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Government Size, Unemployment and Inflation Nexus in Eight Large Emerging Market Economies*

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Abstract

Using annual data for a panel of eight large emerging market economies from 1980 to 2015, we uncover the underlying linkages between government size, unemployment, and inflation by using the panel cointegration and causality frameworks. Overall, our empirical results show that there exists a unidirectional causality running from government size to both unemployment and inflation. The results also tell that the impact of government size on unemployment and inflation varies with how government size is defined or measured. In the case of the ratio of government consumption spending to GDP is chosen as the proxy measure of government size, the causality is one-way and runs from government size to both unemployment and inflation. In addition, indirect taxes are in a significant positive causal association with unemployment, while direct taxes are in a close connection with inflation in the full-country sample.

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1. Introduction

The association of government size with economic growth for both developed and developing countries has long received much attention from public finance economists and growth theorists. This may be explained on the grounds of the following two reasons. First, perhaps the most important one, the government size as a topic is not only economically but also a politically important concept for almost all countries. The size of government has expanded substantially in a large number of countries, especially in the post-World War II period. However, with the influence of neo-liberal policies that dominated the economic arena in the aftermath of the early 1970s, the size of government has relatively tended to downsize. Privatization programs in many countries have played a key role in the downsizing of the government in national economies. Second, the mixed results concerning the government size-growth nexus have led to conducting an increasing number of studies applying different econometric specifications to various sample sizes for different sample countries. As a result, the literature on the relationship between government size and economic growth has considerably expanded and has even been continuing to grow. Among a wide range of literature, the studies by Scully (1989), Barro (1991), Engen and Skinner (1992), Fölster and Henrekson (2001), Dar and AmirKhalkhali (2002), Bose *et al*. (2007), Afonso and Furceri (2010), Afonso and González Alegre (2011), Ghose and Das (2013), and Christie (2014) are some of them that deserve to mention at first glance.

In contrast to previous studies that focus largely on the relationship between government size and economic growth, this paper seeks to examine the association of government size with unemployment and inflation that has been largely ignored in the literature. However, as evident by many country experiences, unemployment and inflation are two major unpleasant factors that always cause concern for economies and societies. Now then, from a macroeconomic policymaking standpoint, discovering the empirical association of these two factors with government size is as important as at least its link with growth. Considering this fact, the present paper seeks to find an answer to the question of how government size does affect unemployment and inflation by conducting empirical research.

The novelty of the present paper is severalfold. First, to the best of our knowledge, the paper focuses on a panel of eight large emerging market economies for which the topic has not been studied before. The existing literature shows that there exists a large body of studies on the relationship between government size and economic growth. However, the research topic of this paper has been broadly ignored in theory and practice alike. Second, for almost all countries, including the countries under scrutiny, inflation and unemployment are two major macroeconomic problems that are an unchanging topical issue for many, from politicians to policymakers to ordinary members of society. Third, unlike most previous studies

that employ models based on time-series, the paper employs a panel cointegration and causality approach to detect the potential existence of the relationship between government size, inflation, and unemployment and to discover the direction of the causality between government size, unemployment, and inflation. Prior to setting out our empirical investigation, it is noteworthy to stress that assessing the potential relationship between unemployment and inflation is beyond our interest in this paper. This is because; needless to say, the literature is extremely rich in this regard. A wide range of empirical studies have been performed hitherto on the unemployment-inflation nexus, especially since A. William Phillips's 'Phillips curve' proposal in the late 1950s. Therefore, throughout this paper, we disregard the linkage between unemployment and inflation and focus solely on the link of government size with unemployment and inflation.

The rest of the paper proceeds as follows. Section 2 provides a theoretical and empirical literature review on the association of government size with unemployment and inflation, while Section 3 explains the methodology of the paper. Section 4 reports the estimation results and the respective discussion. Section 5 concludes.

2. Literature

2.1. Theoretical background

2.1.1. *Theoretical background on government size-unemployment nexus*

Unemployment and inflation are the two primary macroeconomic phenomenon for virtually all countries around the world. There is little counter-argument that unemployment and inflation are economically undesirable for societies and they maximize societies' welfare and well-being. It is valuable keeping in mind that there may be some arguments in favor of low and non-high volatile inflation in that it is welfare enhancing and economically desirable for societies. Through the present paper, the term inflation refers to relatively high and highly volatile inflation. Therefore, achieving full employment together with stable prices is always viewed as the two primary goals of having a sound macroeconomic policy for countries. For this reason, it is noteworthy for researchers to explore unemployment and inflation-driven factors. One of these factors, perhaps the most important one, is government size.

Before linking government size with unemployment and inflation, it would be valuable to identify how government size should be defined or measured. The available literature offers, though no agreement over the appropriate proxy measure of it, several alternative proxies for government size. For example, some researchers, including such as Landau (1983, 1986), Yamamura (2011), use the ratio of government consumption over GDP as the proxy measure of government size, while others, such as Chao and Grubel (1998), Chen and Lee (2005), consider the share of central (or general) government expenditures in GDP at the aggregate level. Some others take into account central (or general) government tax revenue, expressed

as a percentage of GDP, as the proxy measure of government size. Briefly stated, there is a sharp disagreement over how to measure government size in the literature. However, the potential impact of government size on macroeconomic variables, including unemployment and inflation, varies in accordance with how to define or measure it. A common way of defining it is to consider the ratio of general government spending-to-GDP either at the aggregate and disaggregated levels as used in voluminous studies (see, in particular, Devarajan *et al*., 1996; Vedder and Gallaway, 1998; Dar and AmirKhalkhali, 2002; Afonso and Furceri, 2010; Afonso and Jalles, 2016).

An early study by Scully (1989) contended that a rise in government size increases unemployment by reducing the technical efficiency, reflecting a movement away from the production possibility curve. Technical efficiency refers to the effectiveness of inputs, i.e., labor and capital, by which the output is produced. It establishes a physical link between available resources –that is, labor and capital– and the outcome produced. Technical efficiency is said to be achieved when the maximum possible improvement in output is obtained using a given set of inputs. This is to say that there would not be any possibility of boosting output unless at least one of the inputs is increased. However, Abrams (1999) claimed that increases in government spending crowd out interest-rate sensitive private investments, ending up not just a reduction in productivity but also a discouragement in technical change even if the spending is allocated for growth-enhancing infrastructure and others, such as education and health. Regarding the issue of public sector efficiency and the size of government, Afonso *et al*. (2005, 2010) provide evidence of the existence of room for improvement in both developed and developing economies.

Battaglini and Coate (2011), in contrast to Scully (1989) and Abrams (1999), looked at the issue from a fiscal policy viewpoint and found evidence that increases in government spending or tax cuts (i.e. it corresponds to changes in government size) tend to reduce unemployment rather than increase, but it occurs at the expense of substantial rises in government's future indebtedness. According to the authors, for example, reductions in taxes give the private sector an opportunity to hiring more people, whereas government spending increases will reduce unemployment by creating extra job opportunities in the public sector. However, one must keep in mind that both actions will impose a significant fiscal cost on the government's budget. Of course, a key point that should be emphasized here is that how government size influences unemployment is closely related to, and depend on, how government size is defined or measured.

Concerning the government size-unemployment nexus, the existing literature also offers some further explanations. To start with, the bigger government comes to mean taxing more to cover increasing government needs. In simple terms, taxing more signifies increases in compulsory money transfers to the government from individuals, households, and firms –labeled simply as economic agents. So, taxing more means higher taxes on economic agents would discourage them to save, to consume, and to invest or at least affect their economic decisions in this regard in one way or another. In this regard, Abrams (1999) put forward that high-income tax rates are likely to affect the work-leisure decisions of economic agents, encouraging not working. Second, in a two-sector economy with the government and private sector, all else being equal, an increase in government size results in the downsizing of the

private sector. At this point, what would be important is that the net effect of the changes in the size of the two sectors on unemployment will depend on which sector creates more employment opportunities. Third, in some cases, the regulatory power of the government can be forceful even though the numerical size of the government, regardless of how government size is measured or defined, is substantially low. In such a case, the government would have the potential for strict control over the labor market. A case point is a minimum wage and working hours related arrangements of the government. Indeed, such arrangements put an unpleasant effect on unemployment in one way another. Lastly, but not least, the big government may enlarge the size of the informal economy via high taxes and intensive regulations and arrangements, inciting unregistered employment. As seen, there are various potential ways to connect government size with unemployment.

2.1.2. *Theoretical background on government size-inflation nexus*

In their classic work, Sargent and Wallace (1981) postulated that under the inter-temporal government budget constraint, the monetary authority's commitment to providing as well as maintaining price stability would force the fiscal authority to act accordingly. Sargent and Wallace (1981) call such a regime a monetary dominant regime –what is also known as a 'Ricardian regime'. However, if the fiscal authority does not act under the monetary authority's commitment that refers to the 'fiscal dominant' (or 'non-Ricardian regime') in such case government spending is financed through printing money and it may put pressure on price level indirectly, depending on monetary policy's stance, whether it is loose or tough.

Similar to the Sargent and Wallace's (1981) unpleasant monetarist arithmetic, the fiscal theory of price level (FTPL) developed notably by Leeper (1991), Sims (1994), Woodford (1994, 2001) established a direct causal link between government size and inflation. The FTPL is an argument that challenges Friedman's (1963) conventional proposition, stating that 'inflation is always and everywhere a monetary phenomenon'. The proponents of the FTPL put forward the notion that the price level is not only determined but also maintained by fiscal policies but rather monetary policies as asserted by Milton Friedman, a prominent American economist. According to them, the intertemporal government budget constraint –that is, a constraint faced by decision-makers in making choices for the present and future alike– plays a key role in determining, as well as stabilizing, the price level. They go on to argue that inter-temporal budget constraint can be satisfied without fiscal authority having to adjust their policy if prices are endogenous. This is the case notably when government bonds are nominal. Because of this, fiscal policy in general, government spending, in particular, will be indicative of the price level. Under the FTPL, the monetary authority does not have to undertake such an assignment of accommodating increases in government spending through printing money. If the fiscal authority raises government spending independently of the monetary authority, then the government saving –that is, the difference between taxes and government spending– will decrease. The decrease in government savings will result in an increase in prices.

By referencing a fiscal dominant regime, the FTPL exponents argue that the fiscal dominant regime arises especially when fiscal policy is weak and government bonds are consid-

ered as net wealth. According to them, all these make it difficult for a monetary authority to be conducted its price stability objective, no matter how it is a commitment to low inflation (Leeper, 1991; Sims, 1994).

Briefly, contrary to the traditional (or monetarist) view that claims that the fiscal policy regime is Ricardian, the FTPL postulates that the fiscal policy regime is non-Ricardian. If the authority has an opportunity of choosing primary surplus independently of public debt, and then it is the price level that must adjust the present value government budget constraint (Sala, 2004). For this reason, the price level in an economy is determined and stabilized by the fiscal authority, rather than monetary authority.

Another potential explanation of the nexus between government size and inflation could be through the model of aggregate demand and aggregate supply. In the context of this model, the Keynesian view asserted that increases in government spending make an expansionary effect on aggregate demand, but differently, depending on the types of spending whether it is real, i.e. consumption and investment, or transfer payments. Under the assumption of fixed aggregate supply, an increase in aggregate demand, all else equal, results in rises in prices unless the economy is in the Keynesian extreme case of underemployment.

An interesting theoretical explanation that links government size with inflation comes from Cuciniello (2009). The author states that an increase in government size, measured as a share of government spending or its equivalent taxes in national income, not only widens the gap between the levels of efficient and natural output but also increases the real money demand. Both effects compel the monetary authority to pursue an expansionary monetary policy that, ceteris paribus, raises inflationary pressures. In such circumstances, the monetary authority undergoes a reduction in the marginal cost of inflation by lowering the leisure cost and by raising the demand for real money balances.

Last but not least, an explanation that relates government size to inflation could be through the government spending pressure that emerges in the absence of a sufficient tax system, largely arisen from the large size of the informal sector, to meet government spending. In such cases, as highlighted by Phelps (1973), the lack of sufficient tax revenue may compel governments to resort to 'just another tax or just one form of taxation' –the so-called 'inflation tax'– to raise government revenue through printing money. In such a case, the fiscal authority effectively controls monetary policy and attempts to raise revenue from the inflation tax to cover at least some part of its expenditure (Nolivos and Vuletin, 2014).

2.2. Empirical literature

2.2.1. *Empirical literature on government size-unemployment nexus*

In a panel of 37 developed and developing countries, Karras (1993) examined the relative impact of government spending on employment and economic growth by categorizing them as permanent and transitory government consumption. When viewed in isolation, the author

documented that permanent (or persistent) changes in government consumption spending create a larger impact on employment than transitory (or cyclical) changes in the same size do.

In a seminal paper, Abrams (1999) studied the relationship between government size and unemployment rates by using data from 20 OECD countries and found supportive evidence for the hypothesis that increases in government size, other things being equal, expressing in general terms, produce both expenditure and tax effect that increase reported unemployment rate. More specifically, a 1% increase in government spending would cause an increase in the unemployment rate by approximately 1.4%. Similarly, Christopoulos and Tsionas (2002) showed that there is a one-way causal relationship between government size and the unemployment rate for ten European countries. The direction of causality is from the former to the latter. For the same country group and the same period with Abrams (1999), Christopoulos *et al*. (2005) provided evidence of a positive long-run relationship between government size and the unemployment rate, confirming the validity of the so-called 'Abrams curve'.

A related work by Wang and Abrams (2007a) focused on the dynamic effects of government outlays on unemployment and economic growth for the same sample used by Abrams (1999), as mentioned just before, for the period 1970-1999 and found broadly consistent results with those in Christopoulos and Tsionas (2002). Relating to the government size-unemployment linkage, Wang and Abrams (2007a) reported the followings: (i) positive shocks to government outlays raise the unemployment rate; (ii) the effects of government outlays on unemployment vary with the types of outlays, e. g., transfers and subsidies generate a larger effect than government purchases; (iii) there exists a unidirectional causal relationship between two variables, running from government outlays to the unemployment rate; (iv) how government finances its outlays does not influence findings. Put it briefly, what we can infer from these items that an increase in government size raises unemployment and different types of government outlays make a different impact on unemployment. Moreover, the authors' Granger-causality test results confirm that there is a one-way causality and causality runs from government outlays, a proxy measure for government size, to the unemployment rate.

Using data on 58 developing countries, Feldmann (2009) documented that a larger government sector is likely to increase unemployment. The author went further arguing that the greater share of government consumption in total consumption and the greater share of transfers and subsidies in GDP reflecting a greater government size have a detrimental effect on employment in developing countries. In a follow-up study, Feldmann (2010) investigated how government size affects unemployment for 52 developing countries and found that a large government sector can raise unemployment.

Likewise, Sa (2011) explored the relationships among government size, economic growth, and unemployment by using a sample of 83 countries, 51 of which are developing countries, and found that the larger the government size, the higher the unemployment is for all sample countries. The author went further saying that the relative effect of government size on the unemployment rate is approximately three times higher in developing countries compared to developed countries. Based on this finding, the author concluded that the effect of government size on the unemployment rate may vary from one country to another, depending on how the

development levels of the countries are (see Table A1 in the appendix for the synopsis of the studies reviewed above).

2.2.2. *Empirical literature on government size-inflation nexus*

Another strand of the literature is concerned with the nexus between government size and inflation. However, in reviewing the existing literature, what we observe is that empirical studies on the relationship between government size and inflation are highly scant. To our knowledge, the literature offers the following few studies.

We begin with a comprehensive study conducted by Campillo and Miron (1997) on the inflation performances of countries. The authors in their study showed that countries with greater government expenditure need to make greater use of the inflation tax. The authors also noted that countries having difficulty in raising non-inflation tax revenue rely more on inflation tax. However, the authors' study yielded supportive evidence that government expenditure expressed as a proportion of output has a positive impact on inflation. However, its statistical significance is rather weak.

Campillo and Miron's (1997) study also revealed that like the ratio of government expenditure to output, the government debt-to-output ratio as a proxy measure for government size produces a significant positive impact on inflation. Along similar lines, Wang and Wen (2017) examined the macroeconomic impact of government spending on an emerging market economy, China. The authors presented evidence that government spending (measured as a percentage of GDP) –that is, a proxy measure of government size– Granger-causes inflation in this country. They justified this evidence by reference to public finance considerations in developing countries that are the determinants of monetary policy as well as the proximate cause of inflation.

Using data from 80 countries, Han and Mulligan (2008) investigated the potential presence of a causal relationship between government size and inflation. The authors showed that contrary to the conventional view that big government and inflation are closely linked, their cross-country analysis revealed that large government size is significantly positively associated with inflation only in special cases, e. g., notably in the case when war- and peace times were compared. More importantly, they found supportive evidence that there is a positive but weak peacetime time-series correlation between government size and inflation, and that there is a negative cross-country correlation between inflation and non-defense government spending.

Conversely, a relatively recent study by Nguyen (2018) applied the cointegration and VECM to the time-series data of three big Asian emerging market economies (India, China, and Indonesia) and found mixed evidence. Exploring the short- and long-run impact of government spending on inflation, the author reported supportive evidence that whatever their institutional governance is, there is a cointegrating Granger-causality between government size (measured by the government spending-to-GDP ratio) and inflation in the long run in the

three. However, the author concluded that in the short run, government spending seems to be negatively associated with inflation in China's case, while it is positively related to inflation in the case of the remaining two sample countries (see Table A2 in the appendix for the synopsis of the studies reviewed above).

3. Methodology

3.1. Panel cointegration test

We proceed with applying panel cointegration tests proposed by Pedroni (1999, 2004). To test the cointegration relationship, Pedroni (1999, 2004) proposes several statistical tests based on the residuals of the Engle and Granger (1987) cointegrating regression in a panel data model that allows for considerable heterogeneity. The formulation by Pedroni (1999, 2004) allows for the heterogeneity across the cross-sections by permitting individual-specific fixed effects, slopes, and deterministic time trends for each cross-section. All variables are assumed to be integrated of order one, $I(1)$. To test the cointegration, the following bi-variate regression equation is estimated:

$$y_{it} = \gamma_i + \lambda_i X_{it} + \varepsilon_{it}. \tag{1}$$

We observe panel data for $i = 1, \ldots, N$ cross-section units and $t = 1, \ldots, T$ time periods. The fixed effects γ_i and the slope coefficient λ_i are allowed to vary across individual countries.

$$\varepsilon_{it} = \psi_i \varepsilon_{it-1} + \nu_{it}, \tag{2}$$

where ψ_i is the autoregressive coefficient of the residual ε_{it} from Eq. (2). Here, the test statistics are constructed using the residuals from the following hypothesized cointegrating regression based on Eq. (1). We are interested in testing the null hypothesis of no cointegration for all individuals in the panel. Under this null hypothesis, the residuals from the estimated regression in Eq. (3) will be $I(1)$. To test whether this is true or not, Pedroni (1999, 2004) develops seven different test statistics. These tests can be split into two main groups. The first group tests 'within dimensions' that contain four test statistics termed as *panel-v*, *panel-p*, *panel-t* non-parametric (*PP*), and *panel-t* parametric (*ADF*). The second group 'between dimensions' contains three statistical tests termed *group-p*, *group-t* non-parametric (*PP*), and *group-t* parametric (*ADF*). The estimated statistic will be the average of the individual statistics. The rejection of the null of no cointegration indicates that the cointegration holds, at least, for one individual.

The within-dimension statistics test the null hypothesis of no cointegration, $H_0 : \psi_i = 1$ for all i against the alternative, $H_A : \psi_i = \psi < 1$ for all i. The null hypothesis of the between-dimension statistics is given by $H_0 : \psi_i = 1$ for all i and the alternative is $H_A : \psi_i < 1$ for all i.

The estimated statistic would be the average of the individual statistics. The rejection of the null hypothesis of no cointegration indicates that the cointegration holds at least one

individual. With the panel cointegration test statistics, Pedroni (1999, 2004) shows that the standardized statistic is asymptotically normally distributed as follows:

$$K = \frac{K_{N,T} - \mu\sqrt{N}}{\sqrt{v}} \Rightarrow N(0,1),$$

where $K_{N,T}$ is the standardized form of the test statistic with respect to N and T. Pedroni (1999, 2004) reports the critical values for μ and v for different values of regressors in the cointegration relationship.

3.2. Estimation and inference of panel cointegration model

To obtain the panel cointegration vector based on the panel DOLS estimator, the following model is estimated with the OLS for each member of the panel. The DOLS estimator (β) can be obtained by Kao *et al*. (1999):

$$y_i = \mu_i + x'_{it}\beta_i + \sum_{k=-pi}^{pi} \delta_{ik}\Delta x_{it-k} + \varepsilon_{it}\,, \tag{3}$$

where y_i denotes the dependent variables, x_{it} is the matrix of the explanatory variables, Δ is the first-difference operator, p_i is the lead and lag length. The panel cointegration parameter is constructed as $\hat{\beta}_{PDOLS} = N^{-1}\sum_{i=1}^{N} \beta_{i,DOLS}$ which is the cointegration parameter obtained from the individual DOLS estimation of Eq. (3) and the associated t-ratio for the panel cointegration parameter is derived as $t_{\hat{\beta}_{PDOLS}} = N^{-1/2}\sum_{i=1}^{N} t_{\hat{\beta}_{i,DOLS}}$.

3.3. Panel Granger causality

Since the cointegration analysis does not provide any information regarding the direction of causality, a widely applied approach in the literature is to investigate causal interactions between the variables once cointegration is established. To do so, we use the two-step Engle and Granger (1987) approach. As demonstrated by Engle and Granger (1987), inferences from a causality test based on a vector autoregression (VAR) model in the first differences would be misleading when the variables are cointegrated. To remove this problem, it is essential to estimate a vector error correction model (VECM) by augmenting the VAR model with a one-lagged error correction term. So, to investigate the short- and long-run causal relationship between the variables under consideration, the following VECM models are estimated in panel data:

$$\Delta U_t = \delta_{1i} + \sum_{p=1}^{k} \delta_{11ip}\, \Delta GovSize_{it-p} + \sum_{p=1}^{k} \delta_{12ip}\, \Delta U_{t-p} + \sum_{p=1}^{k} \delta_{13ip}\, \Delta X_{t-p} + \emptyset_{1i} \hat{\varepsilon}_{it-1} + \nu_{1it}, \tag{4}$$

$$\Delta \pi_t = \delta_{2i} + \sum_{p=1}^{k} \delta_{21ip}\, \Delta GovSize_{it-p} + \sum_{p=1}^{k} \delta_{22ip}\, \Delta \pi_{t-p} + \sum_{p=1}^{k} \delta_{23ip}\, \Delta X_{t-p} + \emptyset_{2i} \hat{\varepsilon}_{it-1} + \nu_{2it}, \tag{5}$$

where k is the optimal lag length(s) and $\hat{\varepsilon}_{it}$ is the residuals. As mentioned above, this specification for the Granger-causality allows us to investigate both the short-run and long-run causal relationships between government size (GovSize)-unemployment (U) and government size (GovSize)-inflation (π). The short-run causality, for example from government size (GovSize) to unemployment (U), is tested with the Wald test by imposing $\delta_{12ip} = 0$. The long-run causality, however, is examined by the statistical significance of the t-statistics on the error correction parameter ∅(ECT). For instance, the statistically significant $\emptyset_{1i}$ implies that government size (GovSize) Granger causes unemployment (U) in the long run.

4. Analysis and discussion

4.1. Data

To capture the possible existence of the relationships between government size, inflation, and unemployment for eight large emerging market economies (the sample countries we focus on) which are classified by the IMF as the large emerging market economies, i. e., Argentina, Brazil, China, India, Indonesia, Mexico, South Africa, and Turkey, we use the annual data from 1980 to 2015. Data availability and economic similarities are two additional factors that encouraged us to use eight large emerging market economies as a case. From this perspective, primarily, subject to data availability, we opt for the possible largest sample as we can and then consider the longest time frame. In addition to this basic sample, we consider some sub-periods for some of the sample countries for which no larger dataset is available. The purpose is to broaden the number of countries incorporated into the sample by overcoming data limitations and to obtain results from a larger country spectrum that falls into the same country group from the standpoint of their economic development levels.

In this paper, we use a set of eight large emerging market economies, as mentioned above. Largely, emerging market economies take an important place in today's world economy. They are widely regarded as the 'powerhouse of the global economy'. According to the figures released by international organizations, the emerging market economies account for roughly 60-80% of global GDP on a PPP basis, as a whole. However, it is a fact that emerging market economies are noticeably divergent. They constitute a subset of the continuum of world economies that ranges from advanced countries to poor developing countries. They have been experiencing many years rapid growth rates well above the world average, with considerable progress in other areas of national development. Among emerging market economies, the panel of countries that we focus on in this paper is considered as the largest emerging economies by either their nominal or PPP-adjusted GDP. At the same time, they represent the G-20 EMEs with two missing countries. That is Russia and Saudi Arabia. In this paper, we drop these two countries from the sample due to a lack of data.

In general, inflation, measured by the change in CPI, in an emerging market, as a whole, has indicated a dramatically declining trend, especially since the 1990s. Despite this fact, when we take a quick glance at inflation in the sample countries for the revived period, it, on average, lies down from single digits to triple digits, changing from about 4% to well over 300%. We see virtually a similar picture when we look at the unemployment rates of the sample countries, ranging between almost 2-20%. So, it becomes important for public finance researchers to discover the role of government in explaining such divergent inflation as well as unemployment rates experienced by the same group of countries. Even beyond these, as in many other countries, ensuring price stability together with a low unemployment rate is one of the major priories for all countries.

All data we used come from the following two international sources: the IMF and World Bank databases. We work with three main (or interest) variables. These are government size (GovSize), unemployment (U), and inflation (π). As proxy measures of government size, we treat in turn total general government spending and taxes. For this purpose, we consider economically meaningful breakdowns of total government spending and taxes as proxy variables of government size. Accordingly, we computed a decomposition of total general government spending such as government consumption spending (GovCS), social transfers (STRs), and subsidies (SUBs). As for the breakdown of taxes, we decompose them into three major components as direct taxes (DTAX), indirect taxes (INDTAX), and social contributions (SCont). All these proxy measures we use for government size are also measured as a percentage of GDP.

Our second main variable is unemployment (U). Traditionally, U is defined as the proportion of total unemployed people in the total labor force and is usually measured on an annual basis. U is used as in country i and year t ($i = 1, \ldots n$; $t = 1980\text{-}2015,\ 1990\text{-}2015, \ldots, 2005\text{-}2015$). When it comes to our third major variable, it is inflation (π). Throughout this paper, π refers to the changes in the consumer price index and is measured as the annual percentage change in the consumer price index over the previous year.

The control variables (X) that we use consist of the real effective exchange rate (REER), population growth (POP), and real GDP per capita (Y). The REER measures developments

in prices and costs in the sample countries and their main trading partners, providing information regarding the countries' international competitiveness.

We provide the descriptive statistics in Table A3 and correlation coefficients together with t-statistics and probabilities of the variables in Table A4 in the appendix, respectively. Examining Table A3, we see that the level of social transfers for the period under consideration is 18.64% on average. Indeed, the average level is much lower for subsidies (8.90%) while it rises to 12.56% for government consumption spending. However, the maximum of social transfers (66.04%) is larger than that of all other government spending components. In addition to that, there is a noticeable disparity between the minimum and the maximum values of social transfers. This is followed by subsidies. Compared to social transfers and subsidies, the dispersion of government consumption spending seems to be relatively low. Looking in terms of tax structure, social contributions are 43.6% on average while it is followed by indirect taxes (42.47%) and direct taxes (12.12%), respectively. The maximum of indirect taxes (91.00%) is greater than that of direct taxes (47.08%) as well as of social contributions (15.98%). Also, we observe that the standard deviation is greater for direct taxes (55.63%), and lower for government consumption spending (4.34%).

As can be seen in Table A4 in the appendix, all government spending components and social contributions are negatively correlated with unemployment, but not direct and indirect taxes. Now turning to inflation, all types of government spending and taxes are negatively related to inflation as well.

4.2. Results and discussion

Testing the interrelationships of government size (GovSize) with unemployment (U) and inflation (π) will be performed through the following three steps. First, we test the univariate time-series properties of all variables considered in analyses. Then, we test for cointegration between GovSize and U, and GovSize, and π. Lastly, we examine the possible presence of a Granger causality between the variables we considered.

We assess the long-run relationship by using various proxy measures for government size. Each of the following base models presents the long-run association of unemployment (U) and inflation (π) with explanatory variables we added to the models below:

$$\text{Model 1A: } (U) = f(\text{GovCS, STRs, SUBs, X}), \tag{6.1}$$

$$\text{Model 2A: } (U) = f(\text{DTAX, INDTAX, SCont, X}), \tag{6.2}$$

$$\text{Model 1B: } (\pi) = f(\text{GovCS, STRs, SUBs, X}), \tag{6.3}$$

$$\text{Model 2B: } (\pi) = f(\text{DTAX, INDTAX, SCont, X}). \tag{6.4}$$

Panel-based unit root tests have higher power than unit root tests based on individual time series. In the existing literature, several approaches propose detecting unit roots in panel

data. Broadly speaking, the literature contains two types of panel unit root tests as first and second-generation unit root tests. The first-generation panel unit root tests are based on the studies by Maddala and Wu (1999), Hadri (2000), Choi (2001), Levin *et al*. (2002), Im *et al*. (2003), which assume that the individual time series in a panel are cross-sectional and independently distributed. The second-generation panel unit root tests that allow cross-sectional dependence are the tests proposed by Phillips and Sul (2003), Moon and Perron (2004), and Pesaran (2007). In the present paper, before testing panel cointegration, we conduct panel unit root tests proposed by Levin *et al*. (2002) and Im *et al*. (2003) to detect the order of integration of panel data series. Additionally, we perform the ADF test of Maddala and Wu (1999) and the PP unit root test of Choi (2001) for the variables to check the robustness of our results. Therefore, our first step in exploring the existence of possible Granger-style causal relationships between government size (GovSize), unemployment (U), and inflation (π) is to look at the stationary properties of variables we employed.

Table 1 presents the results of panel unit root tests at levels along with the results of the first differences of all variables. What we see quite clearly from the table is that all tests (Levin *et al*., 2002; Im *et al*., 2003; ADF, and PP) reject the null hypothesis of the presence of unit roots for all variables. Based on these results, it can be concluded that the variables are stationary in their first differences and are thus integrated of order one, $I(1)$.

However, the tests presented in Table 1 can yield biased and misleading results about the unit root tests. They also have lower test efficacy. Moreover, these traditional unit root tests, as shown in Table 1, do not allow for a structural break that may have a significant effect on the stationary results. To this end, the possibility of structural breaks can be accounted for by the robust technique developed by Zivot and Andrews (1992). Therefore, following Zivot and Andrews (1992), we proceed with the unit root tests allowing for one structural break. The results from the Zivot-Andrews unit root test with intercept and trend are presented in Table 2. The table shows that all variables are non-stationary in level. Nevertheless, after first differencing, in the presence of structural breaks, all variables become stationary. Since the presence of a structural break in the variables is established, we proceed to conduct a cointegration test to ascertain whether these variables have a long-run relationship in the presence of endogenous structural breaks.

Tables 3A and 3B show the results of various Pedroni's (1999, 2004) panel cointegration tests applied to Models 1A and 1B and Models 2A and 2B, which are identified in Section 4.2., respectively, corresponding to different proxy measures of government size. As shown in Table 3A, three of seven statistical tests reject the null hypothesis of no cointegration. These tests are in turn Panel PP-statistic, Panel ADF-statistic, and Group ADF-statistic tests. Addressing these findings, it can safely be argued that the panel tests tend to support the presence of a cointegrating relationship among variables in the sample countries. Empirical evidence suggests that the null hypothesis of no cointegration should be rejected by all three tests. These findings make clear that as long as Models 1A and 1B are considered, there is supportive evidence for the presence of one joint cointegrating relationship among all variables in the model over time across the countries under consideration. Focusing on Table 3B in which Models 2A and 2B are presented, the results therein indicate that four of seven

statistics reject the null hypothesis of no cointegration. These are in turn Panel PP-statistic, Panel ADF-statistic, Group PP, and Group ADF. Therefore, evidence that emerges from these panel tests appears to support the presence of a cointegrating relationship between variables for the sample economies.

Table 1
PANEL UNIT ROOT TESTS RESULTS

Variables	Levels				First differences			
	Levin *et al.*	Im *et al.* W-stat	ADF-Fisher Chi-square	PP-Fisher Chi-square	Levin *et al.*	Im *et al.* W-stat	ADF-Fisher Chi-square	PP-Fisher Chi-square
U	–1.50126	–0.45712	17.70	47.02	–8.771	–7.12	44.65	66.37
	(0.113)	(0.015)	(0.007)	(0.011)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
π	–2.18391	–2.66609	6.54	56.12	–6.522	–18.86	89.01	89.732
	(0.006)	(0.021)	(0.047)	(0.009)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
GovCS	–2.3679	–2.2254	9.03	58.17	–13.29	–15.11	104.55	61.99
	(0.017)	(0.007)	(0.051)	(0.008)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
STRs	–1.3177	–1.4951	4.21	87.14	–15.89	–12.42	112.67	95.06
	(0.090)	(0.011)	(0.032)	(0.011)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
SUBs	–2.98134	–2.9221	12.34	95.03	–9.19	–21.15	154.91	107.44
	(0.030)	(0.044)	(0.014)	(0.023)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
SCont	–1.4236	–1.5171	15.66	85.53	–12.48	–19.44	125.11	98.66
	(0.211)	(0.006)	(0.032)	(0.009)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
DTAX	–2.4378	–2.6602	9.97	48.83	–9.37	–19.15	93.00	87.54
	(0.012)	(0.009)	(0.077)	(0.035)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
INDTAX	–1.6602	–1.601	4.40	77.02	–11.42	–4.11	103.41	126.747
	(0.019)	(0.112)	(0.025)	(0.021)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
REER	–4.4581	–3.98138	32.51	68.32	–17.13	–16.83	84.49	149.274
	(0.006)	(0.021)	(0.042)	(0.007)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
POP	–3.21715	–3.4252	28.37	81.07	–12.62	–21.76	104.49	105.505
	(0.021)	(0.081)	(0.060)	(0.051)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
Y	–1.13981	–0.4631	19.41	51.13	–11.63	–15.43	97.37	124.032
	(0.019)	(0.030)	(0.064)	(0.097)	(0.000)*	(0.000)*	(0.000)*	(0.000)*

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: Subsidies, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. Each of the tests includes an intercept as well as a linear trend. Values in parentheses are ρ-values. Schwarz information criterion (SIC) is used to select the lag length. The maximum number of lags is set at three. Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. * Denotes statistical significance at the 1% level.

Table 2
ZIVOT-ANDREWS'S STRUCTURAL BREAK UNIT ROOT TESTS RESULTS

Variables	Levels		First differences	
	t-Statistic	Break year	t-Statistic	Break year
		Argentina		
U	–1.77 (2)	2001	–4.89 (4)*	2000
π	–2.60 (3)	2001	–3.50 (3)*	2002
GovCS	–3.40 (3)	2001	–4.34 (5)*	2001
STRs	–2.19 (5)	2005	–4.45 (6)*	2005
SUBs	–1.55 (4)	2001	–3.35 (2)*	2001
SCont	–3.49 (3)	2001	–4.04 (5)*	2001
DTAX	–2.39 (2)	2005	–4.45 (2)*	2005
INDTAX	–1.30 (2)	2013	–5.25 (2)*	2009
REER	–3.10 (2)	2002	–5.57 (5)*	2005
POP	–2.84 (4)	2007	–6.14 (6)*	2005
Y	–4.15 (4)	2007	–5.14 (6)*	2007
		Brazil		
U	–2.70 (4)	1998	–4.10 (5)*	2003
π	–2.19 (3)	1998	–5.94 (5)*	2003
GovCS	–2.95 (2)	2003	–4.63 (2)*	2003
STRs	–3.44 (5)	2003	–5.05 (6)*	2003
SUBs	–2.36 (5)	2005	–4.09 (3)*	2005
SCont	–3.61 (3)	2007	–5.72 (4)*	2007
DTAX	–3.82 (2)	2014	–5.21 (4)*	2014
INDTAX	–2.96 (1)	2014	–4.10 (5)*	2012
REER	–3.65 (3)	2007	–5.28 (6)*	2003
POP	–2.65 (5)	2007	–4.68 (3)*	2009
Y	–2.90 (4)	2007	–3.66 (4)*	2009
		China		
U	–1.15 (1)	2002	–3.89 (3)*	2008
π	–2.48 (2)	2008	–3.26 (3)*	2003
GovCS	–1.04 (2)	2010	–3.95 (1)*	2007
STRs	–1.80 (2)	2007	–3.89 (6)*	2002
SUBs	–2.23 (1)	2009	–3.15 (6)*	2002
SCont	–2.39 (1)	2009	–6.95 (5)*	2007
DTAX	–1.74 (2)	2002	–4.22 (5)*	2002
INDTAX	–2.51 (4)	2002	–3.34 (2)*	2009
REER	–1.37 (4)	2007	–3.91 (5)*	2009
POP	–2.49 (2)	2000	–4.06 (4)*	2009
Y	–2.62 (3)	2002	–5.42 (4)*	2003

(*Continued*)

Variables	Levels		First differences	
	t-Statistic	Break year	t-Statistic	Break year
		India		
U	–2.62 (2)	2000	–3.46 (5)*	2007
π	–2.77 (3)	2000	–4.37 (6)*	2009
GovCS	–2.54 (4)	1995	–4.46 (4)*	2009
STRs	–1.14 (4)	2007	–3.10 (3)*	2011
SUBs	–1.99 (2)	2009	–3.17 (3)*	2008
SCont	–1.46 (3)	2009	–4.60 (5)*	2005
DTAX	–1.15 (2)	2011	–4.91 (4)*	2000
INDTAX	–2.10 (4)	2008	–3.27 (6)*	1995
REER	–2.47 (2)	2005	–3.33 (3)*	1995
POP	–1.14 (3)	1998	–2.44 (2)*	2007
Y	–1.99 (2)	1998	–3.56 (2)*	2009
		Indonesia		
U	–2.04 (4)	2009	–4.65 (6)*	2009
π	–1.13 (2)	2009	–3.55 (4)*	2009
GovCS	–2.88 (4)	1998	–4.36 (4)*	2009
STRs	–3.49 (2)	1998	–4.29 (5)*	2009
SUBs	–3.83 (3)	2005	–4.33 (5)*	1998
SCont	–2.26 (3)	2010	–3.46 (3)*	1999
DTAX	–2.21 (4)	1998	–3.35 (3)*	2012
INDTAX	–1.26 (5)	1998	–4.77 (3)*	2011
REER	–1.89 (5)	2007	–4.52 (2)*	1995
POP	–1.11 (2)	2007	–3.53 (5)*	1995
Y	–2.40 (2)	2007	–4.15 (5)*	2007
		Mexico		
U	–2.48 (3)	2009	–4.21 (5)*	2010
π	–2.54 (2)	2008	–3.10 (2)*	2007
GovCS	–1.60 (3)	2002	–4.31 (4)*	2010
STRs	–2.57 (1)	1999	–4.89 (6)*	2005
SUBs	–1.19 (4)	1998	–3.80 (3)*	2009
SCont	–1.30 (4)	2012	–3.12 (3)*	1998
DTAX	–2.43 (5)	2010	–5.58 (4)*	2008
INDTAX	–2.34 (2)	2005	–7.03 (5)*	2010
REER	–1.45 (3)	2009	–8.20 (6)*	2010
POP	–2.74 (3)	1998	–5.90 (3)*	2007
Y	–2.31 (2)	2010	–3.66 (3)*	2007

(*Continued*)

Variables	Levels		First differences	
	t-Statistic	Break year	t-Statistic	Break year
		South Africa		
U	–1.15 (3)	2008	–4.46 (2)*	2005
π	–2.31 (4)	2008	–4.23 (3)*	2009
GovCS	–2.29 (5)	2011	–3.31 (5)*	2011
STRs	–1.92 (2)	2010	–4.63 (6)*	2011
SUBs	–2.52 (3)	2005	–6.32 (2)*	2011
SCont	–1.98 (2)	2009	–6.79 (3)*	2007
DTAX	–2.28 (2)	2011	–6.84 (5)*	2008
INDTAX	–1.66 (4)	2005	–4.48 (5)*	2011
REER	–2.63 (3)	2005	–3.48 (2)*	2011
POP	–3.46 (3)	2011	–3.84 (3)*	2005
Y	–2.22 (4)	2011	–4.60 (3)*	2005
		Turkey		
U	–1.69 (3)	2009	–3.17 (6)*	2011
π	–1.35 (3)	2009	–4.53 (6)*	2002
GovCS	–2.10 (5)	2010	–3.04 (4)*	2003
STRs	–2.40 (5)	2009	–4.96 (4)*	2003
SUBs	–1.07 (2)	2008	–3.04 (5)*	2003
SCont	–2.55 (2)	2002	–4.23 (5)*	2003
DTAX	–2.61 (2)	2007	–6.71 (3)*	2009
INDTAX	–2.39 (3)	2011	–5.39 (3)*	2011
REER	–1.49 (3)	2011	–4.06 (5)*	2011
POP	–3.44 (4)	2002	–4.92 (6)*	2005
Y	–2.56 (4)	2007	–4.33 (6)*	2007

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: Subsidies, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. The maximum lag length has been set to 6 and optimal lags included in the models are selected with Schwarz information criterion (SIC). Lag order is shown in parenthesis. * Denotes statistical significance at the 1% level. All variables are tested with intercept and trend.

Table 3A
PANEL COINTEGRATION RESULTS OF MODELS 1A AND 1B

Pedroni cointegration	Constant		Constant and trend	
	Test statistic	ρ-value	Test statistic	ρ-value
Model 1A Dependent variable: (U) Explanatory variables: (GovCS, STRs, SUBs, REER, POP, Y)				
Panel v-statistic	0.29	0.57	0.12	0.42
Panel ρ-statistic	0.18	0.21	1.33	0.12
Panel PP-statistic	–3.12*	0.00	–3.54*	0.00
Panel ADF-statistic	–3.70*	0.00	–3.41*	0.00
Group ρ-statistic	1.14	0.32	1.74	0.55
Group PP-statistic	1.72	0.17	1.04	0.42
Group ADF-statistic	–4.05*	0.00	–4.90*	0.00
Model 1B Dependent variable: (π) Explanatory variables: (GovCS, STRs, SUBs, REER, POP, Y)				
Panel v-statistic	1.52	0.11	2.11	0.33
Panel ρ-statistic	1.66	0.77	1.55	0.17
Panel PP-statistic	–4.20*	0.00	–3.41*	0.00
Panel ADF-statistic	–4.11*	0.00	–4.17*	0.00
Group ρ-statistic	2.03	0.18	1.50	0.58
Group PP-statistic	1.90	0.55	1.09	0.56
Group ADF-statistic	–4.77*	0.00	–4.39*	0.00

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: Subsidies, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. The tests were performed with two lags. Null hypothesis: no cointegration. * Denotes statistical significance at the 1% level.

Table 3B
PANEL COINTEGRATION RESULTS OF MODELS 2A AND 2B

Pedroni cointegration	Constant		Constant and trend	
	Test statistic	ρ-value	Test statistic	ρ-value
Model 2A Dependent variable: (U) Explanatory variables: (DTAX, INDTAX, SCont, REER, POP, Y)				
Panel v-statistic	1.22	0.19	2.29	0.17
Panel ρ-statistic	1.92	0.44	1.55	0.33
Panel PP-statistic	–4.11*	0.00	–4.24*	0.00
Panel ADF-statistic	–5.02*	0.00	–4.17*	0.00
Group ρ-statistic	1.54	0.33	1.56	0.18
Group PP-statistic	–3.78*	0.00	–3.59*	0.00
Group ADF-statistic	–3.48*	0.00	–3.65*	0.00

(*Continued*)

Pedroni cointegration	Constant		Constant and trend	
	Test statistic	**ρ-value**	**Test statistic**	**ρ-value**
	Model 2B Dependent variable: (π) Explanatory variables: (DTAX, INDTAX, SCont, REER, POP, Y)			
Panel v-statistic	1.22	2.07	1.12	0.55
Panel ρ-statistic	1.69	1.77	2.55	0.20
Panel PP-statistic	–5.32*	0.00	–5.04*	0.00
Panel ADF-statistic	–5.11*	0.00	–4.87*	0.00
Group ρ-statistic	1.50	1.87	1.98	0.11
Group PP-statistic	–4.22*	0.00	–4.66*	0.00
Group ADF-statistic	–4.70*	0.00	–4.47*	0.00

Notes: U: Unemployment, π: Inflation, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. The tests were performed with two lags. Null hypothesis: no cointegration. * Denotes statistical significance at the 1% level.

Given the presence of cointegration, the DOLS estimator technique for heterogeneous cointegrated panels is estimated to determine the long-run equilibrium relationship. In this respect, we estimate four different models. The results are presented in Table 4.

The DOLS estimator allows for greater flexibility in the presence of a heterogeneous cointegrating vector. This estimator is also robust in terms of the omission of variables that do not form part of the cointegration relationship. The fundamental idea behind this estimator is to account for possible serial correlation and endogeneity of regressors. Hence, an important property of this estimator is that it generates unbiased estimates for variables that are cointegrated, even with endogenous regressors.

As shown in Table 4, the results related to Models 1A and 1B reveal that government consumption spending (GovCS), expressed as a ratio of GDP, is significantly and positively correlated with both unemployment (U) and inflation (π). However, DOLS estimations demonstrate that the real exchange rate (REER) and population growth (POP), as control variables, only affect unemployment (U) but not inflation (π). These findings imply that the real exchange rate (REER) and population growth (POP) have a significant positive impact on unemployment (U). Taking into consideration Models 2A and 2B given in Table 4, it appears that indirect taxes (INDTAX), measured as a ratio of GDP, along with the control variables above make a positive as well as a significant impact on unemployment (U). When it comes to inflation (π), direct taxes (DTAX) affect inflation (π) significantly and positively, but not the unemployment (U). Based on these empirical findings, it can be argued that linking government size with inflation can only the case when government consumption spending and direct taxes are taken into consideration as proxy measures of government size.

The Granger-causality test results based on panel VECM are set out in Table 5A. To select the optimal lag order, we set the maximum at three lags in the VAR regressions and selected lag

length with a minimum value of the Schwarz information criterion (SIC). The F statistics for the serial correlation test in the last column indicate that the null hypothesis of all serial correlations is rejected. This implies that VECM is well specified and the empirical results pretty robust. Government consumption spending (GovCS) Granger-causes not only unemployment (U) but also inflation (π), as tabulated in Table 5A. On the other hand, in Model 1A, the real exchange rate (REER) and population growth (POP) create a causal effect on unemployment (U). Turning to Table 5B, indirect tax (INDTAX), real exchange rate (REER), and population growth (POP) have a causal effect on unemployment (U) as well. Both direct taxes (DTAX) and population growth (POP) Granger-cause inflation (π), as seen in Model 2B. Meanwhile, the error correction terms listed in Tables 5A and 5B display that the error correction term derived from the equilibrium relationship implies the elimination rate of short-run disequilibrium in the long run.

The effects of government size (GovSize) on unemployment (U) appear to be highly large. For example, the relationship between government consumption spending (GovCS) and unemployment (U) provides supportive evidence for the view that larger government size produces higher unemployment. Put more specifically, a 1 percentage point increase in government consumption spending (GovCS) is associated with an increase of about 1.16% in unemployment (U). However, it seems that the relative effect of indirect taxes (INDTAX) on unemployment is roughly two times higher for the countries under consideration. Accordingly, increases in indirect taxes increase unemployment by almost 2.33%. As to inflation, the results show evidence that a 1 percentage point rise in direct taxes (DTAX) increases inflation by 1.26%. This implies that increases in direct taxes are positively, as well as significantly, connected with inflation for the whole sample countries. The results also hint that a greater government size, measured by the ratio of government consumption spending to GDP, also causes prices to increase and thus create an inflationary effect for the countries under examination.

Broadly speaking, our empirical results regarding the government size-unemployment nexus are consistent with those of the prominent studies, such as Scully (1989), Abram (1999), Feldmann (2009, 2010), and Sa (2011). The results of these studies imply that the bigger government sector leads to higher unemployment in developing countries. However, leading studies available literature, such as Campillo and Miron (1997), Han and Mulligan (2008), and Wang and Wen (2017), hold the view that larger government size is linked with inflation. Our results also support this commonly shared view by previous studies, revealing that expanding government size in the sample countries lead to increases prices and thereby inflation. On balance, the empirical evidence we reached on the relationship of government size with unemployment and inflation is consistent with theoretical predictions explained in detail in Section 2.1: Theoretical background.

Regarding inflation, mostly, our empirical results suggest that government size is positively associated with long-run inflation. It means that an increase in government size drives up inflation. At this point, however, it is crucially important to express here that the impact of government size on inflation varies with how to define or measure government size. If government consumption spending and direct taxes are considered proxy measures of government size, increases in government size produce a positive effect on inflation. This finding can be justified as follows.

Table 4
RESULTS OF DOLS ESTIMATIONS FOR MODELS 1A AND 1B AND MODELS 2A AND 2B

Model 1A Dependent variable: (U) Explanatory variables: (GovCS, STRs, SUBs, REER, POP, Y)			**Model 1B** Dependent variable: (π) Explanatory variables: (GovCS, STRs, SUBs, REER, POP, Y)			**Model 2A** Dependent variable: (U) Explanatory variables: (DTAX, INDTAX, SCont, REER, POP, Y)			**Model 2B** Dependent variable: (π) Explanatory variables: (DTAX, INDTAX, SCont, REER, POP, Y)		
Explanatory variable	**Coefficient**	**t statistic**	**Explanatory variable**	**Coefficient**	**t statistic**	**Explanatory variable**	**Coefficient**	**t statistic**	**Explanatory variable**	**Coefficient**	**t statistic**
GovCS	1.42	3.76*	GovCS	1.15	2.54*	DTAX	0.74	1.07	DTAX	1.41	5.08*
STRs	0.23	1.22	STRs	0.95	1.34	INDTAX	1.43	2.30*	INDTAX	0.74	1.72
SUBs	0.59	1.80	SUBs	0.50	0.76	SCont	1.68	1.57	SCont	0.58	0.88
REER	2.78	2.41*	REER	1.06	1.53	REER	1.17	3.35*	REER	1.77	1.41
POP	1.05	2.69*	POP	1.22	1.37	POP	1.25	4.59*	POP	1.43	1.77
Y	1.70	1.59	Y	1.27	1.00	Y	0.83	1.94	Y	1.78	1.64

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: Subsidies, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. Schwarz information criterion (SIC) is used to select the lag length. The maximum number of lags is set at three. Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. * Denotes significance at the 1% levels, respectively.

Table 5A
GRANGER-CAUSALITY TEST RESULTS BASED ON PANEL VECM FOR MODELS 1A AND 1B

Dependent variables	Model 1A Dependent variable: (U) Explanatory variables: (GovCS, STRs, SUBs, REER, POP, Y)								
	ΔU	ΔGovCS	ΔSTRs	ΔSUBs	ΔREER	ΔPOP	ΔY	ECT_{it-1} (Coefficient)	F-statistics
ΔU	—	1.16	0.70	2.72	0.89	2.16	2.34	–0.04	2.22
		(0.00)**	(0.33)	(0.31)	(0.01)*	(0.00)**	(0.61)	[–1.09]	(0.07)
ΔGovCS	1.15	—	0.44	1.55	1.22	1.71	1.58	–0.02	3.47
		(0.37)	(0.65)	(0.10)	(0.10)	(0.63)	(0.42)	[–2.22]**	(0.13)
ΔSTRs	0.34	0.55	—	0.80	1.45	0.65	1.03	–0.02	2.34
	(0.13)	(0.32)		(0.93)	(0.54)	(0.20)	(0.11)	[–2.36]**	(0.22)
ΔSUBs	0.77	1.69	0.29	—	0.98	1.01	2.66	–0.05	2.17
	(0.22)	(0.72)	(0.32)		(0.13)	(0.22)	(0.54)	[–2.55]**	(0.45)
ΔREER	1.33	1.87	1.22	0.78	—	1.56	1.36	–0.02	2.36
	(0.41)	(0.22)	(0.17)	(0.18)		(0.41)	(0.25)	[–2.50]**	(0.34)
ΔPOP	0.68	1.49	0.56	1.21	1.70	—	0.55	–0.03	3.01
	(0.68)	(0.19)	(0.13)	(0.67)	(0.39)		(0.17)	[–3.31]**	(0.15)
ΔY	2.16	2.09	1.25	0.55	2.62	1.60	—	–0.05	2.23
	(0.49)	(0.00)**	(0.64)	(0.13)	(0.14)	(0.33)		[–2.43]**	(0.33)

(*Continued*)

Dependent variables	**Model 1B** Dependent variable: (π) Explanatory variables: (GovCS, STRs, SUBs, REER, POP, Y)								
	Δπ	ΔGovCS	ΔSTRs	ΔSUBs	ΔREER	ΔPOP	ΔY	ECT_{it-1} (Coefficient)	F-statistics
Δπ	—	2.33	0.54	0.68	1.17	2.11	0.51	–0.02	3.23
		(0.00)**	(0.12)	(0.81)	(0.19)	(0.71)	(0.17)	[–2.34]**	(0.23)
ΔGovCS	1.33	—	0.46	0.40	0.95	1.77	0.89	–0.03	3.18
	(0.07)		(0.11)	(0.09)	(0.13)	(0.33)	(0.44)	[–3.48]**	(0.11)
ΔSTRs	1.78	2.11	—	1.22	0.55	0.66	1.19	–0.05	2.01
	(0.09)	(0.44)		(0.45)	(0.32)	(0.16)	(0.23)	[–2.31]**	(0.93)
ΔSUBs	0.60	1.99	0.84	—	0.88	1.41	0.59	–0.04	2.61
	(0.36)	(0.51)	(0.51)		(0.11)	(0.13)	(0.44)	[–2.19]**	(0.87)
ΔREER	1.07	0.69	1.30	0.78	—	0.87	1.43	–0.02	3.51
	(0.54)	(0.25)	(0.78)	(0.33)		(0.39)	(0.30)	[–3.17]**	(0.19)
ΔPOP	1.72	1.71	1.87	1.08	1.55	—	0.92	–0.02	2.75
	(0.09)	(0.68)	(0.13)	(0.54)	(0.70)		(0.19)	[–2.58]**	(0.34)
ΔY	1.58	1.60	0.55	0.69	0.66	1.60	—	–0.04	2.55
	(0.36)	(0.00)**	(0.43)	(0.11)	(0.44)	(0.14)		[–3.11]**	(0.16)

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: Subsidies, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. Values in parentheses and brackets are p-values and t-statistics, respectively. * and ** statistical significance at the 5% and 1% levels, respectively.

Table 5B
GRANGER-CAUSALITY TEST RESULTS BASED ON PANEL VECM FOR MODELS 2A AND 2B

Dependent variables	Model 2A Dependent variable: (U) Explanatory variables: (DTAX, INDTAX, SCont, REER, POP, Y)								
	ΔU	ΔDTAX	ΔINDTAX	ΔSCont	ΔREER	ΔPOP	ΔY	ECT_{it-1} (Coefficient)	F-statistics
ΔU	—	1.34	2.33	0.72	2.07	1.33	0.33	–0.05	1.55
		(0.11)	(0.00)**	(0.89)	(0.02)*	(0.00)**	(0.65)	[1.45]	(0.12)
ΔDTAX	1.97	—	0.72	0.28	1.22	0.79	0.45	–0.03	2.51
	(0.33)		(0.13)	(0.41)	(0.44)	(0.01)*	(0.34)	[–2.22]**	(0.04)
ΔINDTAX	1.33	0.90	—	0.65	1.79	0.55	0.78	–0.02	2.89
	(0.09)	(0.22)		(0.19)	(0.38)	(0.78)	(0.22)	[–3.11]**	(0.68)
ΔSCont	2.09	2.61	1.02	—	1.50	1.07	1.26	–0.01	2.90
	(0.32)	(0.14)	(0.65)		(0.11)	(0.55)	(0.45)	[–2.14]**	(0.15)
ΔREER	1.23	2.03	0.65	1.13	—	0.67	0.88	–0.02	3.04
	(0.64)	(0.44)	(0.12)	(0.22)		(0.26)	(0.53)	[–3.21]**	(0.17)
ΔPOP	1.26	1.09	1.45	0.75	0.33	—	1.33	–0.04	2.72
	(0.42)	(0.18)	(0.22)	(0.14)	(0.17)		(0.16)	[–2.34]**	(0.09)
ΔY	1.68	0.69	2.03	1.15	0.78	1.32	—	–0.02	2.50
	(0.44)	(0.17)	(0.41)	(0.22)	(0.25)	(0.22)		[–2.19]**	(0.33)

(*Continued*)

Dependent variables	**Model 2B** Dependent variable: (π) Explanatory variables: (DTAX, INDTAX, SCont, REER, POP, Y)								
	Δπ	ΔDTAX	ΔINDTAX	ΔSCont	ΔREER	ΔPOP	ΔY	ECT_{it-1} (Coefficient)	F-statistics
Δπ	—	1.26	0.89	0.55	1.07	1.07	1.26	–0.02	2.11
		(0.00)**	(0.45)	(0.88)	(0.28)	(0.04)*	(0.45)	[–2.34]**	(0.07)
ΔDTAX	2.04	—	0.17	0.77	0.89	1.40	1.33	–0.03	2.40
	(0.18)		(0.65)	(0.13)	(0.21)	(0.39)	(0.12)	[–3.57]**	(0.40)
ΔINDTAX	1.66	1.87	—	1.36	1.03	0.45	1.39	–0.02	3.00
	(0.41)	(0.75)		(0.24)	(0.72)	(0.11)	(0.09)	[–2.24]**	(0.17)
ΔSCont	0.77	0.66	1.22	—	0.39	1.33	1.10	–0.04	2.15
	(0.51)	(0.25)	(0.25)		(0.11)	(0.13)	(0.07)	[–2.40]**	(0.32)
ΔREER	1.03	1.36	0.57	0.58	—	1.22	1.05	–0.04	2.25
	(0.20)	(0.39)	(0.17)	(0.22)		(0.87)	(0.33)	[–3.09]**	(0.17)
ΔPOP	0.25	2.12	1.10	1.06	0.79	—	0.68	–0.02	3.22
	(0.57)	(0.19)	(0.56)	(0.54)	(0.22)		(0.17)	[–2.41]**	(0.08)
ΔY	0.66	0.94	1.29	0.41	0.58	0.78	—	–0.02	1.14
	(0.33)	(0.64)	(0.22)	(0.16)	(0.09)	(0.22)		[–2.04]**	(0.55)

Notes: U: Unemployment, π: Inflation, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. Values in parentheses and brackets are p-values and t-statistics, respectively. * and ** significance at the 5% and 1% levels, respectively.

One justification could be that an increase in government purchases drive up the cost of production. In turn, this would drive up inflation. The second justification could be that government spending may push up both the current and expected future real wages. This would create pressure on firms to increase the prices of their products to fix the profit markup. This would be a case, especially when the monetary authority does not react to inflation by tightening its monetary policy.

Incidentally, it should be kept in mind that the effects of government spending on inflation depend on the state of the economy. If the economy is close to the full employment level, then, higher government spending creates inflationary pressures. Conversely, if the economy is in underemployment, expansionary government spending would not bring forth much inflationary pressure on the economy. To understand the impact of government spending on inflation utterly, we should also consider the following: (i) how government spending is funded. If tax hikes meet it since there will be no change in aggregate demand, there would not be any inflationary pressure. (ii) does government spending crowd-out private sector investments? If the economy is close to full employment level, government spending financed through private domestic borrowing can lower output and thereby can lead to higher inflation. (iii) is government spending used efficiently? If government spending is used inefficiently, then, government spending may cause inflation.

Generally, government spending may influence both demand- and supply-sides of the economy, depending on the components of government spending. If spending is related to spending on infrastructure, public education and health, and R&D, this may boost productivity and thus growth, creating a disinflationary effect over the economy in the long run. In brief, which side of the economy is affected by expansionary government spending is a key element in understanding whether government spending brings forth inflation.

However, our empirical results indicate that government size is positively associated with unemployment, as well. In this context, one can consider the possibility that public-sector employment crowds out private-sector employment, as reported notably by Behar and Mok (2019). Government consumption spending and indirect taxes might bring forth an increase in unemployment.

When we proceed with taxes and consider taxes as a proxy measure for the size of the government, typically, taxes, depending upon their types, can lead to unemployment directly and indirectly. Some taxes, typically those called employment taxes, such as social security payroll taxes, unemployment compensation taxes, directly affect the cost of labor and thus produce unemployment. Others, what is called business taxes, like personal and corporate income taxes, imposed on capital directly influence unemployment by lowering the productivity of labor by preventing capital formation. If a tax levy (or changes thereof) increases the cost of labor above the value of its productive contribution, it is expected that taxes cause unemployment. For instance, a study by Bell and Tawara (2009) document the presence of adverse effects of taxes on labor supply.

When it comes to employment taxes, increases in such types of taxes along with new demand for higher pay and less work may result in mass unemployment. Again, taxes levied

for economic stimulation and full employment may cause unemployment, depending on the state of the business cycle. This is especially a case in employment, i.e. inflationary gap.

Given the above explanations, from a macroeconomic policy viewpoint, the results suggest that government size in the sample countries is well over what it should be. For this purpose, decreasing government size may help ensure low inflation while contributing to relatively lower rates of unemployment. To sum up, an appropriate size of government is essential for having low and sustainable inflation and unemployment.

5. Conclusion

In this paper, we examined the long-run relationship of government size with unemployment and inflation for a panel of eight large emerging market economies over the period 1980-2015. For that purpose, we used panel cointegration and causality techniques.

The empirical results we reached suggest that government size is positively associated with both unemployment and inflation wherein we observed a positive unidirectional Granger-causality running from the government size to unemployment and inflation. Hence, four major conclusions can be drawn from the results. First, there is a robust relationship between government size and unemployment and inflation, with unidirectional causality running from government size to unemployment and inflation. Second, the results seem to confirm the validity of the Abrams curve that suggests there exists a long-run relationship between government size and unemployment. However, this evidence depends on how government size is defined or measured. Third, if government consumption spending and indirect taxes are considered proxy measures of government size, in this case, there is strong and robust evidence verifying the relationship between government size and unemployment. This relationship appears to be in the form of a one-way causal relationship running from government size to unemployment. In the case of indirect taxes, this causality becomes more robust. In all other cases, however, the relationship between the two variables disappears completely. Fourth, government size is significantly positively connected with inflation. Nevertheless, the presence of this relationship, as in the case of the government size-unemployment nexus, critically depends on how government size is measured. As long as government consumption spending or direct taxes are taken into consideration as proxy measures of government size, the results provide favorable evidence for the existence of this relationship. In this relationship, the Granger-causality is unidirectional that runs from government size to inflation.

Although the existing literature does not provide clear-cut empirical results concerning the relationship of government size with unemployment and inflation, our empirical results overlap with the general tendency, corroborating the idea of the Abrams curve that hypothesizes that there is a long-run relationship between government size and unemployment. When it comes to the government size-inflation nexus, our empirical results are largely compatible with the available sparse literature.

To sum up, as stated earlier, the potential relationship of government size with unemployment and inflation differs various with how government size is measured. Accordingly, the most effective proxy measure of government size in explaining variations in unemployment is indirect taxes. This is followed by government consumption spending. As concerns inflation, direct taxes, and government consumption spending are the two most important proxies for government size that make it possible to establish a link between government size and inflation.

Finally, the empirical results we obtained may be interpreted from various aspects as well as can be used for some macroeconomic policy prescriptions. The first thing that comes to our mind is that increases in government consumption spending may have produced a crowding-out effect that put downward pressure on interest-rate sensitive private investments, resulting in an increase in unemployment. Secondly, output growth resulting from government spending increases may not have created extra job opportunities due to the so-called 'hormone-injected growth' phenomena; that is, a term which is used to describe an economic growth process that does not create additional employment opportunities. Furthermore, other things being equal, the rising rate of the active population may have been higher than that of the rise in real GDP growth rate in the period we examined. Lastly, looking at the issue from a tax policy standpoint, in a broader sense, higher taxes mean a higher cost of production in terms of corporates. However, it is most likely that higher taxes negatively affect the disposable income of consumers, leading to lower aggregate demand for goods and services produced in the national economy. Taken together, there would be fewer job opportunities for job seekers, resulting in higher unemployment. Turning now to inflation, increases in government spending may have pushed aggregate demand up and thus raising prices. How the government finances its spending is also a matter that can be viewed as another channel in explaining the government size-inflation nexus.

Appendix

Table A1
SYNOPSIS OF THE EXISTING EMPIRICAL STUDIES ON THE GOVERNMENT SIZE AND UNEMPLOYMENT NEXUS

Study[a]	Sample	Econometric method	Proxy measure used for government size[b]	Empirical finding	Government size-unemployment nexus
Sa (2011)	32 developed and 51 developing countries	OLS regression	Government consumption.	The larger government size, the higher unemployment.	Positive.
Wang and Abrams (2011)	20 OECD countries	Panel error-correction model	Total government outlays and their sub-components.	Different types of government outlay have different effects on employment. There is one-way causality running from government size to the unemployment rate.	Positive and negative, depending on the types of government outlays.
Feldmann (2010)	52 developing countries	OLS regression	Government size component of Economic Freedom of the World Index, consisting of four equally weighted sub-components: (i) government consumption, (ii) transfers and subsidies, (iii) government enterprises and investment, (iv) top marginal tax rate.	It is likely that a large share of government sector increases unemployment in developing countries. Additionally, a large government sector is likely to substantially increase the share of long-term unemployed in the total number of unemployed.	Positive.
Feldmann (2009)	58 developing countries	OLS regression	Government size component of Economic Freedom of the World Index, consisting of four equally weighted sub-components: (i) government consumption, (ii) transfers and subsidies, (iii) government enterprises and investment, (iv) top marginal tax rate.	It is likely that a large share of government sector increases unemployment in developing countries.	Positive.
Wang and Abrams (2007a)	20 OECD countries	VAR	Total government outlays and their sub-components .	Different types of government outlay have different effects on employment. There is one-way causality running from government size to the unemployment rate.	Positive and negative, depending on the types of government outlays.

(*Continued*)

Study[a]	Sample	Econometric method	Proxy measure used for government size[b]	Empirical finding	Government size-unemployment nexus
Wang and Abrams (2007b)	20 OECD countries	Error correction model	Total government outlays and their sub-components.	Government size, measured by the total government size-to-GDP plays an important role in affecting the steady-state unemployment rate. However, when government outlays are disaggregated as transfers and subsidies, and government purchases of goods and services, the above finding change. Accordingly, the former sub-component affects the steady-state unemployment rate while the latter sub-component does not have any significant effect.	Positive and negative, depending on the types of government outlays.
Christopoulos *et al*. (2005)	10 EU countries	Panel cointegration analysis and estimation techniques	Total government expenditure.	In the long run, there is one-way causality that runs from government size to the unemployment rate, supporting the validity of the Abrams curve.	Positive.
Christopoulos and Tsionas (2002)	10 EU countries	Causality and cointegration techniques	Total government expenditures.	The Abrams curve is valid. Accordingly, there is a unidirectional causality running from government size to the unemployment rate.	Positive.
Abrams (1999)	20 OECD countries	Pooled OLS estimation technique	Total government outlays.	Increases in government size induce unemployment.	Positive.
Karras (1993)	37 developed and developing countries	Two-stage LS (2SLS)	Government spending and its sub-components: (i) Permanent government consumption. (ii) Transitory government consumption.	Both components of government spending positively affect employment. However, the effect of permanent consumption is larger than the other's effect.	Negative.
Scully (1989)	115 developed, developing and less developed market economies	OLS estimation technique	Government expenditures.	Increases in government size trigger unemployment.	Positive.

[a] According to inverse chronological order.

[b] Unless otherwise indicated, as a share of GDP.

Table A2
SYNOPSIS OF THE EXISTING EMPIRICAL STUDIES ON THE GOVERNMENT SIZE AND INFLATION NEXUS

Study[a]	Sample	Econometric method	Proxy measure used for government size[b]	Empirical finding	Government size-unemployment nexus
Wang and Wen (2017)	China	VAR	Government spending.	Government spending Granger-causes inflation.	Positive.
Nguyen (2018)	3 Asian emerging market economies: India, China, and Indonesia	Cointegration and VECM.	Government spending.	There is a long-run causal link between government spending and inflation in the long run for all these countries. However, in the short run, government spending seems to have a negative impact on inflation in China, while a positive impact on the other two countries.	In the long run positive, whereas in the short run, mixed.
Tehranchian *et al*. (2010)	Iran	Cointegration and VECM	Total government expenditure.	There is a negative unidirectional causality running from economic growth to inflation.	Negative.
Han and Mulligan (2008)	80 countries	OLS regression	Government spending and its sub-components: (i) Non-defense spending, (ii) Defense spending.	Government size is significantly and positively related to inflation only in special cases, e.g., mainly when periods of war and peace were compared.	Only in special cases, there is a positive relationship between government size and inflation.
Campillo and Miron (1997)	62 developed and developing countries	OLS regression	Government expenditure.	Greater government expenditure requires greater use of the inflation tax.	Positive.

[a] According to inverse chronological order.

[b] Unless otherwise indicated, as a share of GDP.

Table A3
DESCRIPTIVE STATISTICS FOR THE PANEL

Variable	Mean	Std. Dev.	Min.	Max.	Obs.
U	7.7	6.45	1.50	28.00	288
π	82.39	347.77	–1.40	3079.81	288
GovCS	12.56	4.34	5.34	20.70	288
STRs	18.64	25.56	3.43	66.04	288
SUBs	8.90	16.73	5.17	47.15	288
SCont	43.6	20.44	12.33	15.98	288
DTAX	12.126	55.63	11.17	47.08	288
INDTAX	42.476	36.80	1.68	91.00	288
REER	61.18	57.34	48.06	278.32	288
POP	3.53	4.50	1.70	1.37	288
Y	296.8	255.9	10.107	966.28	288

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: subsidies, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita.

Table A4
CORRELATION COEFFICIENTS, T-STATISTICS, AND PROBABILITIES OF THE VARIABLES

	U	π	GovCS	STRs	SUBs	SCont	DTAX	INDTAX	REER	POP	Y
U	1.00										
	—										
	—										
π	–0.00	1.00									
	(–0.06)	—									
	[0.95]	—									
GovCS	–0.06	–0.10	1.00								
	(–0.55)	(–0.95)	—								
	[0.57]	[0.34]	—								
STRs	–0.00	–0.10	0.33	1.00							
	(–0.02)	(–0.90)	(3.15)	—							
	[0.97]	[0.36]	[0.00]	—							
SUBs	–0.03	–0.32	0.17	0.03	1.00						
	(–0.34)	(–3.00)	(1.52)	(0.28)	—						
	[0.73]	[0.00]	[0.13]	[0.77]	—						
SCont	–0.24	–0.27	0.56	0.15	0.45	1.00					
	(–2.26)	(–2.48)	(6.03)	(1.36)	(4.47)	—					
	[0.02]	[0.01]	[0.00]	[0.17]	[0.00]	—					
DTAX	0.04	–0.15	0.44	0.42	0.17	0.39	1.00				
	(0.39)	(–1.36)	(4.44)	(4.17)	(1.57)	(3.75)	—				
	[0.69]	[0.17]	[0.00]	[0.00]	[0.11]	[0.00]	—				
INDTAX	0.05	–0.16	0.35	0.36	0.25	0.33	0.95	1.00			
	(0.47)	(–1.43)	(3.39)	(3.43)	(2.34)	(3.17)	(28.40)	—			
	[0.63]	[0.15]	[0.00]	[0.00]	[0.02]	[0.00]	[0.00]	—			
REER	0.02	–0.41	0.44	0.16	0.43	0.57	0.25	0.25	1.00		
	(0.24)	(–3.99)	(4.37)	(1.48)	(4.28)	(6.14)	(2.31)	(2.28)	—		
	[0.80]	[0.00]	[0.00]	[0.14]	[0.00]	[0.00]	[0.02]	[0.02]	—		
POP	–0.44	–0.26	0.26	–0.13	0.42	0.63	–0.28	–0.28	0.39	1.00	
	(–4.41)	(–2.45)	(2.40)	(–1.19)	(4.09)	(7.25)	(–2.62)	(–2.66)	(3.78)	—	
	[0.00]	[0.01]	[0.01]	[0.23]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	—	
Y	0.17	–0.02	0.41	0.43	–0.02	–0.14	0.47	0.44	0.18	–0.35	1.00
	(1.55)	(–0.24)	(3.98)	(4.20)	(–0.22)	(–1.27)	(4.77)	(4.33)	(1.70)	(–3.31)	—
	[0.12]	[0.81]	[0.00]	[0.00]	[0.81]	[0.20]	[0.00]	[0.00]	[0.09]	[0.00]	—

Notes: U: Unemployment, π: Inflation, GovCS: Government consumption spending, STRs: Social transfers, SUBs: Subsidies, DTAX: Direct taxes, INDTAX: Indirect taxes, SCont: Social contributions, REER: Real effective exchange rate, POP: Population growth, Y: Real GDP per capita. The first values are correlation coefficients. The values in parentheses and square brackets are t-statistics and probabilities, respectively.

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Resumen

Utilizando datos anuales de un panel de ocho grandes economías de mercado emergentes, para el periodo 1980-2015, analizamos los vínculos de causalidad subyacentes entre el tamaño del gobierno, el desempleo y la inflación utilizando técnicas de cointegración. En general, los resultados muestran que existe una relación de causalidad unidireccional entre el tamaño del sector público y los niveles de desempleo e inflación. Los resultados difieren en función de la definición de sector público y del indicador utilizado para su medición. Para el indicador de consumo público respecto al PIB la causalidad es unidireccional, donde el tamaño del sector público explica el desempleo y la inflación. Además, los impuestos indirectos muestran una importante asociación causal positiva con el desempleo, mientras que los impuestos directos guardan una estrecha relación con la inflación en la muestra de todos los países.

Palabras clave: tamaño del Sector Público, desempleo, inflación, economías emergentes, cointegración de paneles, análisis de causalidad.

Clasificación JEL: H10, E60, E61, E63.