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Fatma Dogruel
Marmara University

A. Suut Dogruel
Marmara University

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Price convergence and globalization: evidence from selected countries

Fatma DOGRUEL* and A. Suut DOGRUEL**

Abstract

MENA countries have been confronted with major social, economic and political changes during the last two decades. During this period some emerging countries and transition economies also experienced similar transformation at varying degrees. The transformation of the economic system has affected not only relative domestic prices but also the gap between domestic and international price levels. The paper focuses on how deviation of domestic prices from international market prices is affected by openness in the selected countries. The difference between domestic and international price level is calculated by employing purchasing power parity (PPP). The factors that may have an effect on domestic-foreign price differences other than openness also are considered as control variables of the empirical analyses.

Keywords: Price convergence, Purchasing Power Parity, Trade Openness

JEL Codes: E31, F62, O11

1. INTRODUCTION

MENA countries have been confronted with major social, economic, and political changes over the last two decades. This period starts from the, 1990s during which globalization accelerated, and ends towards the year 2010, which is marked by the worldwide destruction in the wake of the 2008 financial crisis on the eve of the Arab Spring.¹ Over the last two decades, some of the MENA countries have switched from relatively closed to open economies through attempts to liberalize their trade regimes.

Similar transformations can be observed in emerging countries. However, most of the emerging countries, which are classified by the World Bank as upper middle income group, have entered in this period with relatively advanced liberal trade regimes and experienced relatively gradual transition. On the opposite side, transition economies in East and Central Europe were confronted with major social, economic and political changes after the collapse of the Berlin Wall. Consequently, the speed of transformation is much higher in the transition economies.

The transformation of the economic system has affected not only relative domestic prices but also the gap between the domestic and international price levels. This paper focuses on how

* Marmara University, Istanbul.

** Marmara University, Istanbul

¹ 1990s is a period in which financial and trade liberalization accelerated. O'Rourke and Williamson (2002) assert that "globalization is the defining term of the 1990s."

the deviation of domestic prices from international market prices is affected by growth and openness in the selected countries. The difference between domestic and international price level is calculated by employing purchasing power parity (PPP). The factors that may also have an effect on domestic-foreign price differences other than GDP and openness will also be considered as the control variables of the empirical analyses. The empirical model considers a proxy for tradable goods and initial condition as control variables. The assumption is that the control variables also capture the inherited institutional structure of country.

The plan of the paper is as follows: The next section gives brief background information on PPP. Section 3 is devoted to the model and data. Section 4 displays empirical results. The last section concludes the paper.

2. THEROTICAL BACKGROUND

This section gives brief background information on the conceptual meaning of PPP and the literature related to the convergence of domestic prices and international market prices. The literature review first focuses on definitions of PPP and its historical background, and then on the key points of PPP approaches using a rough classification.

Growth comparisons and convergence are the leading issues in the literature over the decades. Per capita income is the main measure (explanatory variable) to compare the income level of countries and country groups from different geographies or historical settings. However, measuring GDP is another key issue in this literature. PPP is the crucial approach in this literature. Deaton and Heston (2010) contribute widely to understand PPP-based National Accounts:² They underline the importance of the data work of Robert Summers and Alan Heston (1991),³ which is called as the Penn World Table (PWT) in the “huge explosion of work” on mechanics of growth and its related areas such as politics, macroeconomics, development and economic history. They also emphasize the data work of Angus Maddison (2003) which provides long-run historical data for the literature (Deaton and Heston, 2010).⁴

Definition and a Short Historical Note

Krugman and Obstfeld (2000: 396) provide a textbook definition for PPP as “(...) all countries’ price levels are equal when measured in terms of the same currency.” Taylor and Taylor (2004) claim that “*PPP is a disarmingly simple theory that holds that the nominal exchange rate between two currencies should be equal to the ratio of aggregate price levels between the two countries, so that a unit of currency of one country will have the same purchasing power in a foreign country.*”

² See Diewert (2010) and Ravallion (2010b) for the discussions on the Deaton and Heston (2010) .

³ The Penn World Table (PWT) covers national accounts from a number of countries. See for the original paper of the data work Robert Summers and Alan Heston (1991).

⁴ “These data helped bring about a new growth economics, with theoretical developments consistently related to evidence. There has been a huge explosion of work since then, trying to **understand the mechanics of growth, linking growth and politics, and forging an integration of macroeconomics, economic development, and economic history, the last supported by the companion creation of long-run historical data by Angus Maddison (2003).**” (Deaton and Heston, 2010:1-2)

Lant Pritchett (1997) clearly explains the needs to the purchasing power adjustments for exchange rates:

“... [i]t is important to stress that using the purchasing power adjustments for exchange rates has an especially important effect in poor countries. While tradable goods will have generally the same prices across countries because of arbitrage, non-tradable goods are typically much cheaper in poorer countries because of their lower income levels. If one applies market exchange rates to convert incomes in these economies to U.S. dollars, one is typically far understating the "true" income level, because non-tradable goods can be bought much more cheaply than market exchange rates will imply.”

The literature agrees that Gustav Cassel (1916) is the main contributor of this theory. Holmes (1967) formulates Cassel's contribution as:

“Cassel formulated this theory so that it applied not only to a flexible exchange-rate standard but also to the gold standard. In this more general formulation the primary determinants of the price of a country's goods domestically were monetary factors, and the secondary determinants were tariffs and hindrances to trade, transport costs, capital flows, and expectations.”

Rogoff (1996: 648-649) emphasizes some classical economists such as John Stuart Mill, Viscount Goschen, Alfred Marshall, and Ludwig von Mises beyond the contributions of Cassel to the treatment of PPP theory.⁵ Although, Rogoff (1996) emphasizes the leading role of Gustav Cassel, Rogoff (1996) and Taylor and Taylor (2004) refer to an earlier century in the PPP theory.:

“First articulated by scholars of the Salamanca school in sixteenth century Spain, purchasing power parity (PPP) is the disarmingly simple empirical proposition that, once converted to a common currency, national price levels should be equal.” (Rogoff, 1996).

“The PPP theory has a long history in economics, dating back several centuries, but the specific terminology of purchasing power parity was introduced in the years after World War I during the international policy debate concerning the appropriate level for nominal exchange rates among the major industrialized countries after the large-scale inflations during and after the war (Cassel, 1918).” (Taylor and Taylor, 2004)

In addition to Gustav Cassel, the name of David Ricardo is another contributor on “the basic idea of PPP” which is “the originator of the theory of the comparative advantage” (Krugman and Obstfeld, 2000: 396; Neary, 2004). Beyond these “originators” there are two main contributors in 1960s: Bela Balassa (1964) and Paul A. Samuelson (1964). Krugman and Obstfeld (2000: 415) refer to the contributions of Bela Balassa and Paul A. Samuelson in the following remarks:

⁵ “The modern origins of purchasing power parity trace to the debate on how to restore the world financial system after its collapse during World War I. (...) Though purchasing power parity had been discussed previously by classical economists such as John Stuart Mill, Viscount Goschen, Alfred Marshall, and Ludwig von Mises, Cassel was really the first to treat PPP as a practical empirical theory.” (Rogoff, 1996: 648-649).

“... international variations in the prices of non-tradables may contribute to price level discrepancies between rich and poor nations. The available data indeed shows that non-tradables tend to be more expensive (relative to tradables) in richer countries. One reason for the lower relative price of non-tradables in poor countries was suggested by Bela Balassa and Paul Samuelson.” (Krugman and Obstfeld, 2000: 415)

Balassa (1964: 584) states that “It [*the PPP theory*] has also had its critics, among others Taussig after World War I and Haberler after World War II, but it has managed to survive nevertheless.” DeLoach (1997) stresses the subsequent contributions

DeLoach (1997) stresses the subsequent contributions in the field:

“Alternatively, in the spirit of Balassa (1964) and Samuelson (1964), recent papers by Hsieh (1982), Neary (1988), and Bergstrand (1991) develop models in which real exchange rates are determined by equilibrium conditions in traded and non-traded goods markets. In these models, the existence of non-traded goods leads to a breakdown of the commodity-arbitrage condition, which leads to PPP. Consequently, PPP holds only for all internationally traded goods. Therefore, the real exchange rate is determined by changes in the relative prices of traded and non-traded goods” (DeLoach, 1997)

Discussions on PPP's Approaches

A classification of PPP's approaches covers three main views: The first view draws attention on productivity differences between developed and developing countries in the production of tradable goods. This view is represented by the Balassa-Samuelson theory. We may emphasize Rogoff (1996) to understand the view:

“rich countries have higher absolute productivity levels than poor countries, but because rich countries are relatively more productive in the traded goods sector. Nontraded goods tend to be more service intensive and there is thus less room for establishing technological superiority.” (Rogoff, 1996)

An alternative view is represented by Bhagwati –Kravis-Lipsey: They focus on factor endowment issue rather than productivity differences. “The Bhagwati –Kravis-Lipsey view relies on differences in endowments of capital and labor rather than productivity differences.” (Krugman and Obstfeld, 2000).

The last one is based on a demand-oriented hypothesis; production process and related concepts, productivity, and factor endowment are not in the consideration. Therefore, the focus is the price differentiations related to *consumer behavior or demand side*. This third hypothesis suggests that, assuming non-homothetic tastes, price levels are higher in countries with higher per capita GDP's because non-traded services are luxuries in consumption while traded commodities are necessities (Bergstrand, 1991). This view is amplified by Hsieh and Klenow (2007). The argue that:

“Price differences across countries are determined by trade barriers and by a country's specialization in production. Consumption goods are therefore more expensive in rich countries simply because rich countries face barriers in importing consumption goods from poor countries.” (Hsieh and Klenow, 2007: 564).

3. MODEL AND DATA

The aim of the model is to explain the difference between domestic prices and international market prices. We presume that GDP per capita and openness may be the main factors to explain domestic-foreign price differences. The empirical model also includes a proxy for tradable goods and initial condition as control variables. We think that the control variables also characterize the institutional structure of countries.

The model as follows:

$$PPP = f(\text{GDP}, \text{OPENNESS}, \text{TRADABLE}, \text{INITIAL CONDITION})$$

Purchasing Power parity (PPP) is the dependent variable of the model. PPP is calculated as “the price level of country i relative to the United States (P_i/P_{US})” (Rogoff, 1996). We consider the current international Dollar and the US Dollar to calculate PPP. Hence, PPP is obtained by the next formula:

$$PPP = \text{GDP per capita, PPP (current international \$)} / \text{GDP per capita (current US\$)}.$$

Two explanatory variables are employed in order to explain the deviation of domestic prices from international market prices in the model: GDP and OPENNESS. GDP represents growth effect on the domestic price level. The first differences of GDP per capita (constant local currency) are used in the estimations. We expect that the difference between domestic and international price level will decrease while GDP increases or *vice versa*. The reason behind this assumption is twofold considering the discussions on PPP's approach in the previous section: i) “Consistently with the Balassa-Samuelson model, evidence is found of a “dynamic Penn effect,” whereby more rapidly growing economies experience steeper increases in their price level index” (Ravallion, 2010a); ii) “Static Penn effect (whereby the price level index is lower in poorer countries) has been attenuated over time” (Ravallion (2010a: 17). The former implies “the demand-oriented hypothesis,” and the latter is based on Balassa-Samuelson model both which are mentioned in the previous section. The paper considers three different openness definitions in the model as OPENNESS variable: i) Exports + Imports, as percentage of GDP; ii) Imports as percentage of GDP, and iii) import penetration ratios, which are calculated as the share of imports in domestic market size. First differences are used for estimation in each form of the data. The expectations from the estimations are similar to the expectations of GDP: we anticipate that the difference between domestic and international price level will decrease while OPENNESS increases or *vice versa*. Cassel's clarifications is behind this assumption/We consider openness due to Cassel's clarifications: “*the primary determinants of the price of a country's goods domestically were monetary factors, and the secondary determinants were*

tariffs and hindrances to trade, transport costs, capital flows, and expectations” (Holmes, 1967) quoted from (Cassel, 1916-March).

Another two explanatory variables are TRADABLE and INITIAL CONDITION. Both are designated as control variables. We also assume that they represent institutional characteristics of the economies as mentioned before. TRADABLE is represented by industrial value added as a percentage of GDP in the model, and first differences are used for estimation, like the other variables. Beyond being a control variable, TRADABLE has information about the sectoral composition of the economy due to its definition. Therefore, it is possible to say that TRADABLE holds the institutional structure of economy. The expectation of the variable has a similar pattern considering the former two explanatory variables: We expect that the difference between domestic and international price level will decrease as TRADABLE increases or *vice versa*. Our expectation reflects what Choudhri and Khan (2005) say:

“There is surprisingly little empirical research on whether Balassa-Samuelson effects can explain the long-run behavior of real exchange rates in developing countries. This paper presents new evidence on this issue based on a panel-data sample of 16 developing countries. The paper finds that the traded-non-traded productivity differential is a significant determinant of the relative price of non-traded goods, and the relative price in turn exerts a significant effect on the real exchange rate. The terms of trade also influence the real exchange rate. These results provide strong verification of Balassa-Samuelson effects for developing countries.”

INITIAL CONDITION is the second control variable. INITIAL CONDITION is represented by GDP per capita in 1988 (US dollars) in the estimations. This is a level variable and the first year of each period for the each country group is considered. Initial income level is another structural indicator and may signify institutional structure as TRADABLE does.

In order to eliminate unit root problem first differences are used for estimation except for “INITIAL CONDITION”

4. EMPIRICAL RESULTS⁶

MENA countries

Data limitation problem do not permit us to consider all MENA countries. For the estimation of the model we construct two samples for the MENA countries. First one is *large MENA group* with limited number of variables and the second one is *the restricted MENA group* with larger number of variables.

The results from *the large MENA group* (11 MENA countries) expose the followings: Openness (OPEN) is significant only when defined as “Exports + Imports, as a percentage of GDP” (Table-1, Model-1 and Model-3). However GDP is significant only when the model does not cover OPEN (Model-2). GDP is significant with openness when we define it as import

⁶ Lists of the countries for the estimations are given in the Appendix.

penetration ratio (Imports, as percentage of domestic demand) (Table-2, Model-1). Although the signs of significant coefficients of GDP and OPEN are consistent with the expectation, they are sensitive to the model specifications.

The results from *the restricted MENA group* (8 MENA countries) reveal that GDP is not a determinant of the relative price changes. GDP is insignificant in the all models. Openness (OPEN) is significant only when defined as “Exports + Imports, as percentage of GDP” and we do not include TRADABLE into the model (Tables-3, Model-6, 8 and 9). Openness (OPEN) is never significant when defined as import penetration ratio (Table-4). TRADABLE is significant in all models both with the OPENNESS defined as total trade volume as a percentage of GDP and import penetration ratio. INITIAL is not significant in all models. These results show that only the estimation results for TRADABLE are robust: Increasing in the share of tradable reduces the gap between domestic prices of the MENA countries and the price level of the US.

Emerging Countries

Estimation results for the MENA countries give weak support to the theoretical expectations outlined in the second section of the paper. However, estimation results for the emerging countries are quite different (Table 5 and 6). Coefficients of the TRADABLE are not robust in the models when trade volume is used as the indicator of openness. Furthermore, the sign of the significant coefficients are opposite.

In contrast to the results for the MENA countries, estimation results for the GDP are robust in this country group: Increase in domestic demand (GDP per capita) decreases the differences between price levels of emerging economies and of developed economies. However, effect of openness is not consistent with expectations. For two definitions of openness we obtained significant and positive coefficients in all model specifications.

Transition Economies

Estimation results for the transition economies are given in the Table 7 and 8. Coefficients of GDP per capita and openness are significant in all model specifications. Signs of these coefficients are same as the signs in the models for the emerging countries. Therefore, in spite of their entirely different historical pasts, these two groups of countries have similar domestic price patterns.

5. CONCLUSIONS

Convergence of price level in the countries considered is a controversial issue. Initial conditions (variations in initial income level) do not have any effect on the speed of price convergence in all estimations. On the other hand, estimation results for GDP, openness and tradable differ across country groups. The changes in the share of tradable in the MENA countries, the changes in the per capita GDP and openness in emerging and transition economies dominate the speed of price convergence. However, estimation results show that openness has an unexpected effect on price convergence.

Estimation results raise an unanswered question: what does make the MENA countries so different than the other countries? The results can be partly explained by the trade structure and composition of domestic production: “*The more diversified trade, the less susceptible the country is to random shocks affecting individual goods, so that shifts in the PPP ratio are lower.*” (Melvin and Bernstein, 1984) “*Price differences across countries are determined by trade barriers and by a country's specialization in production. Consumption goods are therefore more expensive in rich countries simply because rich countries face barriers in importing consumption goods from poor countries.*” (Hsieh, Chang-Tai and Peter J. Klenow, 2007).

Table-1: Large MENA group

Openness = X+M/GDP (1991-2009)

	Complete model	Model-1	Model-2	Model-3
CONS.		0.004 0.531	0.002 0.775	-0.007 0.164
GDP		-0.329 0.019	-0.303 0.022	
OPEN		-0.107 0.047		-0.098 0.070
TRADE				
INITIAL		0.000 0.415	0.000 0.639	0.000 0.885

Table-2: Large MENA group

Openness = M/(GDP+M-X) (1991-2009)

	Complete model	Model-1	Model-2	Model-3
CONS.		0.003 0.609	0.002 0.775	-0.008 0.111
GDP		-0.319 0.019	-0.303 0.022	
OPEN (import penetration)		-0.076 0.198		-0.067 0.265
TRADE				
INITIAL		0.000 0.501	0.000 0.639	0.000 0.997

insignificant

Table-3: Restricted MENA group

Openness = X+M/GDP (1991-2009)

	Complete model	Model-1	Model-2	Model-3	Model-4	Model-5
CONS.	0.009 0.292	0.008 0.325	-0.003 0.493	0.004 0.535	0.004 0.539	-0.003 0.282
GDP	-0.352 0.105	-0.339 0.115		-0.264 0.170	-0.263 0.170	
OPEN	-0.027 0.662		-0.020 0.742	-0.013 0.834		-0.017 0.773
TRADE	-0.429 0.000	-0.449 0.000	-0.399 0.000	-0.438 0.000	-0.447 0.000	-0.403 0.000
INITIAL	0.000 0.384	0.000 0.434	0.000 0.851			

	Model-6	Model-7	Model-8	Model-9	Model-10	Model-11
CONS.	0.006 0.441	0.001 0.903	-0.003 0.372	-0.002 0.762	0.004 0.539	-0.003 0.282
GDP	-0.286 0.176	-0.191 0.352		-0.143 0.432	-0.263 0.170	
OPEN	-0.124 0.037		-0.103 0.070	-0.100 0.076		-0.017 0.773
TRADE					-0.447 0.000	-0.403 0.000
INITIAL	0.000 0.185	0.000 0.459	0.000 0.412			

insignificant

Table-4: Restricted MENA group

Openness = $M/(GDP+M-X)$ (1991-2009)

	Complete model	Model-1	Model-2	Model-3	Model-4	Model-5
CONS.	0.008 0.316	0.008 0.325	-0.003 0.466	0.004 0.530	0.004 0.539	-0.003 0.289
GDP	-0.349 0.112	-0.339 0.115		-0.269 0.168	-0.263 0.170	
OPEN (import penetration)	-0.013 0.855		-0.007 0.917	-0.002 0.981		-0.005 0.934
TRADE	-0.444 0.000	-0.449 0.000	-0.412 0.000	-0.448 0.000	-0.447 0.000	-0.413 0.000
INITIAL	0.000 0.428	0.000 0.434	0.000 0.909			

	Model-6	Model-7	Model-8	Model-9	Model-10	Model-11
CONS.	0.004 0.576	0.001 0.903	-0.004 0.228	-0.002 0.702	0.004 0.539	-0.003 0.289
GDP	-0.253 0.218	-0.191 0.352		-0.134 0.444	-0.263 0.170	
OPEN (import penetration)	-0.099 0.143		-0.077 0.222	-0.079 0.223		-0.005 0.934
TRADE					-0.447 0.000	-0.413 0.000
INITIAL	0.000 0.266	0.000 0.459	0.000 0.526			

insignificant insignificant insignificant insignificant

Table-5: Emerging Countries
Openness = X+M/GDP (1988-2010)

	Complete model	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6	Model-7	Model-8	Model-9	Model-10
CONS.	0.017 0.326	0.024 0.222	-0.021 0.002	-0.006 0.427	0.006 0.465	-0.022 0.000	0.017 0.319	0.023 0.229	-0.022 0.002	-0.005 0.503	0.006 0.465
GDP	-0.387 0.000	-0.406 0.000		-0.359 0.000	-0.383 0.000		-0.394 0.000	-0.379 0.000		-0.366 0.000	-0.383 0.000
OPEN	0.497 0.000		0.484 0.000	0.495 0.000		0.484 0.000	0.479 0.000		0.460 0.000	0.479 0.000	
TRADE	-0.102 0.229	0.377 0.000	-0.136 0.117	-0.097 0.252	0.380 0.000	-0.135 0.117					0.380 0.000
INITIAL	0.000 0.130	0.000 0.319	0.000 0.927				0.000 0.144	0.000 0.263	0.000 0.913		

Table-6: Emerging Countries
Openness = M/GDP (1988-2010)

	Complete model	Model-2A	Model-3A	Model-5A	Model-6A	Model-8A	Model-9A
CONS.	0.034 0.121	-0.019 0.001	0.004 0.652	-0.017 0.000	0.034 0.119	-0.019 0.001	0.003 0.763
GDP	-0.538 0.000		-0.510 0.000		-0.529 0.000		-0.499 0.000
IMPORTS	0.326 0.000	0.286 0.000	0.324 0.000	0.287 0.000	0.341 0.000	0.297 0.000	0.339 0.000
TRADE	0.214 0.012	0.169 0.052	0.218 0.010	0.165 0.055			
INITIAL	0.000 0.131	0.000 0.726			0.000 0.111	0.000 0.939	

Table-7: Transition Economies
Openness = X+M/GDP (1993-2008)

	Complete model	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6	Model-7
CONSTANT	-0.018 0.020	-0.021 0.000	-0.019 0.009	-0.023 0.000	-0.032 0.000	-0.031 0.000	-0.018 0.013	-0.020 0.000
GDP	-0.162 0.002	-0.156 0.003	-0.146 0.004	-0.140 0.005			-0.167 0.001	-0.163 0.001
OPEN	0.057 0.014	0.055 0.015	0.055 0.016	0.054 0.018	0.058 0.010	0.058 0.009		
TRADE	0.063 0.354	0.064 0.351			0.008 0.896	0.007 0.906	0.055 0.418	0.056 0.415
INITIAL	0.000 0.570		0.000 0.565		0.000 0.883		0.000 0.727	

Table-8: Transition Economies
Openness = M/GDP (1993-2008)

	Complete model	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6	Model-7
CONSTANT	0.010 0.583	-0.007 0.461	0.010 0.577	-0.007 0.439	-0.035 0.000	-0.033 0.000	0.007 0.661	-0.006 0.490
GDP	-0.337 0.001	-0.302 0.001	-0.338 0.000	-0.303 0.000			-0.315 0.001	-0.283 0.001
IMPORTS	0.154 0.009	0.149 0.010	0.146 0.012	0.142 0.015	0.137 0.014	0.139 0.012		
TRADE	-0.100 0.467	-0.102 0.458			-0.125 0.252	-0.128 0.238	-0.046 0.731	-0.050 0.707
INITIAL	0.000 0.264		0.000 0.256		0.000 0.821		0.000 0.339	

x x x x

APPENDIX: Lists of Countries

	Large MENA group	Restricted MENA group	Emerging Countries	Transition Economies
1	Algeria	Algeria,	Angola	Albania
2	Bahrain	Egypt	Argentina	Armenia
3	Egypt	Jordan	Botswana	Azerbaijan
4	Jordan	Morocco	Brazil	Belarus
5	Lebanon	Saudi	Chile	Bulgaria
6	Morocco	Arabia	China	Croatia
7	Oman	Syria	Colombia	Czech Republic
8	Saudi Arabia	Tunisia	Costa	Estonia
9	Syria	Yemen	Rica	Georgia
10	Tunisia		Gabon	Hungary
11	Yemen		Malaysia	Latvia
12			Mexico	Lithuania
13			Namibia	Macedonia FYR
14			Panama	Moldova
15			Peru	Poland
16			South	Romania
17			Africa	Russian Federation
18			Thailand	Slovak Republic
19			Turkey	Slovenia
20			Uruguay.	Ukraine.

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