** (0.32)	0.20*** (0.05)
DEBT	−0.60* (0.33)	−0.04 (0.05)	DEBT	−0.58** (0.29)	−0.06 (0.04)
CREDIT	0.97*** (0.35)	0.08* (0.05)	CREDIT	1.95*** (0.34)	0.20*** (0.04)
CBI	1.47*** (0.48)	0.06 (0.07)	CBI	1.23*** (0.47)	0.04 (0.06)
NCF	0.09** (0.04)	−0.01 (0.008)	NCF	0.07* (0.04)	−0.006 (0.007)
Constant	−1.16** (0.54)	0.21*** (0.01)	Constant	−2.50*** (0.39)	0.21*** (0.01)
Pseudo R^2	0.22 0.22		Pseudo R^2	0.15 0.15	
Log likelihood	−573.21–573.21		Log likelihood	−631.87–631.87	
Observations	830 830		Observations	835 835	

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1970–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

multinomial choice model, which is not intended to explain the causal influence of right-hand variables on the adoption of IT. Instead, our empirical model simply examines whether a certain variable is associated with a higher or lower likelihood of adopting IT. In other words, the finding that, for instance, public debt lowers the likelihood of adopting IT does not imply that causality runs from public debt to inflation; it does not exclude the existence of reverse causality. Therefore, endogeneity is of lesser importance within binary/multivariate choice models because they are not used to explore causal effects. Consequently, throughout the paper, we refrain from interpreting the estimates from the multivariate choice model as implying any causal influence; instead, we only assert that certain factors are associated with a lower or higher likelihood of adopting IT.

As mentioned above, our baseline investigation deliberately omits the recent period corresponding to the COVID-19 pandemic with the associated large turbulence in economic activity, which might contaminate the results from the empirical analysis. However, since we do not wish to discard the more recent period completely, we also examine the sensitivity of our estimates by re-estimating the regression based on the extended sample by end of 2021.

Table 4 indicates that expanding the sample size does not significantly alter the estimates obtained from the initial specification of our empirical model (the regressions on the left-hand side). This holds true for both the regression related to the adoption of IT and the regression concerning fixed exchange rates. While there are slight variations in the magnitude of regression coefficients, their marginal effects remain largely consistent with those presented in Table 3, with the exception of the marginal effect of output growth in the IT regression, which shows a slight increase. Similar observations apply to the estimates derived from the two regressions on the right-hand side. Specifically, in the regression focusing on the choice of IT, both the coefficients and their marginal effects closely resemble those in Table 3, with the exception of inflation volatility, where both the coefficient and marginal effect are lower. Thus, none of the previous conclusions are altered by the extension of the sample. Regarding the regression for the adoption of fixed exchange rates, working with the extended sample size has notably impacted the estimates of inflation volatility, financial sector development, and central bank independence, all of which exhibit substantial increases compared to before. However, the remaining variables have remained largely unaffected. Nevertheless, even in this scenario, all principal conclusions regarding the influence of each individual factor on the likelihood of adopting IT and fixed exchange rates remain valid.

4.2. Robustness analysis

4.2.1. Bivariate probit estimation

Multivariate logit regressions, as displayed in Table 3, are based on the assumption that the outcomes of the dependent categorical

Table 7
Robustness checks: "soft" inflation targeting, additional control variables, and geographical dummies.

Inflation targeting						
	(1)		(2)		(3)	
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
INF	−3.09*** (0.51)	−0.30*** (0.05)	−3.08*** (0.40)	−0.31*** (0.04)	−1.32*** (0.24)	−0.13*** (0.04)
GROWTH	−1.09 (0.68)	−0.16** (0.07)	−2.16*** (0.53)	−0.28*** (0.06)	−0.86* (0.48)	−0.19*** (0.07)
DEBT	−0.64 (0.58)	−0.10* (0.06)	−1.67*** (0.49)	−0.21*** (0.06)	0.20 (0.44)	0.008 (0.06)
CREDIT	2.91*** (0.57)	0.22*** (0.05)	1.02* (0.55)	0.04 (0.06)	1.71*** (0.44)	0.16*** (0.06)
CBI	3.77*** (0.84)	0.33*** (0.08)	2.57*** (0.70)	0.19** (0.08)	6.20*** (0.64)	0.74*** (0.08)
NCF	0.76*** (0.19)	0.08*** (0.02)	0.60*** (0.16)	0.07*** (0.02)	0.60*** (0.15)	0.09*** (0.02)
TOT	1.14 (0.97)	0.07 (0.10)				
POL	1.05*** (0.20)	0.10*** (0.02)				
Continent dummy			−0.50*** (0.11)	−0.06*** (0.01)		
Constant	−4.00*** (1.40)	0.21*** (0.02)	2.18** (1.02)	0.21*** (0.01)	−3.30*** (0.70)	0.30*** (0.02)
Fixed exchange rate						
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
INF	−0.86** (0.37)	0.008 (0.05)	−1.30*** (0.42)	−0.04 (0.05)	−1.25*** (0.37)	−0.10* (0.05)
GROWTH	1.01* (0.58)	0.19** (0.07)	0.38 (0.56)	0.16** (0.07)	0.73 (0.56)	0.17** (0.07)
DEBT	0.77 (0.51)	0.14** (0.07)	0.05 (0.47)	0.09 (0.06)	0.36 (0.45)	0.04 (0.06)
CREDIT	2.21*** (0.46)	0.19*** (0.06)	1.62*** (0.43)	0.19*** (0.06)	1.77*** (0.46)	0.15*** (0.06)
CBI	1.84** (0.74)	0.10 (0.10)	2.42*** (0.66)	0.24*** (0.09)	3.94*** (0.68)	0.17** (0.08)
NCF	0.12 (0.08)	−0.01 (0.01)	0.11* (0.06)	−0.01 (0.01)	0.15** (0.07)	−0.02 (0.01)
TOT	1.20 (0.85)	0.12 (0.12)				
POL	0.37** (0.19)	0.008 (0.02)				
Continent dummy			−0.09 (0.09)	0.01 (0.01)		
Constant	−4.81*** (1.17)	0.20*** (0.02)	−2.02** (0.90)	0.21*** (0.02)	−3.26*** (0.75)	0.21*** (0.02)
Pseudo R^2	0.25 0.25		0.22 0.22		0.20 0.20	
Log likelihood	−309.35–309.35		−422.14–422.14		−462.06–426.06	
Observations	433 433		556 556		556 556	

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), financial sector development (CREDIT), terms of trade (TOT), and political polarization (POL). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

variable are independent. In essence, our empirical model meets this criterion, as none of the monetary regimes have been implemented simultaneously in any country within the sample. However, there are a few instances where inflation targeters continued to pursue exchange rate objectives. For instance, Chile introduced IT in 1990–1991 while maintaining its exchange rate band until August 1999, when it transitioned to full-fledged IT. Similarly, Israel adopted explicit inflation targeting in 1992, but retained the exchange rate band until 1997. Mexico also incorporated some elements of IT in 1999, though it did not fully adopt full-fledged IT until 2002. Consequently, we have re-estimated our baseline specification to account for the potential correlation between IT and fixed exchange rate arrangements. The results of this estimation procedure are presented in Table 5.

Regarding the regression for the choice of IT (column 1), the main findings mirror those obtained in Table 3. Specifically, we find that both higher inflation and output growth decrease the likelihood of adopting IT (upper panel). Meanwhile, the results concerning inflation and output growth volatility remain mixed: higher inflation volatility increases the likelihood of IT adoption, while growth volatility reduces it (lower panel). Additionally, the remaining explanatory variables maintain their magnitudes, signs, and levels of statistical significance as those provided in Table 3. Column (2) presents the results of the regression of fixed exchange rate arrangements on all the macroeconomic and institutional variables. The variables used as proxies for macroeconomic conditions (inflation, output growth, and their respective volatilities) become statistically significant. In this specification, higher inflation (upper panel) and inflation volatility (lower panel) decrease the likelihood of adopting fixed exchange rates, while higher output growth (upper panel) and its volatility (lower panel) increase the likelihood of pegging the exchange rate. However, unlike the results in column (2) of Table 3, the coefficients of the remaining explanatory variables, except for financial sector development, are not statistically significant.

Furthermore, Table 5 presents the marginal effects while explicitly considering the correlation between the two monetary regimes. Specifically, we present the marginal effects of the four possible interactions between the two outcomes. Column (3) presents the marginal effects in the event of the simultaneous implementation of IT and fixed exchange rates. Since this combination is absent in our dataset, the ensuing results indicate that such a specification is not suitable for our analysis. Therefore, this finding supports our decision to utilize multinomial logit regression as the primary modelling framework. The subsequent two columns present the

Table 8
Robustness checks: "soft" inflation targeting, additional control variables, and geographical dummies – regressions with macroeconomic volatility.

Inflation targeting						
	(1)		(2)		(3)	
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
INF VOL	−0.16 (1.16)	0.12 (0.15)	1.10 (1.05)	0.23* (0.13)	0.47 (0.93)	0.20 (0.14)
GROWTH VOL	−1.46** (0.69)	−0.13 (0.08)	−2.93*** (0.65)	−0.40*** (0.08)	−1.72*** (0.42)	−0.28*** (0.06)
DEBT	0.15 (0.52)	−0.02 (0.06)	−1.09** (0.43)	−0.16*** (0.06)	0.16 (0.42)	0.002 (0.06)
CREDIT	4.07*** (0.56)	0.41*** (0.06)	2.85*** (0.47)	0.27*** (0.05)	2.78*** (0.43)	0.29*** (0.05)
CBI	4.19*** (0.72)	0.47*** (0.08)	3.37*** (0.59)	0.37*** (0.07)	6.11*** (0.63)	0.81*** (0.08)
NCF	0.58*** (0.17)	0.07*** (0.02)	0.51*** (0.15)	0.07*** (0.02)	0.60*** (0.15)	0.09*** (0.02)
TOT	2.16** (0.16)	0.20* (0.11)				
POL	0.77*** (0.16)	0.09*** (0.02)				
Continent dummy			−0.51*** (0.10)	−0.07*** (0.01)		
Constant	−7.91*** (1.19)	0.21*** (0.02)	−1.46** (0.69)	0.21*** (0.01)	−4.65*** (0.58)	0.30*** (0.02)
Fixed exchange rate						
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
INF VOL	−3.22* (1.84)	−0.46* (0.26)	−1.80* (0.92)	−0.33** (0.13)	−1.88** (0.95)	−0.32** (0.14)
GROWTH VOL	−1.40* (0.77)	−0.14 (0.10)	0.08 (0.47)	0.15** (0.07)	−0.01 (0.46)	0.11* (0.06)
DEBT	0.90** (0.45)	0.12** (0.06)	0.17 (0.43)	0.07 (0.06)	0.38 (0.41)	0.05 (0.06)
CREDIT	2.71*** (0.45)	0.22*** (0.05)	2.53*** (0.40)	0.26*** (0.05)	2.65*** (0.43)	0.23*** (0.05)
CBI	1.52** (0.77)	0.04 (0.10)	2.08*** (0.65)	0.16* (0.09)	3.31*** (0.68)	0.12 (0.08)
NCF	0.08 (0.07)	−0.01 (0.01)	0.08* (0.04)	−0.01 (0.009)	0.11* (0.06)	−0.02* (0.01)
TOT	1.84** (0.86)	0.17 (0.12)				
POL	0.14 (0.18)	−0.01 (0.02)				
Continent dummy			−0.04 (0.08)	0.02 (0.01)		
Constant	−5.13*** (1.11)	0.20*** (0.02)	−3.31*** (0.69)	0.21*** (0.02)	−3.96*** (0.61)	0.21*** (0.02)
Pseudo R^2	0.17	0.17	0.14	0.14	0.16	0.16
Log likelihood	−343.05	−343.05	−465.27	−465.27	−487.34	−487.34
Observations	433	433	558	558	558	558

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), financial sector development (CREDIT), terms of trade (TOT), and political polarization (POL). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

marginal effects of adopting only one of these monetary regimes: either IT (column 4) or exchange rate peg (column 5). The results in column (4) mirror those obtained in column (1) of Table 3, while those in column (5) resemble the estimates in column (2) of Table 3. In fact, the magnitudes, signs, and statistical significance of the marginal effects estimated by considering the potential interaction between the two monetary regimes resemble those obtained when treating both monetary regimes as independent. Therefore, to avoid redundancy, we refrain from further commentary on them. Finally, in column (6), we offer evidence for the scenario where neither of these two monetary regimes is adopted. Here, the results suggest that as inflation, inflation volatility, and public debt increase, monetary authorities are more likely to transition to intermediary monetary strategies. In this scenario, it appears that output growth and its volatility play a limited role in the decision-making process. On the contrary, higher financial sector development, central bank independence, and net capital flows all diminish the likelihood of adopting intermediary monetary strategies.

4.2.2. Robustness check with respect to the sample size

Our baseline regression, as shown in Table 3, focuses on the period coinciding with the actual implementation of IT in New Zealand (1990). Choosing any other year as the beginning of our sample could introduce bias into the estimation, given that IT had not been practiced at all before 1990. However, considering that fixed exchange rate arrangements appear to be the primary alternative to IT for EMEs, we utilize a larger sample size to potentially refine our previous findings. Thus, Table 6 presents the regression estimates based on an extended sample, spanning from 1970 to 2017.

As observed, the results in the upper panel of Table 6 closely mirror the baseline estimates presented in Table 3. Once again, we validate the impact of macroeconomic performance on the choice of monetary policy strategies in EMEs. Specifically, we observe that inflation, output growth, and output growth volatility are associated with a lower likelihood of adopting IT relative to intermediary monetary strategies. Therefore, we can assert that our main findings remain consistent regardless of the sample period used in the empirical analysis. Moreover, we obtain robust findings for the control variables included in the regression: the coefficient of public debt is negative and statistically significant at the 5% level of significance, while financial sector development, central bank independence, and net capital flows increase the likelihood of adopting IT.

Table 9
Determinants of Monetary Regimes: Multivariate evidence, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.72*** (0.36)	−0.27*** (0.04)	INF VOL	1.38 (1.09)	0.22* (0.13)
GROWTH	−1.65*** (0.51)	−0.21*** (0.05)	GROWTH VOL	−2.81*** (0.70)	−0.37*** (0.09)
DEBT	−1.63** (0.51)	−0.22*** (0.06)	DEBT	−1.39*** (0.49)	−0.20*** (0.06)
CREDIT	1.19** (0.49)	0.05 (0.05)	CREDIT	2.65*** (0.48)	0.23*** (0.05)
CBI	3.26*** (0.70)	0.27*** (0.08)	CBI	3.84*** (0.67)	0.41*** (0.07)
NCF	0.77*** (0.16)	0.09*** (0.02)	NCF	0.74*** (0.17)	0.09*** (0.02)
GDPPC	0.63*** (0.17)	0.12*** (0.01)	GDPPC	0.93*** (0.17)	0.16*** (0.02)
Constant	−0.66 (0.76)	0.16*** (0.01)	Constant	−3.69*** (0.64)	0.22*** (0.01)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.38*** (0.46)	−0.08 (0.05)	INF VOL	−1.35* (0.82)	−0.24** (0.10)
GROWTH	0.48 (0.55)	0.13* (0.07)	GROWTH VOL	0.26 (0.42)	0.13** (0.06)
DEBT	0.60 (0.51)	0.15** (0.07)	DEBT	0.67 (0.47)	0.14** (0.06)
CREDIT	2.25*** (0.45)	0.26*** (0.05)	CREDIT	2.75*** (0.44)	0.34*** (0.05)
CBI	2.97*** (0.66)	0.27** (0.08)	CBI	2.50*** (0.65)	0.22** (0.08)
NCF	0.10** (0.04)	−0.02** (0.008)	NCF	0.08** (0.04)	−0.01** (0.007)
GDPPC	−1.232*** (0.21)	−0.19*** (0.03)	GDPPC	−1.29*** (0.25)	−0.21*** (0.03)
Constant	−2.51*** (0.80)	0.21*** (0.02)	Constant	−3.56*** (0.62)	0.21*** (0.02)
Pseudo R^2	0.26 0.26		Pseudo R	0.19 0.19	
Log likelihood	−401.80–401.80		Log likelihood	−436.43–436.43	
Observations	550 550		Observations	552 552	

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), financial sector development (CREDIT), and real GDP per capita (GDPPC). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

As previously mentioned, given the prevalence of fixed exchange rate arrangements in the pre-1990s period, we anticipate potential differences in the estimates from the regression of fixed exchange rate arrangements when working with the extended sample. Indeed, the results presented in the lower panel of Table 6 provide evidence that, over the extended sample, macroeconomic conditions seem to have played a more significant role in the adoption of exchange rate pegs. Here, both inflation and its volatility reduce the likelihood of adopting fixed exchange rate arrangements relative to intermediary monetary strategies. On the other hand, we find that output growth and its volatility increase the likelihood of adopting fixed exchange rate regimes, though the coefficient of output growth is not statistically significant. Generally, both the magnitudes and the signs of regression coefficients of these variables are comparable to those in Table 3, except that now the statistical significance of regression coefficients is higher compared to the baseline estimates. This difference reflects the larger sample size, which provides more information for estimation, resulting in lower standard errors. As for the coefficients of control variables (financial sector development, central bank independence, and net capital flows), although they retain the same signs, most of their marginal effects are not statistically significant. One potential explanation behind this finding may be related to the more volatile macroeconomic conditions prevailing over the extended sample (due to the inclusion of the 1970–1990 period). It appears that, faced with an unstable macroeconomic environment, the monetary authorities in EMEs were primarily sensitive to changes in macroeconomic variables. Additionally, the global trend towards higher central bank independence was observed only from the 1990s onwards.

4.2.3. *Further robustness checks: additional control variables and "soft" inflation targeters*

In Tables 7 and 8, we check the stability of the main results in two directions: first, by adding additional explanatory variables to the baseline specification which might provide further explanatory power to the model, and second, by working with "soft" instead of full-fledged IT regime. In order to make the presentation concise and clear, we present these robustness checks separately for the regression with macroeconomic variables in levels and for the regression with their volatilities. In this respect, the former estimates are presented in Table 7, while the latter are provided in Table 8.

The first column in Table 7 augments the baseline specification by including two additional control variables: terms of trade (TOT), and political polarization (POL). The inclusion of the former variable is justifiable considering our sample primarily consists of small open economies that regard terms of trade as given. Consequently, fluctuations in terms of trade represent significant sources of foreign shocks for these countries, potentially influencing the decision-making process of monetary authorities. Regarding the latter variable, in countries characterized by higher political polarization, political actors tend to exert pressure on central banks in favor of procyclical

Table 10
Determinants of Monetary Regimes: Multivariate evidence, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−3.36*** (0.41)	−0.35*** (0.04)	INF VOL	0.20 (1.02)	0.15 (0.13)
GROWTH	−1.26** (0.55)	−0.20*** (0.06)	GROWTH VOL	−1.69*** (0.54)	−0.26*** (0.07)
DEBT	−0.27 (0.52)	−0.07 (0.06)	DEBT	−0.13*** (0.47)	−0.05 (0.06)
CREDIT	2.43*** (0.48)	0.18*** (0.05)	CREDIT	3.44*** (0.48)	0.36*** (0.05)
CBI	4.42*** (0.72)	0.41*** (0.08)	CBI	4.05*** (0.61)	0.49*** (0.08)
NCF	0.47*** (0.14)	0.05*** (0.02)	NCF	0.44*** (0.14)	0.06*** (0.02)
TRADE	−1.69*** (0.34)	−0.18*** (0.04)	TRADE	−0.67** (0.27)	−0.08** (0.04)
Constant	−0.53 (0.77)	0.22*** (0.01)	Constant	−3.76*** (0.59)	0.22*** (0.02)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.42*** (0.49)	−0.04 (0.06)	INF VOL	−2.41** (1.04)	−0.38*** (0.15)
GROWTH	0.82 (0.56)	0.19** (0.07)	GROWTH VOL	0.26 (0.49)	0.12* (0.07)
DEBT	0.72 (0.48)	0.12* (0.07)	DEBT	0.69 (0.44)	0.11* (0.07)
CREDIT	2.32*** (0.47)	0.22*** (0.06)	CREDIT	2.97*** (0.45)	0.29*** (0.05)
CBI	2.81*** (0.64)	0.19** (0.09)	CBI	2.12*** (0.61)	0.13 (0.09)
NCF	0.11** (0.04)	−0.01 (0.009)	NCF	0.08** (0.04)	−0.01 (0.008)
TRADE	−0.68*** (0.16)	−0.01 (0.02)	TRADE	−0.41** (0.16)	−0.03 (0.02)
Constant	−2.74*** (0.77)	0.21*** (0.02)	Constant	−3.62*** (0.58)	0.21*** (0.02)
Pseudo R^2	0.22 0.22		Pseudo R^2	0.12 0.12	
Log likelihood	−417.28–417.28		Log likelihood	−470.99–470.99	
Observations	546 546		Observations	547 547	

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), financial sector development (CREDIT), and trade openness (TRADE). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

policies, a trend particularly notable in EMEs. As observed, in comparison with our baseline estimates, the results in the upper panel of Table 7 remain practically unchanged in terms of the magnitudes and signs of regression coefficients, as well as their statistical significance. Once again, we provide evidence that inflation, output growth, and public debt are associated with a lower likelihood of adopting IT relative to intermediary monetary strategies. Additionally, we find that financial sector development, central bank independence, and higher net capital flows all increase the likelihood of adopting IT. Regarding the effects of the two additional controls, it is notable that the impact of terms of trade is not statistically significant, while political polarization is associated with a higher likelihood of adopting IT relative to intermediary monetary strategies. Therefore, we present evidence that polarized political systems are more likely to implement the IT regime, consistent with the findings in Lucotte (2010). Furthermore, the estimates from the regression of fixed exchange rate arrangements (the lower panel of Table 7) are comparable to the baseline results reported in column (1) of Table 3. However, in this regression, the two additional control variables are not statistically significant.

In column (2) of Table 7, we examine the sensitivity of our main findings regarding the country's geographical position by introducing a continent dummy variable. This categorical variable assigns each country in our panel to its corresponding continent (enumerated from 1 to 6), following the Summers and Heston's definition of continents. Its purpose is to explicitly control for the potential distinct characteristics of different country groups. As observed, the continental dummy is statistically significant at the 1 percent level in the regression of adopting IT (the upper panel), but not in the regression of fixed exchange rates. Despite this, the primary results remain consistent, except for the coefficients of output growth and public debt, which are now statistically significant at 1 percent in the regression of adopting IT, while financial sector development becomes statistically insignificant.

As described in Section 3, we adopt the perspective of Calvo and Mishkin (2003) regarding the switch to full-fledged IT as the true date of adopting IT. According to Calvo and Mishkin (2003), a full-fledged IT regime is characterized by an explicit commitment to pre-announced inflation targets within a specified timeframe, along with developed institutional support and transparent actions by the central bank. Conversely, the "soft" IT regime lacks explicit commitment to transparent goals, potentially resulting in less effective actions by the central bank towards meeting the pre-set inflation target, as they may not influence economic agents' inflationary expectations. However, specifying the exact date of adopting the IT regime can be challenging due to the flexibility in its practical implementation. For example, Chile introduced IT in 1990–1991 while retaining its exchange rate band until August 1999, when it transitioned to full-fledged IT. Similarly, Israel adopted explicit inflation targets in 1992 but maintained the exchange rate band until 1997. Mexico also introduced elements of IT in 1999, but did not fully transition to IT until 2002. Since our sample includes only full-fledged inflation targeters, we aim to assess the sensitivity of our main findings to the composition of the sub-sample of inflation

Table 11
Determinants of Monetary Regimes: Multivariate evidence, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.61*** (0.41)	−0.27*** (0.05)	INF VOL	16.74*** (2.90)	1.88*** (0.32)
GROWTH	−1.35** (0.52)	−0.19*** (0.06)	GROWTH VOL	−1.78** (0.69)	−0.23*** (0.08)
DEBT	−1.28** (0.50)	−0.17*** (0.06)	DEBT	−1.67*** (0.49)	−0.21*** (0.06)
CREDIT	1.44*** (0.46)	0.10** (0.05)	CREDIT	2.94*** (0.47)	0.25*** (0.05)
CBI	3.65*** (0.66)	0.34*** (0.07)	CBI	3.70*** (0.62)	0.37*** (0.08)
NCF	0.60*** (0.16)	0.07*** (0.02)	NCF	0.45*** (0.14)	0.05*** (0.02)
MONEY	−3.17 (1.95)	−0.42* (0.24)	MONEY	−8.72*** (1.90)	−1.00*** (0.22)
Constant	−0.31 (0.74)	0.22*** (0.01)	Constant	−2.04*** (0.68)	0.22*** (0.02)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.32*** (0.44)	−0.06 (0.06)	INF VOL	5.71*** (2.06)	0.06 (0.27)
GROWTH	0.40 (0.53)	0.13* (0.07)	GROWTH VOL	0.10 (0.49)	0.10 (0.07)
DEBT	0.15 (0.42)	0.09 (0.06)	DEBT	−0.11 (0.42)	0.06 (0.06)
CREDIT	1.73*** (0.45)	0.19*** (0.06)	CREDIT	2.56*** (0.44)	0.25*** (0.05)
CBI	2.60*** (0.64)	0.20** (0.09)	CBI	2.13*** (0.64)	0.15* (0.09)
NCF	0.10* (0.06)	−0.01 (0.01)	NCF	0.07* (0.04)	−0.01 (0.008)
MONEY	0.31* (0.16)	0.21** (0.10)	MONEY	−2.53*** (0.83)	0.04 (0.12)
Constant	−2.56*** (0.73)	0.21*** (0.02)	Constant	−2.97*** (0.61)	0.21*** (0.02)
Pseudo R^2	0.21 0.21		Pseudo R^2	0.18 0.18	
Log likelihood	−429.66–429.66		Log likelihood	−441.68–441.68	
Observations	553 553		Observations	555 551	

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), financial sector development (CREDIT), and broad money growth (MONEY). Standard errors of regression coefficients and their marginal effects are given in parentheses. For the former we use robust standard errors, while the latter standard errors are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

targeters. Therefore, in the last column of Table 7, we re-estimated the same regression as in column (1) of Table 3, except that we considered "soft" instead of full-fledged inflation targeters. As observed, the results in column (3) of Table 7 closely resemble the baseline estimates, suggesting that monetary authorities base their decision-making process on the same macroeconomic indicators, regardless of the type of IT ("soft" or full-fledged).

The analysis presented in Table 8 follows a structure similar to that of Table 7, with the only distinction being the inclusion of inflation and growth volatilities instead of inflation and output growth. Once again, in column (1), we augment the baseline regression with two additional control variables: terms of trade and polarization. As observed from the upper panel of Tables 8 and in the regression of the adoption of IT, the coefficient of output growth volatility remains negative and statistically significant at the 5% level, but its marginal effect is no longer statistically significant. Conversely, inflation volatility is not statistically significant, and its sign has changed from positive to negative. However, the inclusion of the two additional controls has not impacted the signs, magnitudes, and statistical significance of financial sector development, central bank independence, and net capital flows, with estimates remaining identical to those in the baseline regression. Regarding the additional control variables (terms of trade and political polarization), both regression coefficients are positive and statistically significant at the 5% and 1% levels, respectively, suggesting that political polarization and foreign shocks are associated with a higher likelihood of adopting IT. However, as shown in the lower panel of Table 8, terms of trade and political polarization do not significantly impact the probability of adopting fixed exchange rates relative to intermediary monetary strategies.

In column (2) of Table 8, we examine the sensitivity of our main results with respect to the geographical position of the countries. Once again, the continental dummy is statistically significant at the 1% level in the regression of adopting IT (the upper panel), but not in the regression of adopting fixed exchange rates (the lower panel). This finding suggests that, to some extent, the adoption of IT reflects the country-specific characteristics.

In the last column of Table 8, we present the estimates obtained by working with "soft" instead of full-fledged inflation targeting. Once again, the results in column (3) resemble those in Table 3, confirming that monetary authorities seem to base their decision-making process on the same parameters, regardless of the type of IT regime ("soft" or "hard"). In this regard, our findings differ from those in Samarina and De Haan (2014), who show that the factors affecting the choice of IT somewhat differ between "soft" and full-fledged inflation targeters. We suspect that this may be due to differences in the sample composition: while Samarina and De Haan (2014) work with a mixed sample, containing both OECD and non-OECD countries, our sample consists solely of EMEs, half of which are not OECD members.

In addition to the variables already identified as potential factors in the decision-making process of monetary authorities, the list of other variables that could affect the likelihood of adopting either IT or the fixed exchange rate regime is extensive. Including all of them is an impossible task for any empirical research, so we restrict our approach on the ones already present in the empirical literature. In what follows, we extend our baseline regression for the following variables: real GDP per capita (as a proxy for the level of economic development), trade openness, and broad money growth. The estimates from these regressions are presented in Tables 9–11

In Table 9, we extend our baseline regression model by incorporating real GDP per capita, serving as a proxy for the level of economic development. As previously mentioned, small open economies appear to be favorable candidates for adopting fixed exchange rate regimes. Conversely, it remains challenging to determine whether IT is more suitable for large or small countries. Additionally, since GDP per capita can be considered a proxy for overall institutional development, this variable is associated with a higher probability of adopting IT. As shown in Table 9, the inclusion of real per capita GDP in the empirical model appears justified as it is statistically significant and economically significant in both regressions (for IT and for fixed exchange rates). Accordingly, our estimates suggest that more developed economies are better positioned for adopting IT, while the converse holds for fixed exchange rates; countries with higher GDP per capita are less inclined to adopt this monetary regime.

The former finding conforms well with the common assertion that the implementation of IT is conditional on certain institutional prerequisites (Batini & Laxton, 2007; Carare et al., 2002; Carare & Stone, 2006; Freedman & Ötker-Robe, 2009, 2010; IMF, 2006; Mishkin & Savastano, 2002; Mishkin & Schmidt-Hebbel, 2002, 2007), which are typically absent in many low-income economies. For instance, underdeveloped financial systems in these countries often hinder the use of market-based monetary policy instruments, necessary for successful implementation of IT. Furthermore, central banks in many EMEs often lack the necessary technical infrastructure (data availability, lack of systematic forecasting process, low understanding of the transmission mechanism etc.), which impedes the day-to-day implementation of IT (Jonas & Mishkin, 2007; Mishkin, 2004; Mishkin & Schmidt-Hebbel, 2002, pp. 171–219). These findings are consistent with the existing empirical literature (de Mendonca and de Guimaraes e Souza, 2012; Leyva, 2008; Lucotte, 2010; Minea et al., 2021; Samarina et al., 2014). Given that most of the EMEs are small developing economies, the exchange rate plays a prominent role in the transmission mechanism due to trade openness, exposure to external shocks, and the underdeveloped financial markets (Fraga et al., 2003). In addition, Table 9 reveals that the inclusion of real GDP per capita has resulted in some changes in the size of regression coefficients and marginal effects, albeit without impacting the signs and statistical significance of the variables included in the empirical model.

In Table 10, we modify the baseline specification by including foreign trade (the sum of exports and imports as a percentage of GDP) as a proxy for trade openness. Given that small open economies rely on foreign trade and are sensitive to commodity price changes, they aim to minimize exchange rate fluctuations, thereby favoring fixed exchange rate regimes. Consequently, this variable is expected to have a positive sign for the probability of adopting a fixed exchange rate regime. However, although economic theory suggests that IT could be an appealing policy option for open economies (Svensson, 2000), a priori, it is difficult to argue that IT is more suitable for such economies. Nonetheless, Samarina and De Haan (2014) suggest in their empirical study that trade openness is expected to positively impact the probability of adopting IT.

However, our estimates do not support these hypotheses as trade openness is statistically significant and economically important, but with an unexpected sign in the regressions (the upper and lower panels of Table 10). Concerning the role of trade openness in the choice of IT, our findings align with the broader empirical literature (Arsić et al., 2022; Fry-McKibbin & Wang, 2014; Lin, 2010; Lin & Ye, 2007; Lin & Ye, 2009; Minea et al., 2021; Minea & Tapsoba, 2014; Samarina et al., 2014; Thornton & Vasilakis, 2017; Vega & Winkelried, 2005). Conversely, the finding that higher trade openness also reduces the likelihood of adopting fixed exchange rates (relative to intermediary monetary regimes) is puzzling. Perhaps, this result can be attributed to policymakers in open economies seeking to mitigate excessive fluctuations in real exchange rates, thus leaning towards intermediate monetary regimes incorporating some nominal exchange rate flexibility. Regarding the estimates of other variables, it is notable that the inclusion of trade openness has caused some changes in the size of regression coefficients and their marginal effects, but without materially affecting the main conclusions.

In Table 11, we augment the empirical model with an additional control variable – broad money growth. In both regressions concerning the adoption of IT, money growth is statistically significant and exhibits the expected sign, thereby justifying its inclusion in the empirical model. Consequently, our estimates align with existing empirical literature indicating that monetary expansion diminishes the likelihood of adopting IT (Ardakani et al., 2018; Arsić et al., 2022; Lin & Ye, 2009; Pontines, 2013; Samarina et al., 2014; Yamada, 2013). However, this conclusion does not extend to the choice of fixed exchange rates, where we encounter conflicting results: in the left-hand side regression, the effect of money growth is positive, while in the other regression, it exhibits the opposite sign. We lack an explanation for these conflicting findings, although we suspect they might arise from the correlation between money growth and inflation. Regarding the remaining variables, the inclusion of money growth does not significantly alter the estimates from the left-hand side specification, holding true for both the likelihood of adopting IT and the adoption of fixed exchange rates. Conversely, notable changes emerge in the estimates from the right-hand specification, where we incorporate inflation and output growth volatilities. Specifically, in both regressions presented on the right-hand side, the inclusion of money growth profoundly impacts the estimates of inflation volatility and public debt, while the remaining variables remain largely unaffected. Once again, we speculate that these effects may stem from the correlation between money growth and inflation volatility, as well as the practice of monetizing public debt in many developing countries.

5. Conclusions

Despite the fact that IT has been adopted by an increasing number of EMEs, many of them still rely on other strategies for

controlling inflation. Therefore, based on a panel of 44 EMEs during the period of 1990–2017, we investigate the most important factors that influence policymakers in EMEs to choose IT vis-a-vis alternative monetary policy strategies. To this end, we employ a multinomial logistic regression with IT and exchange rate pegs as treatment groups, and intermediary monetary strategies as the reference group. Our empirical model includes various macroeconomic and institutional conditions, such as inflation, inflation volatility, output growth, growth volatility, public debt, financial sector development, central bank independence, net capital flows, terms of trade, political polarization, trade openness, the level of economic development, and money growth. We believe that our estimation framework provides a more appropriate approach to the subject matter as policymakers in EMEs are able to choose from a variety of monetary strategies, including currency pegs, IT, and intermediate regimes. In addition, our approach allows us to differentiate between the factors that are specific to the implementation of IT and those factors whose relevance is more general, i.e., those that are important for the successful implementation of any monetary strategy.

Our results regarding the likelihood of adopting IT suggest that macroeconomic conditions play a significant role in the policymaker's decision-making process. Specifically, we find that higher inflation reduces the probability of adopting IT, which conforms to the well-observed fact that both advanced economies and EMEs have introduced IT only after bringing inflation down to some relatively low level. In addition, both output growth and its volatility make the adoption of IT less likely, suggesting that the potential advantages of IT, in terms of the possibility to combine inflation targets with output growth objectives, become less obvious for the countries experiencing sound growth performance. As for the effects of control variables, we find that financial sector development, central bank independence, greater exposure to capital flows, and higher GDP per capita make adopting IT more likely, whereas public debt, trade openness, and money growth work in the opposite direction. Further on, although not directly comparable, the comparison between the regressions for IT and fixed exchange rates implies that macroeconomic conditions (inflation, output growth, and their volatilities) seem to have opposite impact on the choice of the two monetary policy regimes. On the other hand, it seems that similar institutional conditions (financial development, and central bank independence) are conducive to the implementation of the two regimes. We have checked the robustness of the main results in several directions: by adding additional explanatory variables, by working with "soft" instead of full-fledged IT, by extending the sample for the 1990–2021 period, and by addressing potential heterogeneity in the sample. The estimates obtained from all these extensions largely support our baseline findings. In these regards, we show that monetary authorities base their decision-making process on the same macroeconomic indicators, regardless of the type of IT regime ("soft" or "hard").

Finally, this empirical approach is an imperfect approximation of the variables and process behind the adoption of a particular monetary regime. In addition to providing a broader framework to existing ones, the multinomial logit model has limited ability in handling complex choice sets and incorporate unobserved heterogeneity. As such, some events which our study does not explicitly address might have affected central banks' behavior with respect to switching strategies. Despite addressing some of these events in the robustness checks, further analysis, potentially using a regime-switching framework might provide interesting conclusions. As central banks continue to adopt new and hybrid monetary strategies, adopting an appropriate empirical framework presents a growing challenge.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

This Appendix presents results that further address the sensitivity of the baseline results in Table 3, with respect to: the specification of equation (1), the transformation of the data used in the regressions, heterogeneity issues in the sample of EME's and issues related to autocorrelation.

As mentioned in the main text, we focus on two separate specifications of the empirical model for the following reason: the left-hand side specification (in which inflation and growth rates are included in the list of regressors) serves as a baseline framework for analyzing the impact of macroeconomic performance on the adoption of IT. In addition, we are interested in assessing how macroeconomic instability (as proxied by inflation and output growth volatilities) affects the choice of IT. This decision has been motivated by the long historical experience of developing countries with volatile macroeconomic conditions. Here, given the high correlation between inflation and inflation volatility (0.75), we avoid including both variables in the same regression, which is another reason for using a separate specification of the empirical model. Since this modelling approach is rather arbitrary, in Table 12 we present the estimates from the empirical model containing all the macroeconomic variables (inflation, output growth and their volatilities).

Table 12
Determinants of Monetary Regimes: Multivariate evidence, 1990–2017

Inflation targeting		
	Coefficient	Marginal effect

(*continued on next page*)

Table 12 (*continued*)

Inflation targeting		
	Coefficient	Marginal effect
INF	−2.68*** (0.34)	−0.25*** (0.04)
INF VOL	16.39*** (3.32)	0.15*** (0.03)
GROWTH	−1.47*** (0.55)	−0.22*** (0.06)
GROWTH VOL	−1.74*** (0.63)	−0.22*** (0.07)
DEBT	−1.24*** (0.52)	−0.16** (0.06)
CREDIT	2.06** (0.46)	0.16*** (0.05)
CBI	4.19*** (0.68)	0.38*** (0.08)
NCF	0.44*** (0.14)	0.05*** (0.02)
Constant	−1.08 (0.79)	0.21*** (0.01)
Fixed exchange rate		
	Coefficient	Marginal effect
INF	−1.45*** (0.25)	−0.08* (0.04)
INF VOL	9.87*** (2.33)	0.62** (0.27)
GROWTH	0.68 (0.50)	0.18*** (0.07)
GROWTH VOL	0.23 (0.42)	0.12** (0.06)
DEBT	0.09 (0.43)	0.08 (0.06)
CREDIT	1.85*** (0.44)	0.17*** (0.05)
CBI	2.60*** (0.65)	0.17** (0.08)
NCF	0.11** (0.05)	−0.01 (0.009)
Constant	−2.82** (0.74)	0.21*** (0.02)
Pseudo R^2	0.23	0.23
Log likelihood	−416.05	−416.05
Observations	556	556

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

After including all the macroeconomic variables in a single regression, most of regression coefficients maintain the magnitudes, signs, and statistical significance comparable to those from the baseline regressions presented in Table 3. Inflation volatility is the only variable which has been affected substantially. Specifically, in the regression for adopting IT (the upper panel), the coefficient of inflation volatility has retained its previous (positive) sign, but it is not highly significant anymore. In addition, the magnitude of this regression coefficient has become much larger though the marginal effect has decreased. On the other hand, in the regression for adopting fixed exchange rates (the lower panel), the coefficient of inflation volatility has changed its sign from negative to positive. This pattern, when a regression coefficient changes its sign depending on whether it is included in the regression along with another variable or whether the two variables are included in the regression separately, is a typical symptom of multicollinearity. Therefore, as inflation and inflation volatility are highly correlated, the above behavior is quite expected, but it is puzzling why we observe this typical symptom only in the lower panel.

In order to avoid the effects of excessive short-run macroeconomic fluctuations, our baseline estimation is based on transformed data, i.e., we work with three-year moving averages of all variables. However, as the transformation smooths out the variables included in the empirical model, this procedure might potentially lead to biased results. For instance, if high inflation volatility lowers the probability of adopting IT, the variations in inflation over time will be smoothed out by using moving averages, hence arbitrarily increasing the likelihood of adopting IT. Therefore, we have re-estimated the baseline specification using untransformed yearly observations.

The empirical evidence presented in Table 13 shows that working with untransformed data does not affect the estimates from the regression concerning the adoption of IT. Indeed, one may observe only a slight decrease in the magnitude of regression coefficients and marginal effects. On the other hand, there are notable effects on some of the estimates from the regression concerning the adoption of fixed exchange rates. Specifically, in the left-hand side specification, the magnitude of the coefficient of financial sector development becomes much higher, the size of the coefficient of central bank independence decreases considerably, while the coefficient of public debt changes both its size and statistical significance. The estimates of inflation, output growth, and net-capital flows remain virtually unaffected. In addition, one may observe substantial changes in the right-hand side specification of our empirical model.

Here, the coefficient of inflation volatility becomes much larger, the coefficients of central bank independence and financial development are substantially lower, there are changes in both the magnitude and statistical significance of output volatility and public debt, while only the estimates of net-capital flows remain virtually the same. To summarize, working with moving averages does have an impact on the estimates regarding the likelihood of adopting fixed exchange rates. However, with the exception of public debt, the main conclusions about the general effect of each macroeconomic and institutional variable on the likelihood of adopting IT remain unaffected.

Table 13
The Choice of Monetary Regimes: Multivariate evidence, 1990–2017

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.94*** (0.32)	−0.22*** (0.04)	INF VOL	1.17 (0.84)	0.31** (0.11)
GROWTH	−1.40*** (0.38)	−0.14*** (0.05)	GROWTH VOL	−2.02*** (0.53)	−0.22*** (0.05)
DEBT	−1.34*** (0.48)	−0.10** (0.04)	DEBT	−0.97*** (0.33)	−0.08** (0.03)
CREDIT	1.69*** (0.41)	0.12*** (0.03)	CREDIT	3.45*** (0.38)	0.28*** (0.03)
CBI	4.39*** (0.60)	0.34*** (0.05)	CBI	4.95*** (0.55)	0.44*** (0.05)
NCF	0.64*** (0.17)	0.05*** (0.01)	NCF	0.57*** (0.16)	0.05*** (0.01)
Constant	−1.29** (0.64)	0.14*** (0.01)	Constant	−4.61*** (0.49)	0.14*** (0.01)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.16*** (0.24)	−0.07** (0.03)	INF VOL	−6.56*** (2.20)	−1.05*** (0.34)
GROWTH	0.53 (0.38)	0.13** (0.05)	GROWTH VOL	0.90*** (0.32)	0.20*** (0.05)
DEBT	−0.60* (0.33)	−0.04 (0.05)	DEBT	−0.58** (0.29)	−0.06 (0.05)
CREDIT	10.97*** (0.34)	0.09* (0.05)	CREDIT	1.95*** (0.34)	0.20*** (0.04)
CBI	1.47*** (0.48)	0.06 (0.07)	CBI	1.23*** (0.47)	0.04 (0.06)
NCF	0.09** (0.04)	−0.01 (0.008)	NCF	0.07* (0.04)	−0.01 (0.008)
Constant	−1.15** (0.53)	0.21*** (0.01)	Constant	−2.50*** (0.39)	0.21*** (0.01)
Pseudo R^2	0.22	0.22	Pseudo R^2	0.15	0.15
Log likelihood	−573.21	−573.21	Log likelihood	−631.87	−631.87
Observations	830	830	Observations	835	835

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). Here, we use untransformed (yearly) data. The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs during 1990–2017 using untransformed (yearly) data. The inflation rate is calculated as $infltr = infl/(1+infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

In Tables 14.A. – 14.C. the original sample is divided into three groups of countries according to the World Bank country classification by income per capita (GNI per capita, Atlas method): lower-middle-income countries (Algeria, Cote d'Ivoire, Ghana, India, Morocco, Nigeria, Pakistan, Philippines, Tanzania, Tunisia, Venezuela), upper-middle-income countries (Argentina, Botswana, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Indonesia, Jordan, Lebanon, Malaysia, Mexico, Peru, Serbia, South Africa, Thailand, Turkey, Ukraine) and high income countries (Chile, China, Croatia, Czech Republic, Hungary, Israel, Panama, Poland, Russia, Singapore, South Korea). In Tables 15.A – 15.B we have included country and time-specific fixed effects in the baseline regression of Table 3. Finally, in Table 16, we have estimated the regression in Table 3, using cluster-robust standard errors, with each country representing a cluster.

Table 14.A
Determinants of Monetary Regimes: Low-middle-income countries, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−30.99*** (2.45)	−0.03* (0.02)	INF VOL	108.52*** (7.22)	0.002* (0.001)
GROWTH	26.25*** (1.62)	0.02* (0.01)	GROWTH VOL	17.574*** (1.13)	0.004 (0.004)
DEBT	12.33*** (0.78)	0.02 (0.02)	DEBT	2.25*** (0.15)	0.004 (0.004)
CREDIT	−5.22*** (0.29)	−0.04 (0.05)	CREDIT	−0.58*** (0.05)	−0.01 (0.01)
CBI	4.46*** (0.22)	0.04* (0.03)	CBI	4.50*** (0.26)	0.008* (0.006)

(*continued on next page*)

Table 14.A (*continued*)

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
NCF	−0.39*** (0.03)	−0.03 (0.04)	NCF	−1.04*** (0.09)	−0.002 (0.003)
Constant	−1.56*** (1.01)	0.07*** (0.01)	Constant	−4.65*** (0.30)	0.07*** (0.005)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	1.71* (0.99)	0.73*** (0.23)	INF VOL	−50.53 (46.36)	−0.28* (0.18)
GROWTH	1.01 (0.80)	0.43** (0.02)	GROWTH VOL	−3.27 (6.78)	−0.18 (0.37)
DEBT	0.25 (0.18)	0.11*** (0.04)	DEBT	0.83 (0.99)	0.46 (0.53)
CREDIT	0.11** (0.05)	0.46* (0.27)	CREDIT	−0.86 (0.72)	−0.48 (0.42)
CBI	0.17 (0.12)	0.72*** (0.20)	CBI	0.81* (0.47)	0.46** (0.20)
NCF	−0.95 (1.99)	−0.04 (0.07)	NCF	0.15 (0.11)	0.09* (0.05)
Constant	−0.47* (0.28)	0.075 (0.02)	Constant	−0.68 (0.55)	0.07*** (0.02)
Pseudo R^2	0.74	0.74	Pseudo R^2	0.62	0.62
Log likelihood	−10.89	−10.89	Log likelihood	−15.81	−15.81
Observations	80	80	Observations	80	80

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 11 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

Table 14.B
Determinants of Monetary Regimes: Upper-middle-income countries, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−3.25*** (0.84)	−0.32*** (0.11)	INF VOL	2.43 (1.52)	0.29* (0.16)
GROWTH	−1.87* (1.06)	−0.21* (0.12)	GROWTH VOL	−2.97** (1.20)	−0.43*** (0.12)
DEBT	−0.32 (0.53)	−0.10 (0.17)	DEBT	−0.47 (0.36)	−0.11* (0.07)
CREDIT	−0.29 (0.34)	−0.10 (0.16)	CREDIT	1.52 (1.18)	0.13** (0.06)
CBI	−0.65 (0.85)	0.18 (0.24)	CBI	0.17 (0.27)	−0.04 (0.13)
NCF	0.58* (0.32)	0.07* (0.04)	NCF	0.52** (0.24)	0.07** (0.03)
Constant	0.27 (0.22)	0.19*** (0.04)	Constant	−0.94 (0.85)	0.19*** (0.02)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.40** (0.65)	−0.54 (0.66)	INF VOL	−6.38 (5.56)	−1.03** (0.46)
GROWTH	−0.42 (0.15)	0.30 (0.45)	GROWTH VOL	6.04 (12.74)	0.22*** (0.08)
DEBT	0.11 (0.09)	0.20* (0.12)	DEBT	1.03 (0.91)	0.18** (0.09)
CREDIT	0.12 (0.12)	0.21 (0.18)	CREDIT	1.96** (0.92)	0.25*** (0.07)
CBI	0.20 (0.21)	0.34* (0.19)	CBI	1.69 (1.45)	0.26* (0.15)
NCF	0.03 (0.33)	−0.02 (0.05)	NCF	0.07 (0.37)	−0.01 (0.04)
Constant	−0.15 (0.26)	0.24*** (0.17)	Constant	−3.30* (1.80)	0.24*** (0.02)
Pseudo R^2	0.20	0.20	Pseudo R^2	0.11	0.11
Log likelihood	−228.60	−228.60	Log likelihood	−254.68	−254.68
Observations	295	295	Observations	295	295

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 22 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

Table 14.C
Determinants of Monetary Regimes: High-income countries, 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−3.99*** (1.11)	−0.17* (0.09)	INF VOL	−8.61 (7.18)	−0.23** (0.11)
GROWTH	−3.52*** (1.21)	−0.56*** (0.12)	GROWTH VOL	−2.70 (1.73)	−0.23 (0.25)
DEBT	−0.10 (0.12)	−0.03 (0.13)	DEBT	−0.21 (0.85)	0.05 (0.12)
CREDIT	0.22* (0.12)	0.25** (0.12)	CREDIT	0.44*** (0.11)	0.48*** (0.14)
CBI	0.75*** (0.13)	0.75*** (0.11)	CBI	0.67*** (0.12)	0.10*** (0.01)
NCF	0.34* (0.20)	0.03 (0.02)	NCF	0.50** (0.21)	0.07** (0.03)
Constant	−0.13 (0.17)	0.36*** (0.03)	Constant	−0.52*** (0.12)	0.36*** (0.03)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−4.87** (1.93)	−0.44** (0.20)	INF VOL	12.86* (7.07)	0.26** (0.11)
GROWTH	1.48 (1.22)	0.47*** (0.15)	GROWTH VOL	−2.96** (1.29)	−0.29 (0.22)
DEBT	−0.14* (0.86)	−0.13 (0.11)	DEBT	−0.20* (0.07)	−0.18** (0.08)
CREDIT	0.39 (0.33)	−0.10 (0.16)	CREDIT	0.34*** (0.09)	0.23* (0.12)
CBI	0.30** (0.13)	−0.08 (0.16)	CBI	0.71 (0.67)	0.35** (0.14)
NCF	0.18* (0.10)	0.02 (0.02)	NCF	0.11* (0.06)	−0.02 (0.02)
Constant	−0.05 (0.22)	0.24 (0.03)	Constant	−0.15 (0.12)	0.24*** (0.03)
Pseudo R^2	0.36	0.36	Pseudo R^2	0.21	0.21
Log likelihood	−112.63	−112.63	Log likelihood	−139.66	−139.66
Observations	163	163	Observations	165	165

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 11 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

Table 15.A
Determinants of Monetary Regimes: Country-specific effect, 1990–2017 period.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.25*** (0.21)	−0.21** (0.10)	INF VOL	1.34 (0.96)	0.21 (0.15)
GROWTH	0.45** (0.20)	−0.46 (0.76)	GROWTH VOL	−1.34* (0.74)	−0.29** (0.12)
DEBT	−0.13*** (0.05)	−0.37* (0.19)	DEBT	−0.67 (0.44)	−0.17* (0.08)
CREDIT	0.01 (0.02)	0.14 (0.29)	CREDIT	2.74*** (0.55)	0.12* (0.06)
CBI	0.33 (0.21)	0.96*** (0.19)	CBI	3.18*** (0.88)	0.66*** (0.12)
NCF	−0.24*** (0.07)	0.03*** (0.01)	NCF	0.42** (0.24)	0.07** (0.03)
Constant	−0.62 (0.88)	0.23** (0.10)	Constant	−2.64*** (0.61)	0.24*** (0.06)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−0.23 (0.59)	−0.59 (0.64)	INF VOL	−4.34*** (1.23)	−0.56** (0.22)
GROWTH	−0.94 (1.21)	0.24 (0.33)	GROWTH VOL	1.13 (0.89)	−0.13 (0.16)
DEBT	−0.87*** (0.26)	0.49** (0.19)	DEBT	1.02 (0.92)	0.07 (0.12)
CREDIT	−0.23 (0.20)	−0.19 (0.35)	CREDIT	1.35*** (0.47)	0.26** (0.11)
CBI	1.95*** (0.59)	0.20** (0.10)	CBI	1.83*** (0.34)	0.24** (0.10)
NCF	0.17* (0.09)	−0.02* (0.01)	NCF	0.16 (0.14)	0.09 (0.10)
Constant	−1.54*** (0.33)	0.08 (0.16)	Constant	−2.37*** (0.77)	0.19*** (0.03)
Country-specific FE	yes	yes	Country-specific FE	yes	yes
Pseudo R^2	0.65	0.65	Pseudo R^2	0.28	0.28
Log likelihood	−75.41	−75.41	Log likelihood	−123.44	−123.44
Observations	387	387	Observations	390	390

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel

of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as *infltr* = *infl*/(1+ *infl*). Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

Table 15.B
Determinants of Monetary Regimes: Time-specific effect, 1990–2017 period.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.32*** (0.76)	−0.35*** (0.07)	INF VOL	0.97** (0.45)	0.13* (0.08)
GROWTH	−1.36 (1.07)	−0.38** (0.15)	GROWTH VOL	−1.32* (0.77)	−0.17** (0.07)
DEBT	−0.26*** (0.04)	−0.45*** (0.03)	DEBT	−0.34 (0.36)	−0.08 (0.07)
CREDIT	0.33*** (0.05)	0.20*** (0.06)	CREDIT	1.32** (0.52)	0.16** (0.07)
CBI	0.26*** (0.01)	0.09** (0.04)	CBI	3.06*** (0.88)	0.47*** (0.06)
NCF	0.11*** (0.02)	0.17*** (0.04)	NCF	0.29** (0.14)	0.05** (0.03)
Constant	0.18 (1.38)	0.23*** (0.01)	Constant	−1.92*** (0.79)	0.12*** (0.03)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−0.95 (0.91)	0.61 (0.73)	INF VOL	−1.67* (0.95)	−0.37** (0.18)
GROWTH	1.49** (0.58)	0.33*** (0.04)	GROWTH VOL	0.22 (0.42)	0.07* (0.05)
DEBT	−0.33 (0.55)	0.17*** (0.05)	DEBT	0.23 (0.53)	0.12 (0.11)
CREDIT	0.49*** (0.05)	0.42*** (0.05)	CREDIT	1.26** (0.66)	0.12* (0.08)
CBI	0.69*** (0.05)	0.75*** (0.07)	CBI	1.86*** (0.67)	0.22** (0.10)
NCF	0.23*** (0.07)	−0.06*** (0.01)	NCF	−0.06 (0.09)	0.03 (0.05)
Constant	−0.71*** (0.12)	0.08 (0.16)	Constant	−2.15*** (0.71)	0.17*** (0.04)
Time-specific FE	yes	yes	Time-specific FE	yes	yes
Pseudo R^2	0.34	0.34	Pseudo R^2	0.27	0.27
Log likelihood	−195.35	−75.41	Log likelihood	−198.25	−198.25
Observations	387	387	Observations	387	387

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use robust standard errors, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as *infltr* = *infl*/(1+ *infl*). Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

Table 16
Determinants of Monetary Regimes: Clustered standard errors (country), 1990–2017.

Inflation targeting					
(1)			(2)		
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−2.98*** (0.62)	−0.32*** (0.11)	INF VOL	1.07 (1.12)	0.24* (0.14)
GROWTH	−1.69* (0.87)	−0.24* (0.13)	GROWTH VOL	−1.96* (0.77)	−0.29** (0.12)
DEBT	−1.08* (0.62)	−0.15* (0.08)	DEBT	−0.64 (0.55)	−0.10 (0.11)
CREDIT	1.46** (0.53)	0.10* (0.07)	CREDIT	3.02*** (0.93)	0.31** (0.15)
CBI	3.69*** (0.83)	0.35*** (0.011)	CBI	3.96*** (0.88)	0.47*** (0.15)
NCF	0.59*** (0.24)	0.07* (0.04)	NCF	0.49** (0.22)	0.07 (0.06)
Constant	−0.58 (0.91)	0.21*** (0.06)	Constant	−3.74*** (0.79)	0.21*** (0.07)
Fixed exchange rate					
	Coefficient	Marginal effect		Coefficient	Marginal effect
INF	−1.27 (0.97)	−0.04 (0.52)	INF VOL	−1.82 (1.45)	−0.33* (0.23)
GROWTH	0.50 (0.72)	0.16* (0.09)	GROWTH VOL	0.14 (0.66)	0.11 (0.10)
DEBT	0.13 (0.61)	0.07 (0.08)	DEBT	0.19 (0.53)	0.06 (0.17)
CREDIT	1.73** (0.68)	0.19* (0.12)	CREDIT	2.62*** (0.82)	0.26* (0.10)
CBI	2.54*** (0.55)	0.19** (0.09)	CBI	2.10*** (0.71)	0.13 (0.12)
NCF	0.11 (0.10)	−0.01 (0.02)	NCF	0.08 (0.17)	−0.01 (0.08)
Constant	−2.54** (1.12)	0.21*** (0.06)	Constant	−3.52*** (0.84)	0.21** (0.10)
Pseudo R^2	0.20	0.20	Pseudo R^2	0.12	0.12
Log likelihood	−433.45	−433.45	Log likelihood	−478.70	−478.70
Observations	556	556	Observations	558	558

Notes: The estimates from the multivariate logit model are obtained by the maximum likelihood estimator with inflation targeting and fixed exchange rate as treatment groups, and intermediary monetary regimes as a reference group. The regression includes the following regressors: inflation (INF), GDP growth (GROWTH), GDP growth volatility (GROWTH VOL), inflation volatility (INF VOL), central bank independence (CBI), net capital flows (NCF), public debt (DEBT), and financial sector development (CREDIT). The standard errors of regression coefficients and marginal effects are given in parentheses. For the former, we use *cluster robust standard errors (clustered by country)*, while the latter are calculated by the delta method. We work with an unbalanced panel of 44 EMEs with three-year moving averages during 1990–2017. The inflation rate is calculated as $infltr = infl/(1+ infl)$. Fixed exchange rate arrangements are defined as per the *de facto* exchange rate coarse classification in Ilzetzki et al. (2019). Finally, ***, ** and * indicate significance at 1%, 5%, and 10% level of significance.

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