Have Remittances Affected Real Unit Labor Costs in the Transition Economies of Eastern Europe, the South Caucasus, and Central Asia?

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Abstract

Twelve of the 29 transition economies in Europe and Central Asia are high remittance recipients, with average remittance receipts equivalent to 5 percent or more of their gross domestic product in the 2010s. The paper examines the evolution, during the 2000s and 2010s, of real unit labor costs, denominated in local currency and U.S. dollars, of the transition economies. Local currency and U.S. dollar real unit labor costs rose much faster between 2003 and 2015–17 in the high remittance recipient economies than in the other transition economies, although there was considerable variance between the countries in the high remittance recipient group. Among the high remittance recipients, approximately half of the increase in real unit labor costs denominated in U.S. dollars can be attributed to increases in local currency real unit labor costs and half to appreciation of their real exchange rates. Fixed effects and cross-country econometric estimates suggest that remittances had a positive and significant impact on the changes in domestic currency real unit labor costs in the transition economies.

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1.   Introduction

High rates of labor emigration and inward flows of workers' remittances characterize many of the transition economies of Europe and Central Asia (ECA). Labor migration and remittances have potentially profound long-term macroeconomic effects in the remittance recipient economies, which in turn have implications for long-term growth and development strategies. Much of the literature on the macroeconomic effects of remittances has focused on their impact on the real exchange rate. Less attention has been paid to the potential impact of migration and remittances on another channel which affects external competitiveness, real unit labor costs, through the supply of, and demand for, labor in the remittance receiving economy.

Real unit labor cost, defined as the cost of labor, in real terms, required to produce a unit of output, is an important component of external competitiveness given that labor comprises a large share of production costs, especially in labor intensive industries and because labor is much less internationally mobile than either capital or intermediate inputs and hence there is greater variation between countries in labor costs than in the cost of other inputs. Appreciation of the real exchange rate will raise unit labor costs denominated in an international currency, *ceteris paribus*. But it is also possible that migration and remittances can exert upward pressure on the real unit labor costs denominated in domestic currency, through the domestic labor market, which would therefore intensify the rise in unit labor costs denominated in foreign currency. Hence the domestic labor market is a potential separate channel through which migration and remittances could adversely affect the international competitiveness of remittance recipient economies.

For some high remittance recipient transition economies, the rise in real unit labor costs, expressed in an international currency (which is the product of real exchange rate appreciation and the rise in real domestic currency unit labor costs) has been very steep and much greater than the real exchange rate appreciation alone. This suggests that the latter may not fully capture the extent to which high remittance recipient economies have lost external competitiveness, at least for their labor intensive traded goods industries. Given that labor intensive traded goods industries have been an engine of growth for many of the fastest growing emerging markets and developing economies (EMDEs), factors which affect the external competitiveness of such industries have potentially important implications for viable growth strategies (Rodrik, 2008).

This paper examines the empirical relationship between remittances and real unit labor costs using data from the transition economies of ECA. We show that real unit labor costs, measured in both local currency and US dollars, rose much more quickly on average among those transition economies which received high levels of remittances compared to other transition economies during the period 2003-17. Estimating panel data fixed effects and Generalized Least Squares (GLS) regressions on 28 transition economies and on a subsample of 11 high remittance recipient transition economies, the coefficient on remittances was positive and significant at the 1 percent confidence level. Although problems of reverse causality cannot be entirely discounted, the results suggest that remittances have a causal effect on real unit labor costs in the transition economies.

The rest of the paper is structured as follows: Section 2 reviews the literature on the impact of migration and remittances on the real exchange rate, labor markets and real wages. Section 3 discusses the concept of real unit labor costs and its relevance as an indicator of external price competitiveness. In section 4 we identify a group of high remittance recipient transition economies in ECA: these are economies with average remittances as a share of GDP of more than 5 percent. In section 5, we provide estimates of trends in their real unit labor costs, in both local currency and US dollars, along with trends in the two individual components of real unit labor costs in local currency; real wages and labor productivity. We present econometric analysis of the impact of remittances on real local currency unit labor costs in section 6. Section 7 offers some conclusions.

2.   How could migration and remittances affect real unit labor costs? A review of theoretical arguments and empirical evidence

A large literature has examined the impact of remittances on the real exchange rate of the remittance recipient economy, with most empirical studies finding that remittances appreciate the real exchange rate (e.g. Amuedo-Dorantes and Pozo, 2004; Lopez, Molina and Bussolo, 2007; Lartey et al, 2008; Gazi and Homes (2013), although Barajas et al (2011) argue that the impact of remittances depends critically on the structure of the economy. An appreciation of the real exchange rate will raise unit labor costs denominated in an international currency, *ceteris paribus*. But it is also possible that migration and remittances exert upward pressure on real unit labor costs denominated in domestic currency, through developments in the domestic labor market, which would therefore intensify the rise in unit labor costs denominated in foreign currency. Hence the domestic labor market is a potential separate channel through which migration and remittances could adversely affect the international competitiveness of remittance recipient economies.

Migration and remittances could affect the domestic labor market through several channels which impact the supply of, and demand for, labor. First, migration reduces the supply of labor directly because workers who migrate cannot simultaneously participate in the domestic labor force. Second, remittances may also affect labor market decisions of remittance receiving households. Because the income of these households rises, they may increase their demand for leisure as well as consumption, thereby raising their reservation wage at which they are willing to participate in the labor force and thus reduce labor market participation (Acosta et al, 2007). Clearly the extent to which a reduction in the size of the labor force exerts upward pressure on wages, for a given level of labor demand, will depend upon the degree of unemployment or underemployment.

Third, demand for labor from nontraded goods industries will unambiguously rise as a result of the increased demand for nontraded goods brought about by remittance income, but this will be offset to some degree by a contraction of traded goods production and thus demand for labor from this sector. However, some firms in traded goods industries, with investments in fixed capital and faced with the prospect of losing labor to nontraded goods industries which can pay higher wages, might prefer to raise wages for their own workers in order to retain them, which would push up wages in both nontraded and traded goods sectors.

A reduction in the supply of labor and/or an increase in labor demand will, *ceteris paribus*, raise real wages which will raise real unit labor costs, unless it is offset by a rise in labor productivity. It is possible that a smaller labor force in the traded goods sectors would raise labor productivity in these sectors, either because of an inverse relationship between labor inputs and its marginal

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product or because capital is substituted for labor. The pressure to increase productivity in the nontraded goods sectors is much weaker because firms in these sectors will be more able to pass on their higher costs to domestic customers than are firms in the traded goods sectors, hence real unit labor costs in the nontraded goods sectors are very likely to rise.

The most comprehensive investigation of the labor market effects of remittances is by Chami et al (2018). Using panel data from a large sample of countries, they estimate a series of regressions in which a labor market outcome is the dependent variable and remittances as a share of GDP is one of the independent variables. They find that remittances reduce unemployment and labor force participation, increase the prevalence of informal employment and depress wage growth but raise the labor share of income (which corresponds to raising real unit labor costs). The last two findings imply that remittances depress labor productivity growth. To explain this finding, they also show that remittances induce a shift of labor from traded goods industries (agriculture and manufacturing) to non-traded goods industries (services and construction), as would be expected in economies incurring Dutch disease effects, which they argue indicates a shift from higher to lower labor productivity activities.

Most of the rest of the empirical literature on the labor market effects of migration and remittances falls into two strands. In the first strand are mostly single country studies which use household survey data to examine the effects of remittances on the labor supply decisions of households. Several of these studies pertain to countries in ECA. Justino and Shemyakina (2012), using data from the 2003 Tajikistan Living Standards Survey, find that the receipt of remittance income by a household has a negative and significant effect on both male and female household members' participation in the labor force and also on the hours of work of household members who participate in the labor force. Similar effects have been found in other countries with high remittance receipts. Grigorian and Melkonyan (2011) find that households which receive remittances work fewer hours than households which do not in Armenia. Kalaj (2013) applies a propensity score matching procedure to Albanian household survey data to study whether the labor market decisions of households which receive remittances differ from those which do not. She finds that there are no statistically significant differences in the labor market decisions of males but that females in remittance recipient households work fewer hours than their counterparts in non-remittance recipient households.

Görlich et al (2007) look more closely at the reasons why households which receive remittances reduce participation in the labor market. Using labor force survey data from Moldova, they find that the receipt of remittances by households has a small but significant negative impact on labor force participation, but that this is associated with increased participation in higher education among younger workers and increased household production activities (e.g. childcare or subsistence farming) among middle age workers. Ivlevs (2016), using data from surveys in six transition economies in 2009, finds that remittances increase the likelihood that households will engage in informal labor employment: this effect pertains to both households which receive remittances and those which do not but which reside in areas where there is a high prevalence of remittance receiving households.

Outside ECA, Kim (2007) and Ndiaye et al (2016) find that remittances reduce labor market participation in Jamaica and Senegal respectively. Airola (2008) finds that hours worked by household heads in Mexico are negatively correlated with the receipt of remittance income and Amuedo-Dorantes and Pozo (2006) find that, in Mexico, remittances did not reduce the overall hours worked by men but that they were associated with a shift from formal to informal

employment, while women in rural areas reduced hours working in non-paid and informal employment.

The second strand of the literature investigates the impact of migration and remittances on wages and other labor market outcomes such as unemployment using a variety of methodologies. Mishra (2014) surveys the rather limited empirical literature on the impact of emigration on real wages in the source countries, which includes his own work on Mexico. This literature includes single country econometric estimates of the determinants of wages which use an estimate of the fall in the domestic labor force (or a specific section of the labor force) due to emigration as an independent variable in the regressions. All of the studies surveyed find that a reduction in the labor force as a result of emigration raises real wages for workers in the source country, by between 2 and 5.5 percent for a 10 percent supply shock to the labor force.

Acosta et al (2007) construct a two sector dynamic stochastic general equilibrium model of a small open economy and test it with data from El Salvador using a Bayesian Vector Autoregression analysis. An inflow of remittances induces both an increase in consumption and increased demand for leisure, and thus reduced labor supply which leads to increased production costs in the relatively labor intensive non-tradeable sector. Bayangos and Jansen (2011) construct a New Keynesian macroeconomic model of the Philippines and use it to simulate a sustained increase in remittances. They find that the increase in migration and remittances leads to a fall in the labor force and a rise in real wages. Although labor productivity increases, this is not by enough to offset the rise in real wages. Consequently, there is a significant increase in real unit labor costs. Bouton et al (2011) using household survey data, find that a supply shock to the labor force caused by emigration raises wages in Moldova.

What can we conclude from this survey of the literature? Remittance receiving households appear to reduce labor market participation and/or the number of hours worked in formal employment, which together with the direct loss of the labor force to emigration reduces the labor supply to the domestic economy. The limited number of studies which examined the impact of remittances on real wages found that this is positive, with the exception of Chami et al (2018). To our knowledge, only Bayangos and Jansen (2011) and Chami et al (2018) have examined the impact of remittances on real unit labor costs, which was found to be positive in both papers, although whereas the former found that remittances raised both real wages and labor productivity, the latter found the opposite effect.

3.   The relevance of the concept of real unit labor costs as an indicator of external price competitiveness

Unit labor costs (ULC) are an important metric of the external competitiveness of traded goods largely because labor accounts for a large share of production costs and because labor is mostly not mobile across countries, whereas other factors of production, such as capital, and most intermediate inputs, are internationally mobile. Consequently, there is more scope for variation in labor costs, relative to labor productivity, across countries, than in capital costs or the costs of intermediate goods. In a Ricardian model of trade, relative unit labor costs are the key relative price which determines comparative advantage (Golub et al, 2017). As a result, unit labor costs are also a potentially important determinant of the location of foreign direct investment in traded goods production.

In principle, the international competitiveness of an economy depends on the prices and qualities of its traded goods, rather than its nontraded goods. For many EMDEs, ULCs can only be computed at the aggregate economy level, and not the sectoral level, because the requisite sectoral data are not available. One drawback of aggregate economy ULCs is that they may not accurately measure ULCs in the traded goods sector if these differ from ULCs in the nontraded sector. The Balassa Samuelson theory states that, over time, productivity rises faster in traded goods industries than in nontraded goods industries, whereas within countries, labor mobility will equalize wage rates between traded and nontraded goods industries (Balassa, 1964). Consequently, in an economy with rising labor productivity, a rise in ULCs at the aggregate economy level over time would overstate the rise in ULCs in that economy's traded goods industries. Landesmannn and Hanzl-Weiss (2013) show that there were substantial differences in the adjustment of unit labor costs between the aggregate economy and those of the manufacturing sector in many of the EU economies following the global financial crisis: in many, but not all, economies the fall in manufacturing ULCs was much greater than that of ULCs for the aggregate economy. However, the distinction between traded goods and nontraded goods may be becoming less relevant, because nontraded goods are usually required as inputs for traded goods and because many types of services which had previously been regarded as non-tradeable have become tradeable or are potentially tradeable (Ark et al, 2005).

$$ULC = \frac{W}{(Y/n)} \tag{1}$$

$$RULC = \frac{(W/P)}{(Y/n)} \tag{2}$$

$$RULC(FC) = \frac{((W/e)/P^f)}{(Y/n)} \tag{3}$$

$$RER = \frac{(P/P^f)}{e} \tag{4}$$

$$\frac{RULC(FC)}{RER} = \frac{(W/P)}{(Y/n)} \tag{5}$$

In equations (1)-(5) ULC and $RULC$ denote nominal and real unit labor costs respectively, $RULC(FC)$ denotes real unit labor costs in terms of a foreign currency (e.g. the euro or the US dollar), W denotes labor costs per worker, P denotes the domestic price level, Y denotes real output, n denotes the number of workers, e denotes the exchange rate in terms of units of domestic currency per unit of the applicable foreign currency, P^f denotes the applicable foreign price level and RER denotes the real exchange rate.

Unit labor costs comprise the average cost of employing one worker divided by average output per worker. This can be expressed in domestic currency in nominal terms, as in equation (1). above, or, more usefully if time series data are involved, in real terms by deflating with an appropriate price index, such as the GDP deflator, as in equation (2). Unit labor costs can also be expressed in a foreign currency, by converting nominal labor costs in local currency into a foreign currency using the prevailing market exchange rate for the applicable period. Real unit labor costs in a foreign currency can be derived by deflating this with the applicable price deflator (e.g. the GDP deflator of the country in whose currency the real unit labor costs are expressed), as in equation (3).

From the perspective of international competitiveness, real unit labor costs in a relevant foreign currency is the most useful indicator. As can be seen from equations (4) and (5), this indicator comprises two components: a real unit labor cost in domestic currency and a real exchange rate $\frac{\left(P/_{Pf}\right)}{e}$. Hence a rise (fall) in real unit labor costs denominated in a foreign currency can be brought about by a rise (fall) in real unit labor costs in domestic currency and/or an appreciation (depreciation) of the real exchange rate.

Unit labor costs have been used in three principal ways. First, as an input into real effective exchange rate (REER) indices, where they are an alternative to price indices such as the consumer price index (CPI) (see Turner and Golub, 1997; Lewney et al, 2012)). The latter are much more commonly used to compute the REER in part because CPI data are more readily available and more up to date than ULC data. Second, to compare levels of ULC across countries (usually countries which are competitors on international markets) at a point in time (see Ark, et al 2005; Golub et al 2017). Third, to track the evolution of unit labor costs in a specific country or countries across time, which usually involves converting the RULC data into indices (see Havlik, 2005; Landesmann and Hanzl-Weiss, 2013; Ordóñez et al, 2015).

The second use (sometimes referred to as relative unit labor costs) is potentially problematic for several reasons. In particular, the data on labor costs may not be fully consistent across all countries, especially in EMDEs. For example, wage data may be derived from surveys (such as establishment surveys) which comprise only part of the employed workforce and the scale of coverage may vary between countries. In EMDEs with a substantial informal sector, the coverage of wage data is likely to be less than comprehensive in terms of its share of the total employed workforce. Also, if wage data are used to compute ULCs, nonwage labor costs will be omitted (often this is unavoidable as the nonwage data are not available). If nonwage labor costs differ across countries (e.g. because of differences in the applicable rates for employers' contributions to social security funds) direct comparisons of ULCs across countries could be misleading. Finally, ULCs are affected by the capital intensity of production, because the greater is the contribution of capital to output, the larger must be the share of returns to capital in income, ceteris paribus. Therefore, a more capital intensive economy would be expected to have lower unit labor costs than a less capital intensive one, but that does not mean that the former is more competitive than the latter, as competitiveness depends on the total costs of production and not just labor costs (Peters, 2010).

Although these issues could also distort time series measures of ULCs in a single country, they are likely to be less problematic for this use than for cross country comparisons. If care is taken with data sources, it should be possible to obtain time series data which are reasonably consistent over time. Changes in nonwage labor costs are a potential problem, but in most countries they probably do not change dramatically over time. While capital output ratios are not constant, they generally only change slowly over time. Since the question we are trying to answer is whether competitiveness is impacted by remittance levels, we are more concerned with the trends in real unit labor costs over time within countries rather than specific comparisons of real unit labor costs between countries at a point in time.

4.   Remittance Receipts in Transition Economies

Table 1 shows receipts of personal remittances as a percentage of GDP for all the transition economies of ECA. We have categorized economies which receive annual remittances greater than 5 percent of GDP as high remittance recipient economies. Of the 29 transition economies in table 1, 12 fall into this category. All except one – Ukraine – received remittances greater than 5 percent of GDP on average in both the first and second decades of the 21st century. For this group of 12 economies, the median value of remittances as a share of GDP in the 2000s and 2010s was around 12 percent.

There are, however, three outliers with very high receipts of remittances. In the 2010s, Tajikistan, Kyrgyz Republic and Moldova received remittances averaging 35 percent, 29 percent and 21 percent of their GDP respectively. Trends over time varied between countries. The Kyrgyz Republic and Tajikistan became more dependent on remittances in the 2010s than in the previous decade whereas Albania, Moldova and especially Bosnia and Herzegovina became less so. Remittance receipts are far less important as a share of their GDP in the other 17 transition economies. The median for the four fuel exporters was 0.3 percent of GDP in the 2010s and that for all of the other transition economies was 2.1 percent of GDP.

The high remittance recipients are mainly located, with two exceptions (Moldova and Ukraine), in the Balkans, Central Asia and the South Caucasus. They are also much poorer than the other transition economies, with a median per capita PPP GDP in 2018 of under $11,000, which is only half that of the fuel exporters and little more than one-third that of the other transition economies. All of the 12 countries in the high remittance recipient group have a lower per capita PPP GDP than every other transition economy with only one exception; Turkmenistan is slightly poorer than Moldova. Furthermore, the two highest remittance recipient economies, Tajikistan and the Kyrgyz Republic, are the poorest countries in this group by a considerable margin, with per capital PPP GDP less than half that of the next poorest country.

The lower GDP of the high remittance recipient economies only partly explains why their remittances/GDP ratios are so much higher than those of the other transition countries. The former also have much higher remittances per head of population than the latter. In 2018, the median value of personnel remittance receipts per head of population in the 12 high remittance recipients was $350, compared to $113 for the 13 other (non-fuel exporting) transition economies.

Table 1: GDP per capita (USD) and Personal Remittance Receipts as share of GDP2000-09 and 2010-18 averages

	GDP PPP per capita 2018	2000-09 average	2010-18 average
High remittance recipients			
Albania	13,364	15.8	11.1
Armenia	10,343	15.2	16.0
Bosnia and Herzegovina	14,624	19.6	10.9
Georgia	12,005	7.6	10.6
Kosovo	11,348	18.9	15.2
Kyrgyz Republic	3,885	10.7	29.5
Moldova	7,272	25.6	20.6
Montenegro	20,690	6.4	11.3
Serbia	17,435	8.6	8.4
Tajikistan	3,450	25.4	35.2
Ukraine	9,249	3.1	7.4
Uzbekistan	8,556	7.3	8.7
median	10,846	13.0	11.2
Fuel exporters			
Azerbaijan	18,044	2.8	2.5
Kazakhstan	27,880	0.2	0.2
Russian Federation	27,588	0.3	0.4
Turkmenistan	19,304	0.2	0.1
Median	23,446	0.3	0.3
Other transition economies			
Belarus	19,995	0.8	1.7
North Macedonia	16,359	3.4	3.4
Bulgaria	21,960	4.9	3.0
Croatia	27,580	3.5	3.9
Czech Republic	39,744	0.7	1.1
Estonia	35,974	1.2	2.0
Hungary	31,103	0.7	2.6
Latvia	30,305	2.8	4.8
Lithuania	35,461	2.1	3.7
Poland	31,337	1.6	1.4
Romania	28,206	0.5	2.0
Slovak Republic	33,736	1.2	2.1
Slovenia	38,049	0.8	0.8
Median	31,103	1.2	2.1

Source: World Development Indicators

Note: Annual data on remittance receipts begins for Kosovo in 2004, Montenegro and Serbia in 2007, Tajikistan in 2002, Turkmenistan and Uzbekistan in 2006.

5.   Real Unit Labor Costs

This section examines trends in real unit labor costs (RULCs) over the last two decades. Our focus is on the trends in each country over time, rather than making direct comparisons of unit labor costs between countries, which is fraught with difficulties as discussed in section 3. We construct indices of RULCs denominated in both local currencies and US dollars, using the data sources and methodology described below.

 Average monthly wage data for the aggregate economy is used as a proxy for labor costs. Ideally, we should use data covering all labor costs, including the nonwage costs borne by employers, but this is not available for all transition economies, including most of those which are of particular interest in this study. The monthly wage data are obtained from the database of the United Nations Economic Commission for Europe (UNECE), available on its website. Where data are missing from this database, we have used data from the ILO and the World Bank's Jobs Gateway for Southeastern Europe. One of the difficulties with published wage data is that different sources are not always consistent, because they are compiled from different surveys (e.g. labor force surveys and establishment surveys). Therefore, when supplementing UNECE data with data from other sources, we have only used the latter when it is clear that the applicable data series are consistent; i.e. when overlapping data points have identical entries. For most of the transition economies, we have annual data on average monthly wages from 2000 to 2017, but a few countries (Montenegro, Turkmenistan and Uzbekistan) data for some years are missing.[1] To generate a series on real wages, we deflate the average monthly wage data with the applicable GDP deflator. For each country we generate an index of real wages in local currency.

To estimate labor productivity, we divide GDP in constant price local currency by the number of persons employed, using the data in the WDI, and convert this into an index for each country.[2] This By dividing the index of real monthly wages by the index of labor productivity, the index of RULCs in local currency is obtained. To generate the index of RULCs in US dollars we convert the nominal monthly wage series in local currency into US dollars using the average annual market exchange rates in the WDI and then deflate teach time series with the US GDP deflator. We have set the indices for each country at 100 in 2003 because that is the earliest year for which we have the requisite wage data for all the countries.

Tables 2a, 2b and 2c show the RULCs for the three groups of transition economies identified in table 1, in both local currency (LC) and US dollars. We compare averages over five periods: 2000-04, 2005-08, 2009-11, 2012-14 and 2015-17. The final three-year period covers the period after the global oil price collapse which had a major impact on real exchange rates in many of the transition economies. The main issue that we address is how RULCs have evolved since the first half of the 2000s.

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[1] A real unit labor cost series could not be estimated for Kosovo because there are no data on wages before 2012.
[2] Labor production is usually defined as real value added per unit of labor. We follow the practice in much of the literature, where labor productivity is measured as GDP (or one of its sectoral components) divided by the total number of persons employed (e.g. Turner and Golub, 1997; Felipe and Kumar, 2011). In some countries, such as the United States, more sophisticated estimates of labor productivity are available which incorporate the number of hours worked but data on hours worked are not available for most of the countries covered in this study.

Table 2a: Trends in Real Unit Labor Costs in Local Currency and US Dollars: 2003 = 100, High Remittance Recipient Transition Economies

	2000-04	2005-08	2009-11	2012-14	2015-17
Albania LC	98	98	105	104	119
USD	91	131	136	124	121
Armenia LC	100	112	134	157	159
USD	103	185	244	278	244
Bosnia and herzegovina LC	96	91	106	102	93
USD	88	114	143	128	99
Georgia LC	97	140	168	165	166
USD	100	220	296	313	249
Kyrgyz Republic LC	93	135	160	165	161
USD	88	190	269	318	256
Moldova LC	94	114	101	85	88
USD	92	173	215	205	170
Montenegro LC	101	120	148	153	145
USD	108	170	238	230	193
Serbia LC	89	104	94	94	98
USD	73	130	121	113	98
Tajikistan LC	98	152	194	245	277
USD	94	232	367	519	410
Ukraine LC	92	109	117	122	118
USD	89	195	222	253	162
Uzbekistan LC	98	na	228	239	279
USD	107	na	543	607	612
Mean LC	96	118	141	148	155
Median LC	97	113	134	153	145
Mean USD	94	174	254	281	238
Median USD	92	179	238	253	193

Sources: UNECE, ILO and SEE jobs Gateway for wages, WDI for real GDP, persons employed, GDP deflators

Table 2b: Trends in Real Unit Labor Costs in Local Currency and US Dollars:2003 = 100, Fuel Exporting Transition Economies

	2000-04	2005-08	2009-11	2012-14	2015-17
Azerbaijan LC	94	83	89	90	105
USD	95	133	188	227	150
Kazakhstan LC	102	87	82	75	72
USD	99	168	204	220	140
Russian Federation LC	90	102	111	103	106
USD	86	192	250	279	179
Turkmenistan LC	64	56	47	42	49
USD	48	67	42	42	36
Mean LC	87	82	82	78	83
Median LC	92	85	86	83	88
Mean USD	82	140	171	192	126
Median USD	91	151	196	223	145

Sources: UNECE, ILO and SEE jobs Gateway for wages, WDI for real GDP, persons employed, GDP deflators

Table 2c   Trends in Real Unit Labor Costs in Local Currency and US Dollars:2003 = 100, Other High Transition Economies

	2000-04	2005-08	2009-11	2012-14	2015-17
Belarus LC	100	108	106	115	121
USD	92	164	164	199	151
Bulgaria LC	101	101	120	127	142
USD	91	138	188	190	183
Croatia LC	105	98	101	94	90
USD	94	123	134	114	91
Czech Republic LC	97	97	100	102	102
USD	86	127	143	132	110
Estonia LC	100	101	105	104	114
USD	89	138	160	161	154
Hungary LC	97	100	100	102	98
USD	85	122	122	113	93
Latvia LC	101	97	108	102	112
USD	90	155	181	169	158
Lithuania LC	101	95	96	88	97
USD	94	125	136	122	115
North Macedonia LC	101	95	108	103	99
USD	92	112	135	124	106
Poland LC	101	91	90	87	87
USD	99	126	122	111	91
Romania LC	107	91	96	93	98
USD	96	160	179	166	153
Slovak Republic LC	99	99	104	103	109
USD	88	118	122	112	97
Slovenia LC	104	105	109	105	102
USD	90	122	133	119	97
Mean LC	101	98	103	102	106
Median LC	101	98	104	102	102
Mean USD	91	133	148	141	123
Median USD	91	126	136	124	110

Sources: UNECE, ILO and SEE jobs Gateway for wages, WDI for real GDP, persons employed, GDP deflators

The 11 high remittance recipient economies in table 2a display considerable variance in the evolution of their local currency RULCs. Two countries – Bosnia and Herzegovina and Moldova – registered small falls in RULCs in local currency between 2003 and 2015-17 while that of Serbia was practically unchanged. Albania, Montenegro and Ukraine registered rises of 18-45 percent in this period. For the remaining five countries, RULCs in local currency rose very strongly; by around 60 percent between 20003 and 2015-17 for Armenia, Georgia and Kyrgyz Republic and close to threefold for Tajikistan and Uzbekistan.

Eight of the 11 high remittance recipient economies registered much larger rises in RULCs in US dollars than in local currency, (the exceptions were Albania, Bosnia and Herzegovina and Serbia): this was because a real appreciation of the US dollar bilateral exchange rate exacerbated the impact of the increase in RULCs in local currency, or offset the decline in the latter in the case of Moldova. For these eight countries the increase in RULCs in US dollars between 2003 and 2015-17 was at least 60 percent and for five of them the increase was more than 100 percent. Across the 11 countries in table 2a, the mean increase between 2003 and 2015-17 in local currency and US dollar RULCs was 55 percent and 138 percent respectively, while median increases were 45 and 93 percent.

Almost 40 percent of the mean increase, across all 11 high remittance recipient countries, of 138 percent in RULCs in US dollars between 2003 and 2015-17 can be attributed to the change in local currency RULCs with the remaining 60 percent attributed to the effects of real exchange rate appreciation. The contributions of these two factors to the median increase of 93 percent in real unit labor costs in US dollars were almost equal.

The trends in the four fuel exporting transition economies were also heterogenous with two countries registering rises and two declines in local currency RULCs between 2003 and 2015-17. However, with the exception of Turkmenistan, these economies recorded quite strong rises in their US dollar RULCs, which peaked in the 2012-14 period and then subsequently declined. These trends were mainly driven by the impact of global oil prices on the real exchange rates of these countries.

The movements in RULCs of the 13 other transition economies shown in table 2c displayed much less variance than those of the high remittance recipient economies. Only Bulgaria registered a relatively strong increase of above 40 percent between 2003 and 2015-17 and six countries registered declines, albeit mostly very small. The mean and median increases between 2003 and 2015-17 were only 6 and 2 percent, respectively. There were stronger increases in US dollar RULCs with mean and median rises of 23 and 10 percent, respectively, for this group of economies, but these were much lower than the corresponding changes for the other two groups of economies.

Returning to the high remittance recipient economies, the variance in the evolution of RULCs between the countries in this group might be explained by differences in the trends of remittances as a share of GDP over time. The two counties which registered falls in local currency RULCs between 2003 and 2015-17 – Bosnia and Herzegovina and Moldova – both recorded lower remittances as a share of GDP in 2015-17 than in 2000-04, and in the former, there was a steep fall in remittances as a share of GDP between the end of the 1990s and 2015-17. In contrast, in four of the five countries which registered increases in RULCs of 60 percent

or more between 2003 and 2015-17, there was an increase in remittances as a share of GDP during this period, albeit not a very large increase in the cases of Armenia (there are no remittance data for Uzbekistan before 2007).

RULCs comprise real wages divided by labor productivity; hence, to help understand their evolution, tables 3 and 4 present data on real wages and labor productivity for the same periods covered in table 2: these are also indices with 2003 set at 100. Almost all of the high remittance recipient economies experienced very strong real wage growth from 2003 to 2015-17 (the exception was Bosnia and Herzegovina). The mean cumulative real wage growth for this group of economies over the 2003 to 2015-17 period was almost 140 percent (equivalent to an average of 6.9 percent per annum).

There was however substantial variance in real wage growth among this group of countries, with Georgia and Tajikistan achieving double digit annual average real wage growth, and Armenia and Uzbekistan close to double digit growth, while that of most of the Balkan countries plus Moldova and Ukraine was much lower (around three percent per annum). Cumulative real wage growth during 2003 to 2015-17 averaged 58 percent for the four fuel exporters and 47 percent for the other transition economies. Hence cumulative real wage growth for the high remittance recipient economies on average as a group was more than double that of the other two groups of economies.

Trends in labor productivity (table 4) are characterized by much less variance both within the three groups of economies and across all of the transition economies together. Mean cumulative labor productivity growth for the high remittance recipient economies between 2003 and 2015-17 was 55 percent which was lower than the mean of 97 percent achieved by the oil exporters but slightly higher than the mean of 47 percent recorded by the other transition economies. Among the 13 other transition economies, mean real wage growth over the 2003 to 2015-17 period was only slightly higher than mean labor productivity growth and within this group of countries real wage growth and labor productivity growth are strongly correlated. In contrast, among the high remittance recipient economies, mean real wage growth was approximately double that of labor productivity and the correlation between the two variables across the countries within this group was much weaker.

The main reason for the substantial differences in the changes in local currency RULCs between the high remittance recipient economies and the other transition economies lies in the differences in real wage growth between the two groups of countries. While labor productivity growth rates were broadly similar across both groups, real wage growth was much faster among the high remittance recipient economies than among the other transition economies, and real wage growth was especially fast among a sub-group of the high remittance recipients in the South Caucasus and Central Asia.

Table 3   Trends in Real Wages: 2003 = 100

	2000-04	2005-08	2009-11	2012-14	2015-17
High Remittance Receipients					
Albania	92	124	153	162	191
Armenia	90	167	212	269	312
Bosnia and Herzegovina	92	110	130	132	129
Georgia	91	200	283	321	346
Kyrgyz Republic	91	142	190	216	234
Moldova	89	146	153	148	164
Montenegro	103	130	162	164	156
Serbia	86	143	149	156	154
Tajikistan	92	174	246	361	470
Ukraine	87	139	145	159	142
Uzbekistan	97	na	290	311	333
Mean	92	148	192	218	239
Median	91	143	162	164	191
Fuel Exporters					
Azerbaijan	89	149	209	215	243
Kazakhstan	95	111	115	120	123
Russian Federation	86	125	143	144	149
Turkmenistan	64	69	75	87	118
Mean	84	113	135	141	158
Median	88	118	129	132	136
Other Transition Economies					
Belarus	97	145	169	199	202
Bulgaria	96	115	152	174	203
Croatia	100	107	108	107	105
Czech Republic	95	115	122	125	132
Estonia	95	120	125	131	148
Hungary	95	113	113	112	109
Latvia	95	123	144	146	170
Lithuania	96	126	136	137	159
North Macedonia	98	107	124	117	115
Poland	97	98	106	110	117
Romania	98	122	140	145	173
Slovak Republic	97	120	139	146	160
Slovenia	99	114	121	121	124
Mean	97	117	131	136	147
Median	97	115	125	131	148

Sources: UNECE, ILO and SEE jobs Gateway for wages, WDI for GDP deflators

Table 4   Trends in Labor Productivity: 2000-03 = 100

	2000-04	2005-08	2009-11	2012-14	2015-17
High Remittance Receipients					
Albania	94	125	146	156	160
Armenia	89	150	158	172	195
Bosnia and Herzegovina	95	122	123	130	139
Georgia	94	141	168	194	208
Kyrgyz Republic	98	105	119	131	146
Moldova	94	128	153	173	186
Montenegro	100	108	109	107	108
Serbia	95	138	159	167	158
Tajikistan	94	114	126	147	169
Ukraine	94	127	125	130	120
Uzbekistan	98	127	125	130	120
Mean	95	126	137	149	155
Median	94	127	126	147	158
Fuel Exporters					
Azerbaijan	94	183	235	238	231
Kazakhstan	93	128	141	161	172
Russian Federation	95	122	129	139	140
Turkmenistan	101	126	159	206	245
Mean	96	140	166	186	197
Median	94	127	150	183	202
Other Transition Economies					
Belarus	97	134	159	173	167
Bulgaria	96	114	127	137	143
Croatia	95	109	108	114	116
Czech Republic	98	118	122	123	130
Estonia	95	119	119	126	130
Hungary	97	113	113	111	111
Latvia	94	126	133	143	151
Lithuania	95	132	142	156	163
North Macedonia	97	113	114	114	116
Poland	97	108	118	126	134
Romania	93	135	146	155	177
Slovak Republic	98	121	134	142	147
Slovenia	95	109	111	115	121
Mean	96	119	127	133	139
Median	96	118	122	126	134

Source: WDI

6.   Did remittances cause the increase in real unit labor costs?

Can the rise in domestic currency real unit labor costs that characterized many of the high remittance recipient economies since the early 2000s be attributed to the remittances themselves? Although there are theoretical reasons for suspecting that high remittance receipts were a causal factor, as discussed in section 2, there are also other possible causes; for example, a fall in the capital intensity of production. To evaluate the influence of remittance receipts on the evolution of domestic currency real unit labor costs, we estimate panel data regressions using data from the countries in table 2. The regression equation that we estimate is as follows.

$$\log (\text{RULC(LC)})_{it} = \beta_1 \text{RMT}_{it} + \beta_2 \text{KY}_{it} + \beta_3 \text{ODA}_{it} + \varepsilon_{it} \qquad (6)$$

The dependent variable is the log of local currency real unit labor costs for each country in each year while the regressors are remittances as a share of GDP, the capital output ratio and net receipts of official development assistance (ODA) as a share of GDP. The subscripts i and t denote the country and year, respectively. The expected sign of the coefficient on remittances is positive and that on the capital output ratio is negative, for the reasons discussed in sections 2 and 3. The theoretical impact of aid is most likely to be positive. Aid inflows could have positive effects on aggregate demand and therefore potentially also on labor demand, although that depends upon what sectors benefit the most from the increased aggregate demand. It is difficult to envisage other variables which would have a systematic effect on RULC, as this would require that the variable has a systematic effect on real wages which is different to that of its effect on labor productivity. There are many variables which would affect labor productivity, such as improvements in human capital, but these variables would also tend to have similar effects on real wages leaving RULC unchanged.

The data are annual observations. For most of the 28 countries in the sample, the data cover the period 2000 to 2017. However, for five of the countries, the time period is shorter because of missing observations, mostly on remittances in some of the years in the first half of the 2000s. The real unit labor cost data are the same as those used in table 2. The capital output data are taken from the Penn World Tables. The ODA data are taken from the WDI. However, for more than a third of the transition economies, there are no entries for ODA in the WDI, presumably because they did not receive any aid as they were not eligible given their income per capita. For these countries we have entered a zero for the relevant observation.

We use two methods of econometric estimation. First, we estimate a country fixed effects regression using OLS, which includes 27 dummy variables for the countries. The fixed effects regression controls for unobserved differences between countries which are constant over time (time invariant country specific characteristics). Second, we run generalized least squares (GLS) regressions which is a more efficient estimator than OLS when the regression errors are heteroscedastic.

A potential problem for these regressions is endogeneity and in particular the potential reverse causality from the dependent variable to the regressors. It is unlikely that there is contemporaneous causality running from RULC to the capital output ratio. The latter changes only slowly over time as a result of investment decisions taken, for the most part, several years in the past and of the depreciation of the existing capital stock. As such it is unlikely that the

capital output ratio is influenced by the contemporaneous RULC. Decisions about ODA inflows are influenced by a variety of economic and political factors and it is not clear why the RULC of the aid recipient should feature among these factors. However, there are channels through which RULC might affect remittances. For example, an increase in RULC, if caused by a rise in real wages, could make working in the domestic economy more attractive and therefore discourage emigration, thereby lowering remittances. On the other hand, if there is friction in labor markets, an increase in RULC might reduce labor demand by firms, thereby increasing unemployment which might encourage more emigration and thereby raise remittances. The ideal way to tackle the potential endogeneity of regressors is by using instrumental variables, although it is difficult to find good instruments for remittances. We estimated the regression equation above using both the Arellano-Bond and Blundell-Bond GMM estimators which use lagged values of the regressors as instruments, but neither performed well and most of the regression coefficients were insignificant, with the exception of that on the lagged dependent variable.

We estimated fixed effects and GLS regressions with both the full sample of 28 transition economies and with a sub-sample of the 11 high remittance recipients in table 2a. The results are displayed in table 5.

Table 5   **Results of Fixed Effects and GLS Regressions of Real Unit Labor Costs**

	Fixed effects OLS		Generalised Least Squares	
	Full sample	High Remittance Recipients	Full sample	High Remittance Recipients
Regressors				
Remittances/GDP	1.5051*** (0.1744)	1.5675*** (0.2082	0.9067*** (0.0329)	1.41498*** (0.0441)
Capital/Output	-2.1641** (0.6914)	-2.3041** (0.8534)	1.6021*** (0.1987)	-4.0456*** (0.2475)
ODA/GDP	-1.6180*** (0.4167)	-1.5232** (0.4892)	-0.8350*** (0.0569)	-1.5925*** (0.0655)
Adjusted R^2	0.9992	0.9989		
Multiple R^2			0.66795	0.73781

Note: The fixed effects regressions include country dummy variables.

In the fixed effects regression on the full sample, the estimated coefficients on both remittances and the capital output ratio have the expected positive and negative signs, respectively and are significant at the one percent confidence level. The coefficient on ODA is also significant but is negative. The coefficients on all the country dummy variables (not shown in the table) are significant which explains the very high adjusted R^2 for the regression. We also estimated a "within" fixed effects regression (which uses the differences from the mean to control for country fixed effects), which produced similar coefficients for remittances, the capital output ratio and ODA but had a much lower adjusted R^2 (0.3) on account of the lack of country

dummies. In the GLS regression on the full sample, the coefficients on remittances and ODA have the same sign and level of significance as in the fixed effect regression, but both coefficients are smaller, while the coefficient on the capital output ratio is positive.

In both the fixed effects regressions and the GLS regressions on the sub sample of 11 high remittance recipients the coefficient on remittances is positive and significant at the 1 percent confidence level. The coefficients on the capital output ratio and ODA are negative and significant in both regressions.

To summarize, remittances have a positive and significant effect on RULC in all of the regressions, which is in accord with the theory discussed in section 2. The negative coefficient on ODA is difficult to explain, but may reflect the fact that this variable is positively correlated with the capital output ratio: to the extent that ODA finances fixed investment it raises the capital output ratio.

6.1 Diagnostic Tests

Test of poolability

We test the hypothesis that the same coefficients apply to each country in the sample. The test for poolability is a standard F test based on the comparison of a model obtained for the full sample and a model obtained from an equation for each country. The results show that all the coefficients are not equal.

```
                F statistic

data:  lrulc ~ remit + cap + aidgdp
F = 15.366, df1 = 81, df2 = 380, p-value < 2.2e-16
alternative hypothesis: unstability
```

Test for individual effects

To test for the presence of individual effects, we apply the Lagrange multiplier test of individual effects on the results from the pooling model. The results suggest the existence of individual effects.

```
        Lagrange Multiplier Test - two-ways effects (Gourieroux, Holly and
        Monfort) for unbalanced panels

data:  lrulc ~ remit + cap + aidgdp
chibarsq = 1157.3, df0 = 0.00, df1 = 1.00, df2 = 2.00, w0 = 0.25, w1 =
0.50, w2 = 0.25, p-value < 2.2e-16
alternative hypothesis: significant effects
```

Hausman test

We conduct the Hausman test (see Hausman 1978), which is based on the comparison of two sets of estimates of the fixed and the random effects models.

```
Hausman Test

data:  lrulc ~ remit + cap + aidgdp
chisq = 0.63881, df = 3, p-value = 0.8875
alternative hypothesis: one model is inconsistent
```

7.   Conclusion

Among the 29 transition economies in Eastern ECA, 12 can be considered as high remittance recipients based on the criterion that their annual remittance to GDP ratio exceeded 5 percent on average during the 2010s. These 12 economies are the poorest (with one exception) of all the transition economies in the region in terms of their PPP GDP per capita.

The potential negative impact of remittances on the external competitiveness of remittance receiving economies, through an appreciation of their real exchange rates, has attracted substantial research. However, there is a second possible channel through which remittances might affect external competitiveness which to date has attracted much less attention: this is the impact of migration and remittances on real unit labor costs. There is some empirical evidence from around the world to indicate that migration and the receipt of remittances have negative effects on labor supply in the migrant sending/remittance recipient economies, while the boost to national income which remittances provide could raise demand for nontraded goods and thereby demand for labor, with a consequent rise in real wages and, unless offset by higher labor productivity, a rise in unit labor costs.

In this paper we calculate indices of real unit labor costs, denominated in both local currency and US dollars, for the transition economies of ECA. The high remittance recipient economies experienced much stronger increases in their real unit labor costs during the first two decades of this century than did the other transition economies. Between 2003 and 2015-17, the mean and median increase in real unit labor costs in local currency for the high remittance recipient economies were 55 and 45 percent, respectively, compared to means and medians of negative 17 and negative 12 percent for the four fuel exporting transition economies and of 6 and 2 percent for the 13 other transition economies over the same period. However, within the group of high remittance economies there was a great deal of variation with the countries of the South Caucasus and Central Asia registering very strong rises in real unit labor costs, of 60 percent or more, while most of those in Eastern Europe and the Balkans recorded only modest increases or, in three countries, small declines.

Almost all of the difference between the high remittance recipient economies and the other two groups of transition economies in regard to the changes in real unit labor costs in local currency is attributable to differences in the evolution of real wages rather than in labor productivity. The mean increase in real wages between 2003 and 2015-17 among the high remittance recipient economies was 139 percent, compared to 58 percent for the fuel exporters and 47 percent for the other transition economies.

Real unit labor cost in foreign currency is a major, although not the only, contributor to the external price competitiveness of an economy. This is the product of unit labor costs in domestic currency and the real exchange rate. Real unit labor costs denominated in US dollars rose by a mean of 138 percent and a median of 93 percent in the high remittance recipient economies between 2003 and 2015-17. On average across this group of economies, approximately half of the increase in real unit labor costs denominated in US dollars can be attributed to the

appreciation of the bilateral US dollar real exchange rate and half to the rise in local currency real unit labor costs.

We estimated panel data fixed effects and GLS regressions for the local currency real unit labor costs in which the independent variables were remittances as a share of GDP, the capital output ratio, and net ODA receipts as a share of GDP. The regressions were estimated on both the sample of 28 transition economies and on a sub sample of 11 high remittance recipients. In all four regressions, the estimated coefficient on remittances was both positive and significant at the 1 percent confidence level. Although problems of reverse causality cannot be entirely discounted, this suggests that remittances have a causal effect on the evolution of real unit labor costs in the transition economies.

What are the policy implications of our findings? Estimates of changes in real exchange rates are often used as proxies for external price competitiveness, but for economies which receive substantial remittances, real exchange rate indices may not fully capture the extent to which they have incurred an erosion of external price competitiveness, especially with regard to labor intensive industries. Trends in real unit labor costs also need to be taken into account in analyzing developments in external competitiveness. The trends in real unit labor costs have potentially profound implications for feasible long term growth and development strategies because of their impact on the economy's potential comparative advantage.

The very steep rises in real unit labor costs, incurred by some of the high remittance recipients in the South Caucasus and Central Asia, may undermine the feasibility of development strategies which focus on labor intensive industries, such as manufacturing. Instead, it may be more realistic for development strategies to focus more on traded goods industries whose competitiveness is less dependent on low cost labor. Tradeable services may offer a more viable alternative for some of these countries because tradeable services tend to be more heterogenous products than manufactured goods and thus their competitiveness may be less sensitive to relative costs. However, most tradeable services are dependent on skilled labor and so resources will have to be devoted to human capital investment in general and vocational training in particular if they are to be the focus of long term development strategies. Fortunately, many of the thigh remittance recipient transition economies in ECA already have fairly high levels of human capital relative to their GDP per capita, so they have a solid foundation on which to build a comparative advantage in skill intensive tradeable services.

References

Acosta, Pablo A., Emmanuel K.K. Lartey, and Frederico S. Mandelman, (2007), "Remittances and the Dutch Disease", *Journal of International Economics*, Vol 79 Issue 1, pp102-116.

Amuedo-Dorantes, Catalina and Susan Pozo (2004), "Workers' Remittances and the Real Exchange Rate: A Paradox of Gifts", *World Development* Vol 32, no 8, pp1407-15417.

Amuedo-Dorantes, Catalina and Susan Pozo (2006), "Migration, Remittances, and Male and Female Employment Patterns", *American Economic Review*, Papers and Proceedings, Vol 96 No 2, pp222-226,

Ark, Bart van, Edwin Stuivenwald and Gerard Ypma (2005), "Unit Labor Costs, Productivity and International Competitiveness", Research memorandum GD-80, Groningen Growth and Development Centre.

Atamanov, Aziz and Marrit M. van den Berg (2012), "Heterogeneous Effects of International Migration and Remittances on Crop Income: Evidence from the Kyrgyz Republic", *World Development*, Vol 40, Issue 3, pp620-630.

Aurola, Jim (2008), "Labor Supply in Response to Remittance Income: The Case of Mexico", *The Journal of Developing Areas*, Vol 1, No 2, Spring, pp69-78.

Balassa, Bela (1964), "The Purchasing Power Parity Doctrine: A Reappraisal", *Journal of Political economy*, Vol 72, No 6, pp584-596.

Barajas, Adolfo, Ralph Chami, Dalia Hakura, Peter Montiel and Thierry Tressel (2011), "Workers Remittances and the Equilibrium Real Exchange Rate: Theory and Evidence", *Economia*, Vol 11, No 2, pp45-99.

Bayangos, Veronica and Karel Jansen (2011), "Remittances and Competitiveness: The Case of the Philippines", *World Development*, Vol 39, No 10, pp1834-1846.

Bouton, Lawrence, Saumik Paul and Erwin R. Tiongson (2011), "The Impact of Emigration on Source Country Wages: Evidence from the Republic of Moldova", Policy Research Working paper 5764, World Bank.

Chami, Ralph, Adolpho Barajas, Thomas Cosimano, Connel Fullenkamp, Michael Gapen and Peter Montiel (2008), "Macroeconomic Consequences of Remittances", *Occasional Paper* 59, International Monetary Fund.

Chami, Ralph, Connel Fullenkamp and Samir Jahjah (2003), "Are Migrant remittance Flows a Source of Capital for Development", Working Paper WP/03/189, International Monetary Fund.

Chami, Ralph, Ekkehard Ernst, Connel Fullenkamp and Anne Oeking (2018), "Are Remittances Good fpr Labor Markets in LICs, MICs and Fragile States? Evidence from Cross-Country Data", Working Paper WP/18/102.

Chowdhury, Murshed (2016), "Financial Development, Remittances and Economic Growth: Evidence Using a Dynamic Panel Estimation", *The Journal of applied Economic Research*, 10: 1, pp35-54.

Drinkwater, Stephen. Paul Levine and Emanuela Lotti (2003), "The Labor Market Effects of Remittances", FLOWENLA Discussion Paper 6.

Felipe, Jesus; Kumar, Utsav (2011) : Unit labor costs in the eurozone, Working Paper, No. 651, Levy Economics Institute of Bard College, Annandale-on-Hudson, NY

Gazi, Hassan M. and Mark J. Holmes (2013), "Remittances and the real effective exchange rate", *Applied Economics*, Vol 45, Issue 35, pp4959-4970.

Golub, Stephen S., Janet Ceglowski, Ahmadou aly Mbaye and Varun Prasad (2017), "Can Africa compete with China in manufacturing? The role of relative unit labor costs", *The World Economy*, 2017;00:1–21. https://doi.org/10.1111/twec.12603

Görlich, Dennis, Toman Omar Mahmoud and Christoph Trebesch (2007), "Explaining Labor Market Inactivity in Migrant-Sending Families: Housework, Hammock, or Higher Education", Kiel Working Paper No. 1391, Kiel Institute for the World Economy.

Grigorian, David A. and Tigran A. Melkonyan (2011), "Destined to Receive: The Impact of Remittances on Household Decisions in Armenia", *Review of Development Economics*, 15(1), pp139–153.

Havlik, Peter (2005), "Unit Labor Costs in the New EU Member States", wiiw Statistical Report, No. 1, The Vienna Institute for International Economic Studies (wiiw), Vienna.

Hausman, J.A. (1978), "Specification Tests in Econometrics", *Econometrica*, Vol 46, No 6, pp 251-72.

Ivlevs, Artjoms (2016), " Remittances and Informal work", *International Journal of Manpower*, Vol 37, issue 7, pp1172-90.

Justino, Patricia and Olga N. Shemyakina (2012), "Remittances and Labor Supply in Post-Conflict Tajikistan", Working Paper Vol 12, No 388, Institute of Development Studies.

Kalaj, Ermira (2013), "Do remittances alter labor market participation?", *Journal for Labor and Social Affairs in Eastern Europe*, Vol. 16, No. 4, pp.417-432.

Kim, Namsuk (2007), "The Impact of Remittances on Labor Supply: The Case of Jamaica", Policy Research Working Paper 4120, World Bank.

Landesmann, Michael and Doris Hanzl-Weiss (2013), «Structural adjustment and Unit Labor Cost Developments in Europe's Periphery: Patterns before and during the Crisis", Research Reports 390, The Vienna Institute for International Economic Studies (wiiw), Vienna.

Lartey, Emanuel K.K., Frederico S. Mandelman and Pablo A. Acosta (2008), "Remittances, exchange rate regimes and the Dutch Disease: A panel data analysis", Working paper no 2008-12, Federal Reserve Bank of Atlanta.

Lewney, Richard, Jörg Claussen, Graham Hay, Evripidis Kyriakou and Günther Vieweg (2012), "The cost competitiveness of European industry in the globalisation era – Empirical evidence on the basis of relative unit labor cost (ULC) at sectoral level", Industrial Policy and Economic Reform Papers No. 15, Enterprise and Industry Directorate-General, European Commission.

Lopes, Humberto, Luis Molina and Maurizio Bussolo (2007), "Remittances and the real exchange rate", Policy Research Working Paper 4213, World Bank.

Mishra, Prachi (2014), "Emigration and wages in source countries: a survey of the empirical literature", in *International Handbook on Migration and Economic Development*, ed Robert E.B. Lucas, Edward Elgar, pp241-266.

Ndiaye, Ameth Saloum, Oumoul Khayri, Ya Cor Ndione Sessinou and Erick Abel Dedehouanou (2016), "Migration, remittances, labor market and human capital in Senegal", Working Paper 2016-10, Partnership for Economic Policy.

Ordóñez, Javier, Hector Sala and José I. Silva (2015), "Real unit labor costs in Eurozone countries: drivers and clusters", *Journal of European Labor Studies*, (2015) 4:15.

Peters, Dominique (2010), "Price Competitiveness in Central and Eastern Europe – a case study for transition economies" IMK Study No 1/2010, Hans-Böckler-Stiftung Institut für Makroökonomie und Konjunkturforschung (IMK), Düsseldorf.

Rodrik, Dani (2008), "The Real Exchange Rate and Economic Growth", *Brookings Papers on Economic Activity*, Fall, pp365-412.

Turner, Antony G. and Stephen S. Golub (1997), "Towards a system of Multilateral Unit Labor Cost-Based Competitiveness Indicators for Advanced, Developing and Transition Countries", Working Paper WP/97/151, International Monetary Fund.