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Inflation Targeting and Developing countries' Performance: Evidence from Firm-Level Data

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Abstract

We examine the impact of inflation targeting on manufacturing firm performance in developing countries. Using a panel of 31,027 firms in 47 countries from 2006 to 2020 and applying the entropy balancing method to mitigate selection issues, we find that inflation targeting significantly increases firm growth and productivity. The findings are economically significant and robust to various checks. Moreover, we provide evidence that our results are not biased towards unobservables nor are they confounded with the effects induced by other reforms, such as IMF programs. We further show that economic and institutional factors such as the quality of judicial processes, fiscal discipline, central bank deviations from the target, and the time length since the policy adoption also influence the link between the monetary regime and firm performance. Last, we explore the main transmission channels and identify macroeconomic stability as the key driver of the regime's effectiveness.

Keywords: • Inflation targeting • Manufacturing firm performance • Developing countries
• Entropy balancing • Monetary policy credibility

JEL Classification: E2, E31, E51, D2

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“Anchoring of inflation expectations is not a deus ex machina. It must come from somewhere, and [...] monetary policy must be the source of the change in the evolution of long-run inflation expectations.” (Mishkin, 2007)

1 Introduction

The 1970s and 1980s witnessed the emergence of monetary reforms, in a context of surging inflation in many countries. Indeed, in the aftermath of the collapse of the Bretton Woods system, countries whose currencies were pegged to the US dollar had to find an alternative monetary framework to the Bretton Woods system. Exchange rate targeting, adopted by the majority of developing countries during the 1970s, 1980s, and early 1990s, failed due to the massive increase in capital that led to rising inflationary pressures in many countries. In 1990, New Zealand became the first to adopt a new monetary framework based on inflation-targeting objectives. This involves an explicit announcement by the central bank of a quantitative level of inflation and its commitment to achieving this target to ensure price stability. To make the target credible, the central bank explicitly announces that low and stable inflation is its main objective, and reinforces its communication policy, for instance, through quarterly or half-yearly inflation reports (Mishkin and Posen, 1998; Svensson, 2010; Bernanke et al., 2018).

Since the 1990s, inflation targeting has been widely adopted by developing countries as a policy tool to promote macroeconomic stability. There is evidence from a number of empirical studies, mainly using macroeconomic data, that by anchoring inflation expectations more firmly, inflation targeting improves monetary policy credibility in developing countries, thus reducing macroeconomic uncertainty or volatility, typically captured by inflation, interest rate, exchange rate or output volatility (see, among others, Vega and Winkelried, 2005; Lin and Ye, 2009; Lin, 2010; Fratzscher et al., 2020; Arsić et al., 2022). Another strand of the literature has looked at the side effects of the monetary framework through its influence on government behavior. It has been shown that by constraining seigniorage, inflation targeting leads the government to greater fiscal discipline (e.g., see Lucotte, 2012; Minea and Tapsoba, 2014; Combes et al., 2018; Minea et al., 2021).

Other studies have examined the effects of inflation targeting at the country level. For instance, [de Mendonça and Lima \(2011\)](#) and [Montes \(2013\)](#) find that a successful inflation-targeting framework provides a stable macroeconomic environment that encourages private investment and job creation in Brazil.¹ Unlike the studies mentioned above, a few articles have examined the effects of inflation targeting using industry or firm-level data. Using a panel of 22 manufacturing industries in 39 advanced and emerging market economies over the period 1990–2014, [Choi et al. \(2022\)](#) find that inflation anchoring fosters growth in industries that are more credit-constrained. [Kumar et al. \(2015\)](#) and [Coibion et al. \(2018\)](#) use firm-level data to examine whether inflation expectations are indeed well ‘anchored’ in New Zealand, the country that pioneered inflation targeting in the early 1990s.

In contrast to the prevailing literature, which mainly focuses on macroeconomic variables, this study combines country and firm-level data to examine the effect of inflation targeting on firm performance. While [Choi et al. \(2022\)](#) examine the inflation targeting effect using industry-level data, we primarily differ from them in that we employ more disaggregated data, i.e., at the firm level. [Kumar et al. \(2015\)](#) and [Coibion et al. \(2018\)](#) use firm-level data to examine whether inflation expectations are well anchored under New Zealand’s inflation targeting regime. We differ from them in two main ways. First, while the authors explore the relationship between the monetary framework and firms’ inflation expectations, this paper examines the direct effect of inflation targeting on firm performance indicators such as sales growth and productivity. Second, our study covers 47 developing countries over the period 2006-20.

Our work is closely related to the literature dealing with the effects of macroeconomic uncertainty on firm outcomes. Numerous studies show that by reducing the predictability of the business cycle, macroeconomic uncertainty — generated by rising inflation or inflation volatility — leads firms to postpone investment, thereby strongly undermining their growth and productivity (see, among others, [Bloom et al., 2007](#); [Chong and Gradstein, 2009](#); [Kelilume, 2016](#); [Bloom et al., 2018](#); [Vo et al., 2019](#)). Against this background, this paper examines whether a monetary framework geared towards price

¹In the same vein, [Bambe \(2023\)](#) provides evidence, for a panel of 62 developing countries, that inflation targeting fosters private-sector investment.

stability, such as inflation targeting, improves firm performance in developing countries, which are generally subject to high macroeconomic instability.

Using a panel of 31,027 manufacturing firms in 47 developing countries over the period 2006-20, we examine the effect of inflation targeting on firms' sales growth and productivity. Inflation targeting may be correlated with unobservable factors that could also affect the overall performance of the economy, and hence that of firms. Therefore, we apply the entropy balancing method developed by [Hainmueller \(2012\)](#) to address the potential selection bias associated with policy adoption. The results suggest that inflation targeting significantly increases firm sales and productivity growth in inflation-targeting compared to non-inflation-targeting countries, with economically significant effects. These findings are robust to a series of tests, including a fixed-effects estimation, alternative samples, additional controls, and alternative measures of firm performance. These results could potentially be driven by confounding factors, such as the adoption of other reforms over the study period. Nevertheless, a placebo test reveals that our estimates are not spurious or confounded by shocks, unobserved trends, or the effects induced by other reforms such as IMF programs. We further highlight some heterogeneity features of the monetary regime according to economic and institutional factors. On the one hand, evidence suggests that inflation targeting is more effective in countries with sound institutions and fiscal discipline. On the other hand, the monetary regime is less effective when the central bank tends to deviate from its target. We also find evidence that the positive effect of inflation targeting on firm performance increases over time. Last, we empirically analyze the main transmission channels through which the effect of the monetary regime could transit. After highlighting that macroeconomic uncertainty, i.e., inflation and its volatility, as well as interest rate and exchange rate volatility, are factors that negatively affect firm performance, we show that enhanced macroeconomic stability resulting from inflation targeting adoption is the main channel through which the monetary framework operates.

The article is organized as follows. The next section offers a theoretical framework linking the monetary regime and firm outcomes. [Section 3](#) presents our empirical methodology. [Section 4](#) describes our data. [Section 5](#) reports some stylized facts. Our main findings are presented in [Section 6](#). [Section 7](#) analyzes the sensitivity of our results.

Section 8 deals with the key transmission channels. The last section concludes.

2 Theoretical background

2.1 Credibility as a transmission channel of monetary policy on firm performance

Based on the existing literature, we believe that macroeconomic stability is the main channel through which inflation targeting may affect firm performance. The literature provides evidence that the explicit announcement of an inflation target plays an important role in coordinating expectations, and significantly increases monetary policy credibility in developing countries, thus reducing macroeconomic instability, captured by inflation and its volatility, as well as interest rate and exchange rate volatility (Minella et al., 2003; Calderón et al., 2004 Vega and Winkelried, 2005; Rose, 2007; Gonçalves and Salles, 2008; Lin and Ye, 2009; Lin, 2010; López-Villavicencio and Pourroy, 2019; Fratzscher et al., 2020; Arsić et al., 2022).² In other words, macroeconomic stability involves inflation, exchange rate, and interest rate stability; lower price increases in response to nominal exchange rate shocks; or lower interest rate increases to break inflationary expectations.

Given the favorable effects of inflation targeting in anchoring inflation expectations, a number of studies have looked at the side effects of the monetary framework on private-sector investment, employment, and competitiveness. In a study focusing on the Brazilian economy from January 2000 to September 2009, de Mendonça and Lima (2011) find that a successful inflation targeting framework creates a stable macroeconomic environment that promotes private investment. Elsewhere, Montes (2013) finds evidence that inflation targeting has been an important strategy for achieving a more stable macroeconomic environment, which has been beneficial for investment and job creation in Brazil. Similarly, using a panel of 62 developing countries, Bambe (2023) shows that inflation

²The most immediate effect of inflation targeting is on the level of inflation. However, there is a strong correlation between the level of inflation and its volatility. Ball (1992) states that high inflation leads to uncertainty about future monetary policy, which in turn results in higher volatility. The inverse relationship may also exist (e.g., see Cukierman and Meltzer, 1986; Devereux, 1989).

targeting helps to create an investment-friendly environment in developing countries. [Aman et al. \(2022\)](#) find inflation targeting helps to reduce exchange rate misalignments in developing countries, thereby improving their external competitiveness.

Another source of macroeconomic uncertainty, interest rate volatility, is closely linked to inflation volatility. For instance, in a context of high inflation, a central bank following the Taylor rule will pursue a restrictive monetary policy by increasing the interest rate. Interest rate hikes in turn limit access to credit and depress investment demand, as suggested by the traditional neoclassical framework ([Harrison et al., 2004](#) and [Beck et al., 2005](#)). Furthermore, [Montes \(2013\)](#) provides evidence that changes in the short-term interest rate have a significant impact on the real cost of capital and hence on firms' investment decisions. Thus, achieving a relatively low inflation target under inflation targeting may prevent regular interest rate increases to control inflation ([de Mendonça and e Souza, 2009](#)). This may give way to a more conducive environment for access to credit or firm investment.³ Along these lines, using industry-level data, [Choi et al. \(2022\)](#) show that anchoring inflation effectively reduces the nominal interest rate and long-term borrowing costs, thereby facilitating lending and the production of output. Last, by reducing exchange rate movements, the exchange rate pass-through effect ([Aleem and Lahiani, 2014](#); [López-Villavicencio and Pourroy, 2019](#)), or interest rate volatility ([Vega and Winkelried, 2005](#); [de Mendonça and e Souza, 2009](#)), inflation targeting should also make firms less vulnerable to exchange rate or global interest rate shocks.

2.2 Macroeconomic uncertainty and firm performance

The literature dealing with the effects of macroeconomic volatility is long-standing and well-documented. Among the pioneering theoretical models, [Lucas Jr \(1967\)](#), [Nickell \(1974\)](#) and [Dixit et al. \(1994\)](#) offered an explicit formalization of the impact of uncertainty on investment in the presence of adjustment costs, or when there is irreversibility

³Asset prices, such as stocks, bonds, or real estate, could also be another transmission channel for monetary policy. This mechanism is closely linked to changes in the interest rate through a wealth effect. However, in the context of this study, this channel is probably of little relevance for developing countries as the participation of these firms in stock markets is generally low. Similarly, for foreign firms, the relevant wealth effect depends on the market in which they are listed. Last, [Bretscher et al. \(2022\)](#) show that uncertainty also generates risk premium shocks, which can restrict the flow of credit to households and firms.

in the production process. Since then, this literature has expanded widely and is structured around two concepts: irreversibility and expectation under uncertainty. Indeed, macroeconomic volatility reduces the predictability of the business cycle, which can significantly affect investment through *irreversibility effects* (Carruth et al., 2000; Dixit and Pindyck, 2012). In other words, investment involves irreversible costs that affect firms' earnings or expected profitability. Hence, if the economic outlook is not good, it is worth waiting as it gives the entrepreneur the opportunity to process new information before making an effective investment decision. Thus, when faced with uncertainty, investors tend to adopt a *wait-and-see* strategy and postpone investment decisions until the uncertainty is resolved (Bachmann and Bayer, 2013; Stokey, 2016).⁴

A large body of literature has empirically examined the impact of macroeconomic volatility on economic performance. For instance, using a panel of 42 developing countries, Aizenman and Marion (1999) show that higher volatility reduces the average rate of investment, with proportional effects to the magnitude of variability in different macroeconomic indicators. Similar evidence is provided by Gavin and Hausmann (1998) for Latin American economies. Studies have also looked at micro-economic variables, by investigating the impact of uncertainty on firms' investment behavior. Using an error correction model (ECM) of investment on a panel of 672 UK-listed manufacturing firms over the period 1972-1991, Bloom et al. (2007) provide empirical evidence that stock price volatility, leading to high uncertainty, makes firms more cautious when investing. These results are further corroborated by Chong and Gradstein (2009) on a detailed cross-country firm-level dataset. Uncertainty can also adversely affect total factor productivity, as it leads to an inefficient allocation of the factors of production across firms, as suggested by Bloom et al. (2018). Last, empirical evidence of the impact of exchange rate volatility on firm performance is also found in the literature (see, among others, Kelilume, 2016; Vo et al., 2019; Khosrowzadeh et al., 2020).

To sum up, based on the mechanisms highlighted above, our theoretical prediction is

⁴A related analysis regarding exchange rate uncertainty and investment is provided by Belke and Gros (2001). Furthermore, in an open economy with a fully flexible exchange rate regime, exchange rate movements affect domestic prices through imported goods (*exchange rate pass-through effect*). A rise in domestic prices may result in higher production costs, leading to a deterioration in the investment environment. This effect can be significant and contribute to inflation persistence (e.g., see Agénor, 2000; and Gagnon and Ihrig, 2004).

that firms operating in inflation-targeting countries should benefit more from inflation anchoring, thereby reducing inflation uncertainty and improving their performance.

3 Empirical methodology

Our analysis considers firm-level observations as treated when the country is operating under inflation targeting. Identifying and tracing down precisely any genuine effects induced by inflation targeting on the economic variables of interest is challenging (Balima et al., 2020 is a good example on this issue). Since countries that adopted inflation targeting may have emerged from a foreign exchange crisis or episodes of high inflation, selection problems are likely to arise. In other words, inflation targeting adoption may be correlated with unobservable factors which may also affect the overall performance of the economy, hence, potentially domestic firm outcomes. Therefore, the potential endogeneity of inflation targeting must be seriously considered, otherwise, it would lead to bias in the estimates. To allay this concern, we rely on the program evaluation methodology, which consists in estimating the average treatment effect on the treated (ATT). The ATT is the average difference in outcome (in our case, sales growth and productivity) between firms operating in inflation-targeting countries and those operating in non-inflation-targeting countries, and is defined as follows:

$$ATT = E[(Y_{i1}|T_i = 1)] - E[(Y_{i0}|T_i = 1)] \quad (1)$$

Y_0 represents the firm's outcome when the country i does not operate under the inflation targeting framework ($T = 0$) and Y_1 is the outcome associated with $T = 1$ (treated observations). Therefore, the inflation targeting effect is the difference between the situation due to the firm's exposure to the treatment and its situation in its absence. A problem arises as this approach faces a counterfactual dilemma, i.e., we cannot simultaneously observe Y_1 and Y_0 . In other words, we cannot observe how a firm located in an inflation-targeting country would have evolved if the country had not adopted the monetary framework. To address this issue, we adopt a counterfactual framework composed of untreated firms, but otherwise make up a potential control group. If the

treatment assignment was random, a simple approach would be to compare the average performance gaps between firms located in inflation-targeting countries and their peers (untreated units). However, as discussed earlier, this would lead to a spurious identification given the potential endogeneity in the reform. A substantial part of the empirical literature relies on a matching approach to examine the inflation-targeting effect on macroeconomic variables (e.g., see [Lin and Ye, 2007](#); [Lin and Ye, 2009](#); [Lucotte, 2012](#); [Minea and Tapsoba, 2014](#); [Ogrokhina and Rodriguez, 2019](#); [Apeti et al., 2023](#); [Bambe, 2023](#)). The matching approach is to reproduce a situation close to a setting where units would be randomly assigned to treatment. The latter are matched to those not exposed to treatment, based on their pre-treatment observable characteristics, which are as comparable as possible. Then, the outcome variable from matching or the ATT can be formalized as follows:

$$ATT = E[Y_{i1}|T_i = 1, X = \chi] - E[Y_{i0}|T_i = 0, X = \chi] \quad (2)$$

where χ is a set of pre-treatment country-level covariates described in subsection 4.2, correlated with inflation targeting adoption and potentially with the outcome variable. $E[Y_{i1}|T_i=1, X=\chi]$ is the expected outcome for the treated units, and $E[Y_{i0}|T_i=0, X=\chi]$ is the expected outcome for the best counterfactuals of the treated units.

In this study, we use the entropy balancing method of [Hainmueller \(2012\)](#) to match treated units with their untreated counterfactuals. Entropy balancing was used by [Neuenkirch and Neumeier \(2016\)](#) to assess the impact of US sanctions on poverty, by [Ogrokhina and Rodriguez \(2019\)](#) to analyze the effect of inflation targeting and financial openness on the currency composition of sovereign international debt, or more recently by [Apeti \(2023\)](#) to assess the impact of mobile money adoption on household consumption volatility. Entropy balancing is a two-step estimation method. The first step is to compute and apply weights to units not subject to treatment, such that the average of pre-treatment variables in the control group is not statistically different from their average in the treated group. This step allows us to create a synthetic group, not exposed to the treatment, but with observable pre-treatment characteristics close to the treated group. Then, in the second step, the weights resulting from entropy balancing are used in a regression analysis with the treatment indicator as an explanatory variable

to neutralize the potential influence of pre-treatment differences on the treatment effect.

[Neuenkirch and Neumeier \(2016\)](#) highlight several advantages of entropy balancing over traditional matching methods. First, unlike propensity score matching methods or the difference-in-differences estimator, entropy balancing is a non-parametric approach, thus requiring no specification of the functional form of the empirical model or the treatment assignment procedure, which may avoid mis-specification issues. Second, the weight system orthogonalizes the covariates with respect to the treatment, which limits multicollinearity issues. Third, entropy balancing ensures a sufficient balance of pretreatment characteristics between treatment and control groups, even in the presence of a small sample or a limited number of untreated units. This makes it possible to construct a suitable control group, representing a near-perfect counterfactual of the treated group. Last, in the second step, the estimator exploits the panel structure of the data, considering both country and time-fixed effects to control for unobserved heterogeneity.

4 Data

Firm-level data are extracted from the World Bank Enterprise Surveys (WBES) dataset. The WBES collects nationally representative firm-level surveys in developing countries using a standard sampling methodology — a representative sample (stratified random sampling) — with a standard questionnaire. We use the standardized dataset conducted between 2006 and 2020, which has a repeated cross-sectional structure consisting of aggregations of individual data from comparable surveys conducted in different periods. We retain a sample of 31,027 manufacturing firms examined in 47 developing countries. The choice of this sample was conditioned by data availability so that the countries selected have sufficient information at the firm level on all the variables used in this study.⁵ We report 13,341 treated observations (under inflation targeting) and 17,686 untreated observations.

⁵For comparison, using the same database over 2006-2014, [Kouamé and Tapsoba \(2019\)](#) examine the impact of structural reforms on firm productivity in a panel of 37 developing countries.

4.1 Treatment variable

Following the existing literature (see, among others, [Lin and Ye, 2007](#); [Lin and Ye, 2009](#); [Lucotte, 2012](#); [Minea and Tapsoba, 2014](#); [Combes et al., 2018](#); [Minea et al., 2021](#); [Apeti et al., 2023](#); [Bambe, 2023](#)), we consider a dummy variable equal to 1 when a country i operates under the inflation targeting regime in a year t , and zero otherwise. We refer to full-fledged or hard inflation targeting, which is considered by academics to be the true date from which the central bank begins to operate under inflation targeting. Our sample includes fifteen inflation-targeting and thirty-two non-inflation-targeting countries, selected from available data. Data on the treatment variable are extracted from previous studies (e.g., see [Rose, 2007](#); [Roger, 2009](#); [Jahan and Sarwat, 2012](#); [Ciżkowicz-Pękała et al., 2019](#); [Apeti et al., 2023](#); [Bambe, 2023](#)).

4.2 Matching variables

We consider two categories of country-level variables. The first category defines whether a country meets the pre-conditions to begin an inflation-targeting policy. From the existing literature (see, among others, [Lin and Ye, 2009](#); [Minea and Tapsoba, 2014](#); [Ogrokhina and Rodriguez, 2018](#)), we include the following variables: lagged inflation rate, real GDP per capita growth, and fiscal balance. Lagged inflation rate is found to negatively affect inflation-targeting adoption. Indeed, as discussed by [Masson et al. \(1997\)](#), a country is more likely to adopt an inflation-targeting policy when its inflation rate is at a reasonably low level, preferably after successful disinflation. The sign for GDP per capita growth is often ambiguous (e.g., see [Lin and Ye, 2009](#); and [Lucotte, 2012](#)). One potential explanation for this mixed effect is that, on the one hand, countries with good macroeconomic performance are more likely to adopt a credible inflation-targeting policy. On the other hand, it can be argued that a better economic situation may also reflect the achievement of successful macroeconomic policies and thus crowd out the adoption of a new monetary regime such as inflation targeting. Last, in the spirit of the unpleasant monetarist arithmetic of [Sargent and Wallace \(1981\)](#), fiscal discipline may reduce the likelihood of the government exerting pressure on the central bank to finance its deficits, thus ensuring a credible inflation-targeting regime. Alternatively,

since inflation targeting also helps to improve fiscal performance, it can be argued that poor fiscal discipline may, in turn, lead the central bank to adopt the targeting regime to promote further fiscal consolidation. Therefore, the correlation between inflation targeting and fiscal discipline may be ambiguous.

The second group considers variables that may affect the probability of adopting exchange rate targeting as an alternative monetary policy framework. This category includes trade openness and the exchange rate regime. These variables are found to negatively affect inflation-targeting adoption. A common explanation regarding the relationship between inflation targeting and trade openness is that countries that are very open to trade tend to target the exchange rate to hedge against external shocks (e.g., see [Fatás et al., 2007](#); [Brenner and Sokoler, 2010](#)). Last, since inflation targeting is implemented under a flexible exchange rate regime, it is negatively correlated with the adoption of the fixed exchange rate regime.

Most of our country-level variables are extracted from the World Bank’s World Development Indicator (WDI) database. Fiscal balance is extracted from [Kose et al. \(2022\)](#). Trade openness is measured by the sum of exports and imports as a share of GDP. The exchange rate regime is constructed from [Ilzetzki et al. \(2019\)](#)’s classification and is captured by a dummy equal to 1 if a country is classified as having a fixed exchange rate regime in the year t , and zero otherwise.

4.3 Control variables

Information on sales and costs is provided in local currencies and at nominal values in the last fiscal year. We adjust all nominal values for inflation, using the GDP deflator from the IMF’s International Financial Statistics (IFS) database, and convert them to US dollars using the exchange rate variable from the WDI database. We include a wide range of firm-level controls, such as firm size, ownership (share of capital owned by domestic households and firms, the government, and foreigners, respectively), age, and legal status. Firm size is captured by an ordinal qualitative variable equal to 1 for small (less than 20 employees), 2 for medium (between 20 and 99 employees), or 3 for large firms (100 employees and over). The firm’s age measures the duration of its existence,

from the year it was formally registered as a start-up. The legal status of the company is captured by distinct variables.⁶ We also include the logarithm of the previous three years' sales to capture initial performance.

As commonly found in the literature, we include some additional country-level variables: institutional quality (proxied by political stability and the level of democracy), financial development, and access to financial markets. The political stability variable is from the Worldwide Governance Indicators (WGI) database and ranges from approximately -2.5 to 2.5 (strong governance). The level of democracy is captured by the Polity V democracy score, ranging from -10 (absolute autocratic regime) to 10 (absolute democratic regime). Financial development is proxied by domestic credit to the private sector as a percentage of GDP and is extracted from the World Bank's WDI database. Last, the access to financial markets variable is from the IMF's Financial Development Index Database and captures the ability of individuals and businesses to access financial services and products.

4.4 Dependent variables

We use real sales and labor productivity growth as measures of firm performance. Data on annual sales and workers are provided at the end of the previous fiscal year and three years ago (in $t - 3$). Equipped with this dataset, we compute the average annual growth in sales (*Growth*) and labor productivity (*LPG*) over the last three years. To limit the influence of outliers, we refer to [Iarossi et al. \(2009\)](#) and compute sales growth by dividing the change in sales between $t - 1$ and $t - 3$ by the average value of initial and final sales. Similarly, the growth in labor productivity is calculated by dividing the change in labor productivity (*LP*) between $t - 1$ and $t - 3$ by the average value of productivity over this period. *LP* in a given year is calculated as the ratio of total sales to the number of workers. Since there are two points in time between this period, we further follow [Kouamé and Tapsoba \(2019\)](#) and smooth our two variables as follows:

⁶The list includes: Shareholding company with shares trade in the stock market; Shareholding company with non-traded shares or shares traded privately; Sole proprietorship; Partnership; Limited partnership; and Other.

$$Growth_{it} = \frac{1}{2} * \frac{Sales_{t-1} - Sales_{t-3}}{\frac{Sales_{t-1} + Sales_{t-3}}{2}} \quad (3)$$

$$LPG_{it} = \frac{1}{2} * \frac{LP_{t-1} - LP_{t-3}}{\frac{LP_{t-1} + LP_{t-3}}{2}} \quad (4)$$

$Growth_{it}$ and LPG_{it} are between -1 and 1, and capture the annual growth of real sales and labor productivity at time t , respectively.

5 Stylized facts

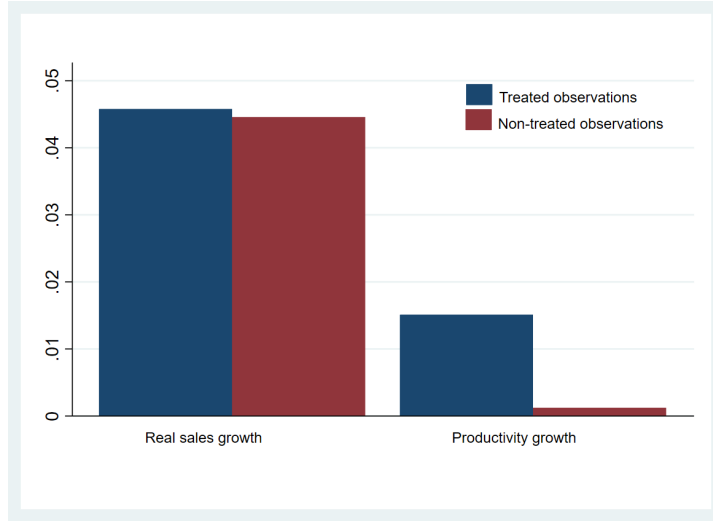
We report some correlational evidence linking the monetary regime, average sales growth, and average productivity growth of the firms in our sample, over the period 2006-20. Figure 1 presents the average rates of sales and productivity growth between treated and untreated observations. Although the average sales growth appears to be slightly higher for the treated observations, the registered difference is statistically not significant ($t = -0.55$; p-value: 0.58). However, treated observations record a much higher average productivity growth than untreated observations, with a difference of about 0.02 points, which is statistically significant ($t = -3.85$; p-value: 0.00). These stylized facts correlate our outcome variables with the treatment, but do not provide any causal relationship. The rest of the study therefore relies on empirical analysis to identify the inflation-targeting effect.

6 Empirical results

6.1 Descriptive statistics

First, we look at some descriptive statistics related to the first stage equation. As mentioned in subsection 4.4, our dependent variables are computed over three years (between $t - 1$ and $t - 3$). Hence, we lag our country-level variables for two periods to circumvent problems of reverse causality. In other words, the inflation rate, real GDP per capita growth, and fiscal balance are averaged from $t - 4$ to $t - 6$. Panel A

Figure 1: Average sales and productivity growth rates between treated and untreated observations (2006-2020)



Notes: The statistics cover 31,027 firms in 47 developing countries, surveyed between 2006 and 2020. We consider 13,341 treated observations (firms located in countries operating under inflation targeting) and 17,686 untreated observations. We compute sales and productivity growth over the last three years. Labor productivity in a given year is calculated as the ratio of total sales to the number of workers.

of Table 1 reports a simple comparison of pre-weighting sample means of all matching covariates between treated (Column [2]) and control (Column [1]) firms, which represent the potential synthetic group. On average, treated observations register a lower inflation rate and a lower level of trade openness compared to non-treated observations. In contrast, untreated observations report a higher GDP per capita growth rate, and a slightly better fiscal balance, and tend to be more oriented towards a fixed exchange rate regime. Column [5] shows significant differences between the two groups for all pre-treatment variables, as all p-values are equal to zero. Such differences could bias the treatment effect due to a potential selection problem. Therefore, in Panel B (Column [1]), we compute a synthetic control group by re-weighting the control units, using the pre-treatment covariates from the benchmark specification. This approach allows making the means of the pre-treatment covariates of the synthetic group as comparable as possible to those of the treated units. As can be seen in Column [5] of Panel B, the weighting eliminated any significant pre-treatment difference between the means of the treated and synthetic covariates, as all p-values are above the 10% threshold. Thus, we can consider the synthetic group as a “near perfect” counterfactual of the treated group.

Table 1: Descriptive statistics and covariate balancing

	[1]	[2]	[3] = [1] - [2]	[4]	[5]
Panel A: Descriptive statistics	Non-treated	Treated	Difference	t-Test	p-Val.
Lag Inflation	6.91	5.71	1.20	17.56	0.00
Lag GDP per capita growth	5.84	3.64	2.20	40.53	0.00
Lag Fiscal balance	-1.15	-1.58	0.43	8.45	0.00
Lag Trade openness	83.02	65.92	17.10	24.89	0.00
Lag Exchange rate dummy	0.16	0.00	0.16	30.03	0.00
Observations	8,418	4,776			
Panel B: Covariate balancing	Non-treated	Treated	Difference	t-Test	p-Val.
Lag Inflation	5.70	5.71	-0.01	0.00	1.00
Lag GDP per capita growth	3.64	3.64	0.00	0.01	1.00
Lag Fiscal balance	-1.57	-1.58	0.01	-0.00	1.00
Lag Trade openness	65.92	65.92	0.00	0.00	1.00
Lag Exchange rate dummy	0.00	0.00	0.00	-1.45	0.16
Observations	8,418	4,776			
Total of weights	4,776	4,776			

6.2 Treatment effects

Next, we assess the effect of inflation targeting on firm performance using the following econometric model:

$$Y_{i,k,j,(t-1,t-3)} = \alpha + \beta T_{j,t-3} + \eta X_{i,k,j,t} + \gamma Y_{j,(t-4,t-6)} + \mu_k + \phi_j + \psi_t + \epsilon_{i,k,j,t} \quad (5)$$

where $Y_{i,k,j,(t-1,t-3)}$ is a measure of the performance of firm i located in industry k , in the country j . $T_{j,t-3}$ is a dummy equal to 1 when country j is operating under inflation targeting, and zero otherwise. We lag the treatment variable by three years due to the lag in our outcome variables. $X_{i,j,k,t}$ is a set of time-varying firm-level characteristics. $Y_{j,t-4,t-6}$ is a set of country-level variables averaged between $t-4$ and $t-6$. μ_k , ϕ_j , and ψ_j account respectively for industry, country, and time-fixed effects, capturing specific characteristics that may be correlated with the treatment. Finally, $\epsilon_{i,k,j,t}$ is the idiosyncratic error term. Following [Chauvet and Jacolin \(2017\)](#) and [Kouamé](#)

and Tapsoba (2019), we cluster standard errors at the country-level.⁷

Using the weights computed in Panel B of Table 1, we estimate Equation 5 from weighted least squares regressions, in which sales and productivity growth are the dependent variables, respectively, and inflation targeting is the explanatory variable referring to conservative dates or full-fledged inflation targeting. The estimated equation includes country, year, and industry fixed effects to capture multi-level heterogeneity, as well as the set of controls described in subsections 4.2 and 4.3.⁸ Results for sales growth and productivity growth are reported in Panel A of Table 2, in Columns [1] and [2], respectively. Estimates from the first column (Panel A) show a positive and significant effect at the 1% threshold, suggesting that inflation targeting leads to an increase in sales growth, of about 3 percentage points. Likewise, with regard to productivity growth, results in Column [2] suggest a positive and significant effect of inflation targeting at the 1% threshold, with a magnitude of about 13 percentage points. Since the estimates represent about 11% of the standard deviation of sales growth and 48% of the standard deviation of productivity growth (see Table C.1, Appendix), the inflation-targeting effects are also economically significant.

7 Sensitivity

7.1 Robustness

7.1.1 Combined entropy balancing and trend

In Panel B of Table 2, we introduce a trend in the linear regression to account for common long-term movements correlated with inflation targeting and potentially with firm performance. Despite a slight fall in the new estimates, the results hold.

⁷Clustering the standard errors at the country-industry, country-year, industry-year, country-industry-year levels, or even when including a trend in the equation, yield similar inference.

⁸We include the following controls: lag inflation, lag GDP per capita growth, lag fiscal balance, lag trade openness, lag exchange rate dummy, firm size, the ownership (share of capital owned by domestic households and firms, the government, and foreigners, respectively), the firm's age, legal status, the logarithm of the previous three years' sales, political stability, the level of democracy, financial development, and access to financial markets.

Table 2: The effect of inflation targeting (IT) on firm performance

Panel A: Entropy balancing	Growth	Productivity
	[1]	[2]
Full-fledged IT dummy	0.0308*** (0.0108)	0.1335*** (0.0172)
Observations	12771	12771
R-squared	0.169	0.1244
Country & Industry & Year FE	Yes	Yes
Control variables	Yes	Yes
Level of se clustering	Country	Country
Panel B: Entropy balancing/trend	Growth	Productivity
	[1]	[2]
Full-fledged IT dummy	0.0291*** (0.0104)	0.1322*** (0.0171)
Observations	12771	12771
R-squared	0.1693	0.1245
Country & Industry & Year FE	Yes	Yes
Trend	Yes	Yes
Control variables	Yes	Yes
Level of se clustering	Country	Country

This table reports estimates of the impact of inflation targeting on firm performance. The treatment variable is an inflation-targeting dummy, referring to conservative dates. The outcome variables are firms' sales growth and productivity growth, respectively. Panel A uses weighted least squares regressions, including controls, country, industry, and year-fixed effects. In Panel B the previous model is augmented by adding a trend. All equations include the following controls: lag inflation, lag GDP per capita growth, lag fiscal balance, lag trade openness, lag exchange rate dummy, firm size, the ownership (share of capital owned by domestic households and firms, the government, and foreigners, respectively), the firm's age, legal status, the logarithm of the previous three years' sales, political stability, the level of democracy, financial development, and access to financial markets. Robust standard errors clustered at the country level are in parentheses. All regressions include the constant, not reported in the table. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

7.1.2 Additional controls

Next, we re-estimate our results using an alternative specification in Table 3. We augment our baseline specification by including two matching variables in the first stage of entropy balancing to capture the level of economic development and the quality of institutions: the logarithm of per capita income (instead of growth in per capita income as in the baseline model) and central bank independence (proxied by the governor turnover variable). At the firm level, we include the share of domestic and foreign materials used in the inputs, respectively; the export status, and the ease of dealing with construction permits. The export status is captured by a dummy equal to 1 if the firm exports its sales abroad, and zero otherwise. The ease of dealing with construction permits takes into account the business environment. The indicator is extracted from the

Doing Business database and ranges from 0 to 100 (the best construction regulation). The literature has shown that IMF reforms also significantly affect firm performance in developing countries (Kouamé and Tapsoba, 2019). Thus, one might assume that the inflation-targeting effect could be confused with those of IMF programs. Therefore, in addition to the variables mentioned above, we also include IMF-supported programs since 2002 from the Monitoring of Fund Arrangements (MONA) database. Consistent with previous work on IMF programs (Dreher et al., 2010; Balima and Sy, 2021), we set a dummy variable equal to the value 1 if a country has benefited from any type of IMF-supported program in the previous three years, and zero otherwise. If the effects of the monetary regime are confounded with those of other reforms, such as that of the IMF, including these potential confounding factors should reduce or even make our previous estimates non-significant.

The results reported in Panels A and B of Table 3 show that the weighting eliminated any significant pre-treatment difference between the means of the treated and synthetic covariates (all the p-values reported in the last column of Panel B are above the 10% threshold). With regard to the new treatment effects reported in Panel C, despite a slight increase, the coefficients remain qualitatively comparable to those of the baseline model, supporting our conclusions. Moreover, including IMF programs does not significantly affect our coefficients, suggesting the inflation-targeting effects are not confused with the potential effects of IMF reforms.

7.1.3 Further robustness

The data used in the study is drawn from private-sector firm surveys. The surveys cover a representative sample of firms, based on a standard questionnaire, to ensure comparability from one country to another and from one year to another. As is often the case with survey data, precision issues on the data collected should not be overlooked. We therefore check the robustness of our results by conducting a few additional tests. More specifically, we consider alternative performance measures such as total factor productivity, value-added per worker, firm investment, and export capacity. The results, reported in subsection A.2 (Appendix), suggest that inflation targeting improves total factor productivity at the firm level, value-added per worker, firm investment (including

in research and development), and export capacity. Therefore, despite the potential precision concerns in the variables used, based on the series of tests conducted, we can safely claim that our results are unlikely to be driven by measurement error.

Some additional robustness tests are reported in the Appendix. In subsections [A.1](#) and [A.3](#), we re-estimate our baseline model using alternative samples and an alternative definition of the treatment variable, referring to soft inflation targeting. The results remain stable. In subsection [A.4](#), we perform random assignment to treatment or «falsification regressions» and show that our results are not driven by confounding factors or a spurious trend. In subsection [A.5](#), we re-estimate our baseline model from the overall sample, using the OLS estimator: we find a favorable effect of inflation targeting on firm performance, with qualitatively comparable coefficients to those of the baseline model when using entropy balancing. Last, in subsection [A.6](#), we run an additional regression where we consider only the treated countries (to consider the within variation) and show that our results hold.

7.2 Heterogeneity

7.2.1 Exploring conditional effects

This section explores some potential heterogeneity features of the treatment effect. We consider the baseline model and augment it with several interactions. The coefficient on the interactive term captures the heterogeneity of the inflation-targeting effect in the presence of a given variable. From a macroeconomic perspective, potential sources of heterogeneity include inflation deviations from the target, fiscal discipline, and institutional quality. On the microeconomic side, we consider firm size, proxied by the level of sales and the number of employees. Estimates are reported in [Table 4](#).

In [Column \[1\]](#), we examine a potential heterogeneity of the monetary framework with regard to inflation deviations from the target, i.e., the difference between achieved inflation and the inflation target announced by the central bank, as in [Ogrokhina and Rodriguez \(2018\)](#).⁹ We interact the treatment variable with the inflation deviation

⁹Data on inflation targets are extracted from publications by the central bank of each country.

from the target. The result suggests that the monetary regime is less effective when the inflation level is above the target. This effect is further amplified when we take into account the squared deviation in Column [2]. Since inflation deviations from the target, regardless of their sign, reflect the credibility of monetary policy, this result provides evidence that low credibility of monetary policy mitigates the benefit of inflation targeting.

According to the unpleasant monetarist arithmetic (Sargent and Wallace, 1981), or the fiscal price theory (Leeper, 1991; Sims, 1994; Woodford, 1995), persistent fiscal indiscipline is likely to foster a situation of fiscal dominance. This could lead the central bank to focus less on its stabilization objective to finance public deficits, thereby reducing monetary policy credibility. To test this hypothesis, in Column [3], we cross the treatment with the term “Sound fiscal discipline” which is a dummy equal to 1 when a country reports a sovereign debt rating above its average value over the period, and zero otherwise. This variable is extracted from Kose et al. (2022) and captures the market’s perception of a government’s creditworthiness, as established by credit rating agencies, including Standard Poor’s, Moody’s, and Fitch Ratings. Results suggest that inflation targeting is more effective in countries with a sound fiscal reputation, i.e., those that are relatively more likely to have a situation of monetary dominance.

Institutions play a crucial role in the success of economic reforms. They can take many forms, such as sociopolitical stability, control of corruption, socio-economic norms promoting private initiative or the protection of property rights, the nature of regulations, administrative constraints, etc. In Column [4], we interact the treatment with a dummy variable equal to 1 if the country has a quality of judicial processes above the sample average, and zero otherwise. This variable is from the Doing Business database and ranges from 0 to 18 (the best judicial processes). Results suggest that inflation targeting is more effective in countries with sound judicial processes that can encourage private-sector development.

In Columns [5]-[8], we check potential heterogeneity features according to firms’ level of wealth and their size. The variable named “Rich firm” is a dummy equal to 1 if the firm’s annual sales are above the sample average, and zero otherwise. As small businesses are the most likely to be financially constrained, the latter may be the most likely to

benefit from the positive externalities of the inflation targeting framework, which may ease financial and investment constraints. However, no heterogeneity seems to emerge regarding firms' level of wealth or size when we test this hypothesis. In other words, inflation targeting seems to benefit all firms, regardless of their size and wealth.

7.2.2 Dynamic effects of inflation targeting

The effect of monetary policy on the economy can take some time. It would therefore have been interesting to look at how long it takes for the shock of introducing an inflation-targeting regime to affect firm performance, for example, using quarterly data. Unfortunately, as the data provided by the World Bank Enterprise Surveys is annual, we are unable to examine this question. Another useful aspect of examining a dynamic effect is that the credibility of the monetary framework may strengthen over time, with more effective effects on inflation performance. An interesting way of dealing with dynamic effects would be to estimate local linear projections, following [Jordà \(2005\)](#). However, as the data used in our study are repeated cross-sections, such an approach is not possible in our design. Another idea would be to cross the treatment variable with the time length since the monetary regime adoption, as in [Lin and Ye \(2009\)](#). Examining the treatment effect of inflation targeting in developing countries, the authors find that inflation targeting has significant effects on improving inflation performance and that for one additional year of policy adoption, the treatment effect on lowering inflation becomes 0.5 percentage points larger. In this vein, in the last column of [Table 4](#), we interact the inflation targeting dummy with the time length since the policy adoption. Results suggest that for an additional year of policy adoption, the effect of the treatment on firm sales growth becomes larger by about 1 percentage point. In other words, this test suggests that the favorable effect of inflation targeting on firm performance increases over time.

8 Validity of transmission channels

This section tests the main channel through which the monetary regime may operate. We adopt a simple two-step approach. First, in Columns [1]-[4] of Panels A and B ([Table 6](#)),

we run uni-variate regressions of inflation and its volatility, exchange rate, and interest rate volatility on firm growth and productivity, using the OLS estimator.¹⁰ In line with the literature, results from Panels A and B suggest a negative relationship between macroeconomic volatility and firm growth or productivity. Second, we re-estimate our baseline model using entropy balancing and controlling for the macroeconomic variables used in the first stage equation, replacing our dependent variable with the potential channel. Results reported in Panel C show that the monetary regime reduces inflation and macroeconomic volatility, in line with previous studies.¹¹ In sum, consistent with our hypothesis, these results suggest that macroeconomic stability is an important channel through which inflation targeting affects firm performance.

9 Conclusion

While the literature dealing with the effects of inflation targeting focuses mainly on macroeconomic data, the main novelty of this paper is to examine the impact of the monetary framework on firm performance. Using a sample of 31,027 firms in 47 developing countries over the period 2006-20 and applying the entropy balancing method to address selection issues, we show that inflation targeting significantly improves firm growth and productivity. The effects are economically significant and robust. Our main findings are further extended through some heterogeneity analyses. Results suggest that, on the one hand, the monetary regime is more effective in countries with sound judicial procedures and a strong fiscal reputation. On the other hand, central bank deviations from the inflation target tend to reduce the effectiveness of the monetary regime in improving firm performance. We also find evidence that the positive effect of inflation targeting on firm performance increases over time. Last, we examine the main transmission channels and show that macroeconomic stability, i.e., the reduction in inflation and its volatility, interest rates, exchange rates, and output volatility, is the main channel through which the monetary framework improves firm performance.

¹⁰We check that each variable is stationary and compute volatility as the standard deviation of a three-year moving average of that variable for each country.

¹¹It would be relevant to investigate business confidence as a potential transmission channel of the monetary regime on firm performance. The OECD provides a measure of business confidence for some countries, but to our knowledge, data covering non-OECD countries are not available.

Our main finding is that a monetary framework that strongly anchors public expectations — such as inflation targeting — can be an important strategy to improve firm performance in developing countries, which are generally subject to high macroeconomic instability.

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Appendix A Further robustness

A.1 Alternative samples

We test the robustness of our results using alternative samples in Columns [2]-[5] of Table A1.¹² The main sample includes some countries with a fixed exchange rate regime and therefore

¹²One might think that hyperinflationary episodes (i.e., observations with an inflation rate of 40% or more) could bias our results. However, no country has such a high inflation rate in our sample over the study period. Therefore, we can rule out this hypothesis.

having an implicit inflation-targeting policy that is inherent to their exchange rate regime. Since the fixed exchange rate regime is not compatible with the adoption of an explicit inflation-targeting framework, in Column [2], we exclude from the sample countries belonging to a monetary union or dollarized countries, as well as those with a fixed de facto exchange rate or currency board.¹³ Second, we exclude from our sample countries that adopted inflation targeting at the end of our study period, namely Russia and Kazakhstan (Column [3]), since the effects of monetary policy may have a lag (Fang and Miller, 2011). Third, in our sample, observations relating to a firm that is not yet treated (but will be) are included in the control group used to compile the synthetic group, as our sample includes a time dimension. That said, our approach may match some treated observations to the same firms at a different time when the firm is not treated. For robustness, in Column [4], we exclude from the control group observations for a firm that is not yet treated but will be (pre-treated observations). Fifth, Tunisia, and South Africa, included in our sample, were surveyed in 2020, i.e., during the Covid-19 pandemic. Hence, in the last column, we restrict the study period before 2020. New estimates reported in Table A1 (Columns [2]-[5]) yield qualitatively similar results to those of the main model.

A.2 Alternative measures of firm performance

Next, we re-estimate our baseline model using alternative performance measures such as total factor productivity (TFP), value-added per worker, firm investment, and export capacity. We estimate the TFP from the residual term of Cobb-Douglas and trans-log production functions, respectively.¹⁴ Value-added per worker is calculated as the difference between annual sales and raw materials and energy costs, divided by the number of workers. The firm’s export status is captured by a binary variable equal to 1 if the firm exports its sales, and zero otherwise (the equation is estimated using a probit model). In addition to investment in land and equipment, we also consider investment in research and development (R&D), captured by a binary equal to 1 if the firm has invested in R&D during the previous fiscal year, and zero otherwise (the

¹³Excluding countries belonging to a fixed exchange rate allows us to compare two groups of countries operating under a flexible exchange rate, one with and another without an inflation-targeting policy. Since this test leads to a qualitatively similar result to that of the baseline model, we can dismiss the hypothesis of a potential bias in our coefficients, which would be related to the effects induced by the fixed exchange rate regime. Otherwise, this result suggests that among countries with flexible exchange rate regimes, those that explicitly target inflation perform better than those that do not.

¹⁴We use sales as the outcome variable, and the net book value of capital and the total permanent full-time employees as inputs.

equation is estimated using a probit model).¹⁵ The results reported in Table A4 suggest that inflation targeting improves total factor productivity at the firm level, value-added per worker, firm investment (including in R&D), and export capacity.

A.3 Soft inflation targeting

Our baseline model considers full-fledged or hard inflation targeting, which is considered by academics to be the true date from which the central bank begins to operate under the inflation-targeting framework. In contrast to hard inflation targeting, soft inflation targeting is defined as the adoption date declared by the central bank itself. In a soft inflation-targeting regime, the central bank’s reaction following a deviation of inflation from the target is slower than in a full inflation-targeting regime. In our sample and over our study period, the adoption dates for soft inflation targeting are similar to those of hard inflation targeting, except for two countries (Dominican Republic and Russia) where there is very little difference between the two dates (one year). Consequently, we believe that using soft inflation targeting should not lead to significantly different results from those of the baseline model. Not surprisingly, the new estimates reported in Panel B of Table A2, when using soft inflation targeting, lead to the same results as those obtained using hard inflation targeting, probably for the reasons mentioned previously.

A.4 Falsification tests

We further perform random assignment to treatment or «falsification regressions». If our results are biased toward unobservables, then the placebo tests could also show significant effects. The results reported in Panel A of Table A2 show that random treatments do not have any statistically significant impact on firm performance. Therefore, we can rule out the possibility of confounding factors driving our results.

A.5 Fixed effects estimates

Next, we re-estimate our main equation from the overall sample, using a fixed effects regression (Panel A, Table A3). OLS estimates suggest that inflation targeting leads to an increase in

¹⁵R&D investment represents one of the basic inputs of innovation and technological progress, and, as with other types of investment, business cycle predictability, and price formation are crucial in R&D investment decision-making (Kung and Schmid, 2015).

sales and productivity growth of about 4 and 15 percentage points, respectively. These results are therefore qualitatively comparable to those obtained using entropy balancing (about 3 and 13 percentage points, respectively), supporting our findings.

A.6 Using within variation

Last, we run an OLS regression using only the treated countries, i.e., those in the upper panel countries in Table B1.¹⁶ This allows us to consider only the within variation. The results are reported in Panel B of Table A3. The coefficients remain stable.

¹⁶Convergence is not achieved with entropy balancing when computing the weights. This is probably due to the fact that, given the restriction of the sample, multicollinearity problems are more likely to occur. We therefore employ a simple OLS regression.

Table 3: Robustness: Additional controls

	[1]	[2]	[3] = [1] - [2]	[4]	[5]
Panel A: Descriptive statistics	Non-treated	Treated	Difference	t-Test	p-Val.
Lag Inflation	6.91	5.71	1.20	17.56	0.00
Lag Log. Per capita income	2.17	2.20	-0.03	-23.56	0.00
Lag Fiscal balance	-1.15	-1.58	0.43	8.45	0.00
Lag Trade openness	83.02	65.92	17.10	24.89	0.00
Lag Exchange rate dummy	0.16	0.00	0.16	30.03	0.00
Lag Governor turnover	0.02	0.01	0.01	6.78	0.00
Observations	8,418	4,776			
Panel B: Covariate balancing	Non-treated	Treated	Difference	t-Test	p-Val.
Lag Inflation	5.71	5.71	0.00	0.00	1.00
Lag Log. Per capita income	2.20	2.20	0.00	0.00	0.99
Lag Fiscal balance	-1.58	-1.58	0.00	0.00	0.99
Lag Trade openness	65.93	65.92	0.01	0.00	1.00
Lag Exchange rate dummy	0.00	0.00	0.00	-0.93	0.36
Lag Governor turnover	0.01	0.01	0.00	0.00	0.99
Observations	8,418	4,776			
Total of weights	4,776	4,776			
Panel C: Treatment effects	Sales growth	Productivity growth			
Full-fledged IT dummy	0.0972*** (0.0227)	0.2200*** (0.0288)			
Observations	12595	12595			
R-squared	0.1656	0.1304			
Control variables	Yes	Yes			
Country & Industry & Year FE	Yes	Yes			
Level of se clustering	Country	Country			

This table reports estimates of the impact of inflation targeting on firm performance, using additional control variables. We augment our baseline specification by including two matching variables in the first stage of entropy balancing: the logarithm of per capita income (instead of growth in per capita income as in the baseline model) and central bank independence (proxied by the governor turnover variable). At the firm level, we include the share of domestic and foreign materials used in the inputs, respectively; the firm's export status; and the ease of dealing with construction permits. We also control via IMF programs. The baseline model equation includes the following variables: lag inflation, lag fiscal balance, lag trade openness, lag exchange rate dummy, firm size, the ownership (share of capital owned by domestic households and firms, the government, and foreigners, respectively), the firm's age, legal status, the logarithm of the previous three years' sales, political stability, the level of democracy, financial development, and access to financial markets. Robust standard errors clustered at the country level are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Heterogeneities of the effect of inflation targeting (IT) on firm performance.

Dependent: Growth	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Full-fledged IT dummy	0.1113*** (0.0090)	0.1001*** (0.0081)	0.0911*** (0.0150)	0.0308*** (0.0108)	0.0235** (0.0112)	0.1372** (0.0575)	0.1574** (0.0580)	0.1346** (0.0562)	0.1181*** (0.0372)
IT * Deviations	-0.2165*** (0.0351)								
IT * Squared deviations		-0.3469*** (0.0562)							
IT * Sound fiscal discipline			0.1372*** (0.0078)						
IT * Quality of judicial processes				0.1012*** (0.0192)					
IT * Rich firm					-0.0828 (0.0908)				
IT * Small firm						-0.0154 (0.0174)			
IT * Medium firm							0.0037 (0.0149)		
IT * Large firm								-0.0056 (0.0306)	
IT * Time									0.0089*** (0.0014)
Observations	12771	12771	12771	12771	12771	12912	12912	12912	11421
R-squared	0.169	0.169	0.169	0.169	0.1833	0.1473	0.1139	0.1411	0.1687
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country & Industry & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the results of the heterogeneity effects of inflation targeting. The equation is estimated by considering the main model augmented by the interactive term. Vector X variables in isolation (without interaction with inflation targeting) and controls are included but not reported for the sake of space. Robust standard errors clustered at the country level are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Table 5: Heterogeneities of the effect of inflation targeting (IT) on firm performance.

Dependent: Productivity	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Full-fledged IT dummy	0.1813*** (0.0102)	0.1746*** (0.0104)	0.1922*** (0.0151)	0.1335*** (0.0172)	0.1243*** (0.0175)	0.2304*** (0.0539)	0.2494*** (0.0548)	0.2191*** (0.0532)	0.1922*** (0.0416)
IT * Deviations	-0.1286*** (0.0367)								
IT * Squared deviations		-0.2059*** (0.0588)							
IT * Sound fiscal discipline			0.1182*** (0.0073)						
IT * Quality of judicial processes				0.0713** (0.0291)					
IT * Rich firm					0.0210 (0.0803)				
IT * Small firm						-0.0119 (0.0312)			
IT * Medium firm							-0.0096 (0.0198)		
IT * Large firm								0.0147 (0.0284)	
IT * Time									0.0053*** (0.0015)
Observations	12771	12771	12771	12771	12771	12912	12912	12912	11421
R-squared	0.1244	0.1244	0.1244	0.1244	0.1343	0.1167	0.1039	0.1134	0.1249
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country & Industry & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the results of the heterogeneity effects of inflation targeting. The equation is estimated by considering the main model augmented by the interactive term. Vector X variables in isolation (without interaction with inflation targeting) and controls are included but not reported for the sake of space. Robust standard errors clustered at the country level are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Table 6: Validity of transmission channels

Panel A	[1]	[2]	[3]	[4]
	Growth	Growth	Growth	Growth
Inflation volatility	-0.0011*** (0.0004)			
Interest rate volatility		-0.0829*** (0.0048)		
Exchange rate volatility			-0.0070*** (0.0003)	
Inflation				-0.0011** (0.0005)
Observations	21834	17419	17419	21795
Panel B	[1]	[2]	[3]	[4]
	Productivity	Productivity	Productivity	Productivity
Inflation volatility	-0.0003 (0.0004)			
Interest rate volatility		-0.0734*** (0.0050)		
Exchange rate volatility			-0.0063*** (0.0003)	
Inflation				-0.0012** (0.0005)
Observations	21261	16950	16950	21224
Panel C	[1]	[2]	[3]	[4]
	Inflation volatility	Interest rate volatility	Exchange rate volatility	Inflation
Full-fledged IT dummy	-0.2179*** (0.0134)	-0.0348*** (0.0113)	-2.4184*** (0.1471)	-0.0004 (0.0567)
Observations	13194	13194	13194	13194

This table reports the results of the main transmission channel through which inflation targeting affects firm performance. In Columns [1]-[4] of Panels A and B, we estimate a univariate regression of inflation and its volatility, exchange rate, and interest rate volatility on firm growth and productivity, using the OLS estimator. In Panel B, we re-estimate our baseline model using entropy balancing, controlling for the macroeconomic variables used in the first stage equation, and replacing our dependent variable with the potential channel. * p < 0.1, ** p < 0.05, *** p < 0.01

Table A1: Robustness: alternative samples

Panel A: Sales growth	[1]	[2]	[3]	[4]	[5]
Full-fledged IT dummy	0.0308*** (0.0108)	0.1207*** (0.0093)	0.0312*** (0.0109)	0.0292** (0.0110)	0.0284** (0.0112)
Observations	12771	11638	11593	12686	12467
R-squared	0.169	0.169	0.1685	0.1692	0.1725
Control variables	Yes	Yes	Yes	Yes	Yes
Country & Industry & Year FE	Yes	Yes	Yes	Yes	Yes
Level of se clustering	Country	Country	Country	Country	Country
Panel B: Productivity growth	[1]	[2]	[3]	[4]	[5]
Full-fledged IT dummy	0.1335*** (0.0172)	0.1940*** (0.0110)	0.1341*** (0.0173)	0.1298*** (0.0172)	0.1311*** (0.0174)
Observations	12771	11638	11593	12686	12467
R-squared	0.1244	0.1244	0.1238	0.1254	0.1276
Control variables	Yes	Yes	Yes	Yes	Yes
Country & Industry & Year FE	Yes	Yes	Yes	Yes	Yes
Level of se clustering	Country	Country	Country	Country	Country

This table reports estimates of the impact of inflation targeting on firm performance, using alternative samples. Column [1] reports the results of the baseline model (main sample). In Column [2], we exclude countries belonging to a monetary union or dollarized countries, as well as those with a fixed de facto exchange rate or currency board. In Column [3], we exclude countries that adopted inflation targeting at the end of our study period, namely Russia and Kazakhstan. In Column [4], we exclude pre-treated observations, i.e., observations relating to a firm that is not yet treated (but will be). In Column [5], we restrict our study period to the years before the COVID-19 crisis. All equations include the following controls: lag inflation, lag GDP per capita growth, lag fiscal balance, lag trade openness, lag exchange rate dummy, firm size, the ownership (share of capital owned by domestic households and firms, the government, and foreigners, respectively), the firm's age, legal status, the logarithm of the previous three years' sales, political stability, the level of democracy, financial development, and access to financial markets. Robust standard errors clustered at the country level are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Robustness: soft inflation targeting and falsification tests

Panel A: falsification tests	Sales growth	Productivity growth
	[1]	[2]
Random treatment	0.0018 (0.0042)	-0.0012 (0.0055)
Observations	12771	12771
R-squared	0.1887	0.1506
Control variables	Yes	Yes
Country & Industry & Year FE	Yes	Yes
Level of se clustering	Country	Country
Panel B: soft inflation targeting	Sales growth	Productivity growth
	[1]	[2]
Soft IT dummy	0.0308*** (0.0108)	0.1335*** (0.0172)
Observations	12771	12771
R-squared	0.169	0.1244
Control variables	Yes	Yes
Country & Industry & Year FE	Yes	Yes
Level of se clustering	Country	Country

This table reports the effects of inflation targeting on firm performance. In Panel A, we consider fictitious adoption dates or random assignments to treatment, using the baseline model specification. In Panel B, we refer to soft inflation targeting or default starting dates. Robust standard errors clustered at the country level are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Robustness: OLS estimates and within variation

Panel A: OLS estimates	Sales growth	Productivity growth
	[1]	[2]
Hard IT dummy	0.0455*** (0.0085)	0.1545*** (0.0088)
Observations	13294	12949
R-squared	0.189	0.1481
Control variables	Yes	Yes
Country & Industry & Year FE	Yes	Yes
Level of se clustering	Country	Country
Panel B: within variation	Sales growth	Productivity growth
	[1]	[2]
Hard IT dummy	0.0519*** (0.0059)	0.1460*** (0.0061)
Observations	7392	7149
R-squared	0.1888	0.1468
Control variables	Yes	Yes
Country & Industry & Year FE	Yes	Yes
Level of se clustering	Country	Country

This table reports the effects of inflation targeting on firm performance. In Panel A, we re-estimate our main equation from the overall sample, using a simple OLS regression. In Panel B, we run an OLS regression using only the treated countries. Robust standard errors clustered at the country level are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Table A4: Robustness: alternative measures of firm performance

Panel A	[1]	[2]	[3]
	Total factor productivity (1)	Total factor productivity (2)	Log. Value-added per worker
Full-fledged IT dummy	0.3263*** (0.0692)	0.2787*** (0.0623)	0.3064*** (0.0490)
Observations	9129	9129	10496
Control variables	Yes	Yes	Yes
Country & Industry & Year FE	Yes	Yes	Yes
Level of se clustering	Country	Country	Country
Panel B	[1]	[2]	[3]
	Log. Investment in capital	Exports dummy	R&D investment (probit estimations)
Full-fledged IT dummy	0.3544* (0.1985)	0.1907*** (0.0362)	0.2810*** (0.0458)
Observations	5336	14454	10755
Control variables	Yes	Yes	Yes
Country & Industry & Year FE	Yes		
Level of se clustering	Country		

This table presents the effect of inflation targeting on alternative measures of firm performance, using weighted least squares regressions (except in Column [3] of Panel A). The treatment variable is a full-fledged inflation-targeting dummy. In Panel A, the outcome variables are total factor productivity estimated from a Cobb-Douglas function (Column 1), total factor productivity estimated from a translog function (Column 2), and the logarithm of value-added per worker (Column 3). In Panel B, the outcome variables are the logarithm of investment in equipment and land, firm export status (a binary variable equal to 1 if the firm exports its sales, and zero otherwise), and a dummy equal to 1 if the firm invested in research and development in the previous fiscal year and zero otherwise, respectively. Columns [2] and [3] of Panel B are estimated from a probit regression, controlling for the previously used variables. All equations include the following controls: lag inflation, lag GDP per capita growth, lag fiscal balance, lag trade openness, lag exchange rate dummy, firm size, the ownership (share of capital owned by domestic households and firms, the government, and foreigners, respectively), the firm's age, legal status, the logarithm of the previous three years' sales, political stability, the level of democracy, financial development, and access to financial markets. Robust standard errors clustered at the country level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Appendix B Data and sample

Table B1: List of countries

Inflation targeting (IT) countries		
	Soft IT (default starting dates)	Full-fledged IT (conservative dates)
Brazil	June 1999	June 1999
Colombia	September 1999	October 1999
Dominican Republic	2011	2012
Ghana	January 2007	January 2007
Hungary	June 2001	August 2001
Kazakhstan	August 2015	August 2015
Paraguay	May 2011	May 2011
Peru	January 2002	January 2002
Philippines	January 2002	January 2002
Poland	September 1998	September 1998
Romania	August 2005	August 2005
Russia	2014	2015
Serbia	September 2006	September 2006
South Africa	February 2000	February 2000
Thailand	May 2000	May 2000
Non-targeting countries		
Benin	—	—
Bhutan	—	—
Bolivia	—	—
Bulgaria	—	—
Cambodia	—	—
Cameroon	—	—
China	—	—
Costa Rica	—	—
Cote d'Ivoire	—	—
El Salvador	—	—
Gambia	—	—
Georgia	—	—
Honduras	—	—
Jordan	—	—
Kenya	—	—
Kyrgyz Republic	—	—
Lao PDR Republic	—	—
Lesotho	—	—
Malaysia	—	—
Morocco	—	—
Myanmar	—	—
Nepal	—	—
Nicaragua	—	—
North Macedonia	—	—
Papua New Guinea	—	—
Senegal	—	—
Sierra Leone	—	—
Solomon Islands	—	—
Sudan	—	—
Trinidad and Tobago	—	—
Tunisia	—	—
Vietnam	—	—

Sources: Rose (2007); Roger (2009); Jahan and Sarwat (2012) and Ciżkowicz-Pękała et al. (2019); Apeti et al. (2023); Bambe (2023)

Table B2: List of variables and their sources

Variables	Nature	Sources
1. Treatment variable		
Full-fledged Inflation Targeting	Dummy	Rose (2007); Roger (2009); Jahan and Sarwat (2012); Ciżkowicz-Pekala et al. (2019); Bambe (2023); Apeti et al. (2023)
2. Control variables		
2.1 Country-level variables		
Inflation	Continuous	WDI, World Bank
Real GDP per capita growth	Continuous	WDI, World Bank
Domestic credit to private sector	Continuous	WDI, World Bank
Access to financial markets	Continuous	Financial Access Survey (IMF)
Fiscal balance	Continuous	Kose et al. (2022)
Trade openness	Continuous	WDI, World Bank
Fixed exchange rate	Dummy	Authors' calculations based on Ilzetzki et al. (2019)
Political stability	Index ranging from -2.5 to 2.5	Worldwide Governance Indicators database (Kaufmann et al., 2011)
Democracy score	Index ranging from -10 to 10	Polity V
2.2 Firm-level variables - (WBES)		
Log Real sales (3 years ago)	Continuous	
Firm size	Ordinal	
Firm age	Continuous	
Firm's legal status	Ordinal	
Share of private domestic assets in the company	Percentage	
Share of public domestic assets in the company	Percentage	
Share of foreign assets in the company	Percentage	
3. Firm performance indicators		
Sales growth	bounded between - 1 and 1	Authors' calculations
Productivity growth	bounded between - 1 and 1	Authors' calculations
Total factor productivity (Cobb - Douglas function)	Continuous	Authors' calculations
Total factor productivity (Trans-log function)	Continuous	Authors' calculations
Value-added per worker	Continuous	Authors' calculations
Log. investment in equipment and land	continuous	WBES
Export status	Dummy	WBES
Investment in research and development	Dummy	WBES
4. Additional controls		
Annual GDP growth	Continuous	WDI, World Bank
GDP per capita	Continuous	WDI, World Bank
Governor turnover	Dummy	Dreher et al. (2008); Dreher et al. (2010)
Log. net book value of capital	continuous	WBES
Log. investment in equipment and land	continuous	WBES
Ease of dealing with construction permits	Score ranges from 0 to 100	Doing Business database
Quality of land administration	Score ranges from 0 to 30	Doing Business database
Quality of judicial processes	Score ranges from 0 to 18	Doing Business database

Appendix C Summary statistics

Table C1: Descriptive statistics of the baseline model variables

Variables	Obs.	Mean	Sd	Min	Max
Sales growth	21,795	0.045	0.274	-1	1
Productivity growth	21,224	0.007	0.278	-1	1
Lag Inflation	30,993	5.978	4.225	-0.210	24.798
Lag GDP per capita growth	30,993	3.968	2.960	-1.719	11.606
Lag Fiscal balance	30,993	-1.738	2.729	-7.827	11.084
Lag Trade openness	30,873	76.578	34.732	11.676	166.552
Lag Fixed exchange rate	22,566	0.116	0.321	0	1
Log. Real sales sales (3 years ago)	25,158	8.852	2.174	0	26.252
Firm size	30,993	1.927	0.787	1	3
Firm age	27,725	24.798	15.043	2	203
Firm's legal status	30,407	2.696	1.118	1	6
National share capital	30,301	88.572	29.401	0	100
Foreign share capital	30,294	9.229	26.969	0	100
Government share capital	30,302	0.636	6.282	0	100
Lag Financial development	27,598	48.386	33.236	4.115	127.550
Lag Access to financial markets	24,447	0.283	0.239	0	0.642
Political stability	30,103	-0.385	0.632	-1.727	0.974
Democracy score (Polity V)	24,406	4.138	6.034	-7	10