Wesleyan Economic Working Papers

http://repec.wesleyan.edu/
N°: 2013-001

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March, 2013

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Abstract: This paper examines the compositional changes that occur in economies experiencing current account reversals using sectoral-level data on output and employment growth around 55 reversal episodes. The experiences of developing and industrialized countries are compared, and the role of currency crises is also examined. Labor market adjustment following reversals in developing countries is shown to differ from that of industrialized economies. The possibility that this difference is related to labor market informality is briefly examined.

JEL: F3, F4

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Acknowledgements: The authors are grateful to Lisa Lee for outstanding research assistance and to Abigail Hornstein and seminar participants at Vassar College and the Southern Economic Association meetings for helpful comments. Any mistakes are our own.

I. Introduction

A considerable literature has arisen in recent years examining current account reversals – large and persistent decreases in current account deficits. Much of this research was motivated by concerns about the large US current account deficits in the mid-2000s. More recently, concerns about current account imbalances have also featured prominently in discussions of the euro crisis.

As shown below, national accounts identities imply that adjustment of current account imbalances may have disparate effects across sectors within economies. Analysis of sectoral-level dynamics during reversals may therefore be of interest to both scholars and policymakers. This paper uses sectoral data to examine how the composition of output and employment evolve during current account reversals, with a focus on comparing the experiences of developing and industrialized countries.

It is shown that construction is the most sensitive sector to current account reversals, experiencing large decreases in growth in both developing and industrialized countries. For industrialized countries, manufacturing sees the second-largest decrease in growth, but during reversals in developing countries several other sectors experience larger output growth declines. While output and employment dynamics are similar in industrialized country episodes, reversals in developing countries exhibit relatively mild declines in employment relative to output, which may be related to the greater prevalence of informality in developing country labor markets.

Most of the literature on current account reversals has focused on the implications for aggregate economic activity and financial variables or on the likelihood of reversals, which sometimes occur in "sudden stop" crises with a precipitous decline in financial inflows (on the effects of sudden stops, see Guidotti et al, 2004). A number of studies have focused on industrial country episodes. Freund (2005) finds that reversals are associated with real exchange rate depreciations, decreasing output growth and declines in the share of investment in

GDP. Freund and Warnock (2007) examined how adjustment is affected by different characteristics of the deficits prior to the reversals, such as their magnitude and whether they were primarily driven by consumption or investment. Croke, Kamin and Leduc (2006) found that industrial country reversals are not characterized by severe crises that they refer to as "disorderly adjustment." Debelle and Galati (2007) analyze the changes in financial flows accompanying reversals in industrial countries and find that the primary change is a reduction in lending inflows, but little sign of disruptive changes or domestic capital flight.

Evidence for developing countries is more mixed. Milesi-Feretti and Razin (2000) find that reversals in developing countries are not systematically associated with slowdowns in growth. They do find, however, that output growth falls during currency crises, but only one-third of current account reversals are accompanied or preceded by currency crises. In the sample examined here, growth does decrease following reversals in developing countries, though the slowdowns are more severe in cases where a currency crisis also occurs. In a sample including both industrialized and developing countries, Edwards (2002) found that reversals are linked to declines in investment-GDP ratios and output growth, which is consistent with the findings below, and that currency crises are more likely in a three-year window surrounding reversals. Edwards (2004) also finds a statistical relationship between the incidence of current account reversals and sudden stops.

Some studies have considered shifts between traded and nontraded goods production in circumstances related to current account reversals – e.g., Dekle, Eaton and Kortum (2008) examine a "global rebalancing" scenario in a 42-country calibrated model, and Kehoe and Ruhl (2009) consider the consequences of sudden stops in a model calibrated based on Mexico. However, relatively little empirical study has been devoted to the implications of current account reversals for the sectoral allocation of labor and output within economies, particularly with an application to actual sectors rather than traded and nontraded sub-aggregates.

Adjustments of current account balances imply changes in the composition of production and employment. A brief examination of national accounts identities illustrates how current account adjustment can occur in a multiplicity of ways. As a

share of GDP (Y), the current account (CA) is linked by identity to the trade balance – i.e., exports (X) less imports (M):

$$\frac{CA}{Y} = \frac{NFP + UT}{Y} + \frac{X}{Y} - \frac{M}{Y}.$$

Holding constant net factor payments (NFP) and unilateral transfers (UT), this shows that a current account reversal implies an increase in exports and a decrease in imports as a share of GDP.

Alternatively, the current account can be expressed as:

$$\frac{CA}{Y} = 1 + \frac{NFP + UT}{Y} - \frac{C}{Y} - \frac{I}{Y} - \frac{G}{Y},$$

which illustrates that a current account reversal implies a reduction in the share of GDP devoted to one or more of consumption (C), investment (I) or government purchases (G) – that is a decrease in domestic "absorption."

These identities suggest that the current account reversals might lead to a reallocation of resources towards export-related sectors, but also that reversals might be reflected in relative output decreases in sectors that produce consumption and capital goods as well.

Current account reversals were first investigated at the sectoral level by Craighead and Hineline (2013). Using data for 55 sectors in 14 countries, that study found that current account reversals were associated with particularly large declines in investment-related sectors – especially construction – while primary commodities sectors fared relatively well. However, that study was focused on industrialized countries and had a limited sample size of 14 reversal episodes in OECD countries.

By employing a broader, though less highly disaggregated, sectoral dataset, this paper can examine a much larger sample of 55 reversals. Importantly, the sample includes developing countries. This paper applies an "event study" approach that is commonly used in the current account literature to sectoral-level output and employment data. In addition to exploring differences between developing and industrialized country reversal episodes, the effect of currency crises is also considered.

II. Identification of Current Account Reversals and Currency Crises

To analyze how the structure of economies changes during reversals, the 10-sector database of the Groningen Growth and Development Center (Timmer and deVries, 2009) is utilized. This dataset provides series of real and nominal value added and employment at the sectoral level for ten Asian, nine Latin American, eight European countries and the US. Using this data, the behavior of output and employment during current account reversals is analyzed for nine different sectors.[1]

Reversals are identified using data on current account balances as a percentage of GDP from the World Bank World Development Indicators through 2009 and from *The Economist* for 2010 and 2011 (the 2011 data are mid-year estimates). Because the reversal criteria require data for four years after a potential reversal, this allows identification of reversals through 2007.

Four criteria similar to those established by Milesi-Feretti and Razin (2000) and Freund (2005) are used to identify the reversals. A current account reversal must begin with the current account in significant deficit (criteria #1), and be followed by substantial (#2 and #3) and sustained (#4) decreases in the deficit. Specifically:

1. The deficit must initially exceed 2% of GDP;
2. The deficit must decrease more than 2 percentage points of GDP three years after the reversal;
3. The deficit must decrease by at least one-third three years after the reversal; and
4. The deficit must not subsequently exceed the peak level in the four years after the reversal.

[1] For most developing countries, the dataset reports sectors 9 (community, social and personal services) and 10 (government services) together. For the countries where they are reported separately, they are merged by adding (employment) or calculating an average (real value added), weighted by nominal value added.

Cases in which consecutive years, or two years separated by one year, meet the reversal criteria are treated as single episodes, with the reversal date identified as the first year that all four criteria are satisfied.

The sample of countries includes 16 developing countries and 9 industrialized countries.[2] Identification of reversals begins in 1975, the first year that the current account reversals can be identified for the majority of the 25 countries. The episodes are listed in Table 1. Developing country current accounts are more volatile. There are 43 developing country reversals, and most of the developing countries in the sample experienced multiple reversals, with the only exceptions being Singapore, which had one, and India, which had zero. For the industrialized countries, there are 12 episodes, with only Spain, Sweden and the US having more than one reversal. Furthermore, the peak current account deficits tend to be significantly larger for the developing countries, averaging 7.63% of GDP, versus 4.25% for the industrial countries.

Currency crises are identified from the chronology of Reinhart and Rogoff (2004), which classifies exchange rate regimes based on market data rather than official declarations. A currency crisis is defined as entry into the state they call "freely falling," which requires the inflation rate to exceed 40%. A reversal episode is considered to be associated with a currency crisis if there is a crisis in the reversal year, or in any of the two years before or after. The third column of Table 1 lists the currency crises associated with current account reversals. All of the reversals with a currency crisis occurred in developing countries. There is considerable heterogeneity in the timing of current account reversals relative to exchange rate crises. Of the 14 currency crisis reversals, in six cases the crisis precedes the reversal, two have the crisis and the reversal in the same year and in six cases the reversal comes before the crisis.

[2] These are all the countries covered by the GGDC 10-sector database, except Hong Kong, Taiwan and Germany, which are excluded due to data limitations.

III. Analysis

III. a. Growth Rates, Before and After

Table 2 reports the median growth rates[3] of real value added by sector for the two years before and the two years after the reversals for industrialized and developing countries. The pre- and post-reversal median growth rates of employment are reported in Table 3. Current account reversals are associated with slowdowns in overall output growth for both industrialized and developing countries. Interestingly, the median slowdown in total output growth is larger in developing country episodes than in industrial ones, yet the decrease in employment growth is less severe. In industrialized country episodes the decreases in median output and employment growth are similar in magnitude (2.15% and 1.93%, respectively). The large decrease in output growth (3.67%) relative to employment growth (0.70%) in developing countries implies that current account reversals are associated with significant declines in labor productivity growth. This contrast is also evident in Figure 1, which shows median employment and value added growth for the years surrounding the reversal (where the year of the reversal is labeled as "0").

Among sectors, construction suffers the biggest slowdown in output and employment growth in both developing and industrialized country episodes. Figure 2 illustrates the sharp contraction in this sector, which accounts for a substantial part of the overall decline in investment seen in current account reversals. The decline in construction is also consistent with Aizenman and Jinjarak's (2009) finding that real estate markets are sensitive to current account dynamics. In both developing and industrialized country episodes, manufacturing growth (Fig. 3) also decreases more than overall growth though it appears to rebound sharply in the third year after the reversal. This suggests that whatever gains in manufacturing

[3] Because the GGDC data ends in 2005, the Thailand (2005), US (2006) and Spain (2007) episodes were excluded from calculating the medians.

that might occur from increased manufactured exports tend to be outweighed by the negative effects of the economy-wide growth slowdowns following a reversal.

An area of contrast between industrialized and developing country episodes is that, in developing country reversals, median output growth in (i) wholesale/retail trade hotels and restaurants, (ii) transport, storage and communication and (iii) finance, insurance and real estate also decrease more than overall output growth, and more sharply than manufacturing. Figure 4 illustrates the sharp decline in financial sector output growth in developing countries, which is in contrast to the comparatively mild decrease in industrialized countries. The wholesale/retail trade sector is a particularly clear case of diverging employment and output dynamics during developing country reversals. Figure 5 shows the sharp decline in that sector's output growth following reversals in developing countries, while employment growth barely falls. In industrialized country reversals, on the other hand, the median decrease in wholesale/retail trade employment growth (2.54%) is larger than the decline in output growth (0.94%).

Among the sectors that appear to do relatively well following reversals are agriculture, forestry and fishing as well as mining and quarrying, with relatively small decreases in output growth. For developing country episodes, these are the two sectors with the smallest slowdowns, and in industrialized countries the slowdowns for these sectors are less than for overall value added. This is consistent with Craighead and Hineline's (2013) findings, and might be indicative of a relative shift towards commodity production for export as part of the rebalancing process. In developing countries, employment growth in these two sectors accelerates following reversals. As Figure 6 illustrates, the agriculture, forestry and fishing sector is also another case of contrast between output and employment dynamics in developing countries.

Another difference between developing and industrial country episodes is that, in industrial countries, government and public utility output are relatively stable (indeed, utilities are the one sector where output growth rises). In developing countries, by contrast, output growth in these sectors decreases (though not as

much as overall output). This may be a result of greater dependence on external finance on the part of developing country governments.

While overall employment growth in developing countries slows much less than output growth, the degree to which employment underadjusts relative to output varies considerably across sectors. The difference between the overall employment and output slowdowns is 2.97 percentage points. The wholesale/retail trade, construction and mining and quarrying sector have larger gaps between the changes in employment and output growth. None of the disparities between the output and employment growth changes are this large in industrialized countries. One possible explanation for the contrast in employment dynamics between developing and industrialized country episodes may be differences in labor market institutions. In particular, developing countries generally have a higher degree of labor market informality. This is investigated further below.

Table 4 reports growth rates for developing countries with and without currency crisis (all currency crisis episodes are in developing countries). The output declines are more severe when accompanied by a currency crisis, which is consistent with the results of Milesi-Feretti and Razin (2000). However, even when currency crisis episodes are excluded, output growth slows down, which is in contrast to Milesi-Feretti and Razin's finding that there is not a systematic association between reversals and slowdowns in output growth.[4] The overall output growth slowdown in developing countries without currency crises is similar to that of industrialized countries, which suggests that the increased severity of adjustment in developing countries on average may be due to the fact that they are more likely to be accompanied by currency crises. For all sectors, the decrease in median output growth is larger in currency crises episodes; the biggest differences are in (i) transport, storage and communication, (ii) manufacturing and, especially (iii) construction. The fact that manufacturing declines more in currency crisis episodes

[4] This could, in part, be due to different samples: Milesi-Feretti and Razin's study includes a large number of low-income countries, whereas the developing countries in this sample would be considered middle-income, and covers a different time period.

indicates that whatever export boost might come from a large exchange rate depreciation is insufficient to offset the effects of the decline in domestic economic activity.

III. b. Regression Analysis

To provide formal statistical evidence of how the dynamics of current account reversals vary among sectors between developing and industrialized countries as well as the role of exchange rate crises, an extended version of the regression of Freund (2005) is employed. Dummy variables for the years before, during and after reversal episodes reveal how the behavior of sectoral output and employment and prices change during current account reversals.

Regressions are run separately for each sector. The regression model has the form:

$$\Delta x_{j,t} = \alpha \Delta x_{j,t-1} + \sum_{s=-3}^{3} \beta_{R+s} r_{j,R+s} + \sum_{s=-3}^{3} \gamma_{R+s} d_{j,R+s} + \sum_{s=-3}^{3} \delta_{R+s} c_{j,R+s} + \theta_j + \mu_t + \varepsilon_{j,t},$$

where Δx is the percentage growth rate of the dependent variable – real value added or employment – indexed by country (j), and year (t). The effect of a reversal is captured by the coefficients (β) on dummy variables, (r) that are equal to one for the reversal year (R) and each of the three years before and after. For example, Denmark experienced a current account reversal in 1986, so $r_R = 1$ for Denmark in 1986, and $r_{R+1} = 1$ for 1987, etc. The corresponding β coefficients are the partial correlations of growth in x with the respective years surrounding the episode. The coefficients (γ) on a second set of dummies (d) for developing countries in the years surrounding reversals captures the additional change in x in developing country reversals. That is, Indonesia's reversal in 1986 means that $r_R = 1$ and $d_R = 1$ for Indonesia in 1986, and the total change in x associated with a developing country reversal year is $\beta_R + \gamma_R$. The third set of dummies (c) are associated with the years before, during and after reversals which have currency crises; the coefficients (δ) are the impact of currency crises. The regression also includes country fixed effects

(θ) that capture the different growth trends in different countries, and μ is a calendar year dummy which captures global effects in a particular year. As in Freund (2005), a lagged dependent variable is included and, in many cases, the coefficient on it is statistically significant.

Because the regressions include dummy variables associated with the three years subsequent to the reversals, in order to minimize any effects of unidentified reversals from 1974 or earlier, the regressions are run on the GGDC series for the period 1978-2005. Because this is a subset of the time period used to identify reversals, we are able to include the effects of reversals that occur outside of this window, from 1975-2007. For example, the dummies for the second and third years after the 1976 current account reversal in Spain are included, as are dummies for the three years leading up to the 2006 current account reversal in the US.

Table 5 reports estimates of the β, γ and δ coefficients from regressions on value added for a five-year[5] window surrounding reversals. Results for the employment regressions are in Table 6. The association of current account reversals with economic slowdowns found in earlier studies is underscored by the statistically significant negative β coefficients on overall output growth for the reversal year and the year after and on employment growth for one and two years after the reversal. The greater severity of output declines in reversals that coincide with currency crises is evidenced by the negative δ coefficients on total value added growth for the two years after the reversal. The γ coefficients on overall output are relatively small, though mostly positive, which suggests that the more severe declines in developing countries are due to the greater frequency of currency crises. The γ coefficient on total employment for the year after a reversal is positive and significant, which reflects the fact that developing countries do not experience as severe employment slumps as industrialized countries do during reversals.

Negative and significant β coefficients on employment and value added for years following the reversals for manufacturing, construction and wholesale/retail trade

[5] Although the regressions include sets of seven year dummies, for clarity, the third year before and third year after the reversals are not included in the tables.

highlight the sensitivity of these sectors to reversals (i.e., these are the sectors leading the overall slumps). The decline in construction is part of the overall reduction in investment, and the declines in wholesale/retail trade would follow from reduced consumption – both suggest declines in domestic absorption when the current account deficit falls.

In the employment regressions, for the two years after the reversals the β coefficients are generally negative, while the γ coefficients are almost all positive. The positive and significant γ coefficients on employment in construction, wholesale/retail trade and government in years following the reversal highlight that these are sectors where employment in developing countries does not follow the declining pattern of the industrialized countries (reflected by the negative β coefficients).

There are a number of significant positive γ coefficients on value added growth in the years leading up to the reversals in developing countries, in manufacturing, transport, storage and communication and finance, insurance and real estate. These provide an indication of which sectors are "booming" during periods of financial inflows into developing countries. However, the β coefficients for the years prior to the reversals are mixed in sign and generally insignificant, providing little indication of unusual growth in industrialized countries prior to reversals.

Significant negative δ coefficients on manufacturing, public utilities, construction and wholesale/retail trade in the year after reversals, and on finance, insurance and real estate in the second year after indicate that these are the sectors that are particularly sensitive to currency crisis episodes. Interestingly, the δ coefficient for employment in agriculture, forestry and fishing in the second year after a reversal is positive and significant. This would be consistent with a return to "traditional" employment in the wake of severe crises.

III. c. Informality and Labor Market Adjustment

As mentioned above, the difference between developed and industrialized country patterns of employment adjustment during current account reversals might potentially be related to the greater prevalence of informal employment in developing countries. To examine this hypothesis, Schneider's (2006) estimates of the shares of GDP accounted for by "shadow economies" are used as a proxy for the prevalence of labor market informality. The application of this data to the sample of current account reversals is limited by the fact that Schneider's estimates cover 1999-2003 in two-year increments (the 1999-2000 estimates are used here) and are not sector specific. Because of these limitations, this analysis should be regarded as suggestive and an area for further research if more detailed data becomes available. Among the countries in the sample, the shadow economy share ranges from 8.5% for the US to 67.1% for Bolivia. For the 15 developing countries with reversals, the average shadow economy share is 35.2%, while it is considerably lower, 17.7%, for the seven industrialized countries that have reversals.

To account for the impact of labor market informality on the labor adjustment process, the regression specification is altered by replacing the developing country year-dummies (i.e., the *d*'s) with terms interacting the shadow share of each country's economy with the years surrounding reversals. The resulting regression:

$$\Delta x_{j,t} = \alpha \Delta x_{j,t-1} + \sum_{s=-3}^{3} \beta_{R+s} r_{j,R+s} + \sum_{s=-3}^{3} \phi_{R+s} (r_{j,R+s} * s_j) + \sum_{s=-3}^{3} \delta_{R+s} c_{j,R+s} + \theta_j + \mu_t + \varepsilon_{j,t}$$

where s_j is the shadow share (expressed as a decimal), is run with employment growth as the dependent variable. The β coefficient represents the baseline change in employment growth in a reversal episode-year and the ϕ coefficient represents how this increases or decreases with the degree of informality in the economy.

Results in Table 7 show that the β coefficients are predominantly negative in the wake of reversals, but the ϕ coefficients in the two years after a reversal are mostly positive. This suggests that the overall effect of reversals on employment growth is

negative, but less negative or even positive where there is a large shadow economy. The informality effect is strong in the sectors - mining and quarrying, construction, wholesale/retail trade - which had also been identified above as seeing a significant disparity between labor and output adjustment in developing countries.

Since developing countries tend to have higher degrees of informality, the largely positive ϕ coefficients are consistent with the view that labor market informality may help explain the differences between industrialized and developing countries in how labor market adjustment to reversals. To some extent, this may reflect the counter-cyclical nature of informal employment found by Loayza and Rigolini (2006).[6] However, the coefficients vary considerably, indicating that the effect of informality is uneven across sectors. Because productivity varies considerably across sectors in developing countries (Rodrik and McMillan, 2011), the shifts in the composition of employment following reversals may have an impact on overall productivity and growth.

IV. Conclusion

The adjustment to current account reversals differs considerably between developing and industrialized economies, and among the sectors within economies. The fact that output declines are more severe for developing country reversals appears to be due to the fact that currency crises are more frequent in developing countries.

Unlike previous studies of current account reversals that have focused on aggregate data, this paper has examined sectoral-level data. The differences in relative sectoral output and employment growth rates show the unevenness of adjustment and the compositional changes that occur within economies during reversals. In particular, the construction sector suffers large declines following reversals in both developing and industrialized countries. Declines in agriculture and mining are relatively modest – i.e., the composition of output shifts in favor of

[6] However, this pattern may not be consistent. Fiess, Fugazza and Maloney (2010) discuss circumstances in which informal employment may be procyclical.

these sectors. Output of the government and public utilities sectors are relatively stable in industrialized countries, but decline (though not as much as overall output) in developing countries. Compared to industrialized countries, developing countries see larger output growth declines in the wholesale/retail trade and the transport, storage and communication sectors following reversals.

The employment growth declines following developing country reversals are relatively small compared to both output in the same group of countries, as well as employment in industrialized countries. This pattern is uneven across sectors, with some sectors' employment under-adjusting relative to output more than others. Suggestive evidence indicates this is may be related to the greater prevalence of informality in developing country labor markets.

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Table 1. Reversal Episodes

Country	Reversal Years; CA as % of GDP in Parentheses; Episodes with Currency Crises in Bold	Currency Crises
Developing Country Episodes		
Argentina	***1980 (6.20)***, ***1987 (3.81),*** 1998 (4.84)	1981, 1986
Bolivia	***1979 (8.98)***, 1987(10.00), 1992 (9.46), 1998 (7.83)	1980
Brazil	***1975 (5.63)***, 1982 (5.79), ***1999 (4.32)***	1975, 1998
Chile	***1984 (10.98)***, 1998 (4.94)	1982
Colombia	1982 (7.84), 1997 (5.39)	
Costa Rica	***1981 (15.59)***, 1993 (6.43)	1981
India	None	
Indonesia	1983 (7.42), 1986 (4.89), ***1996 (3.37)***	1998
S. Korea	1980 (8.32), ***1996 (4.16)***	1998
Malaysia	1982 (13.14), 1995 (9.73)	
Mexico	***1981 (6.49), 1994 (7.03)***, 2000 (3.22)	1982, 1995
Peru	1981 (6.92), 1988 (14.70), 1996 (6.52), 2001 (2.23)	
Philippines	***1982 (8.62),*** 1997 (5.28)	1984
Singapore	1980 (13.22)	
Thailand	1979 (7.62), 1983 (7.18), 1990 (8.53), 1995 (8.08), 2005 (4.34)	
Venezuela	1978 (12.33), 1982 (5.54), ***1988 (9.94)***, ***1992 (6.41),*** 1998 (4.85)	1987, 1993
Industrialized Country Episodes		
Denmark	1986 (5.20)	
France	1982 (2.11)	
Italy	1992 (2.31)	
Japan	None	
Netherlands	None	
Spain	1976 (4.02), 1981 (2.72), 1991 (3.53), 2007 (10.03)	
Sweden	1980 (3.28), 1992 (3.30)	
UK	1989 (5.02)	
US	1987 (3.42), 2006 (6.02)	

Table 2. Median Growth Rates of Value Added

Sector	Industrialized			Developing		
	2 yrs before	2 yrs after	Change	2 yrs before	2 yrs after	Change
Agriculture, Forestry and Fishing	1.87	0.99	-0.87	2.33	1.78	-0.55
Mining and Quarrying	2.25	1.59	-0.65	4.13	2.31	-1.82
Manufacturing	2.27	-0.01	-2.28	5.61	2.23	-3.38
Public Utilities	2.99	3.85	0.86	6.85	4.90	-1.95
Construction	2.30	-2.70	-5.00	7.26	-5.70	-12.96
Wholesale and Retail Trade, Hotels and Restaurants	2.57	1.63	-0.94	5.44	-0.12	-5.56
Transport, Storage and Communication	4.37	3.21	-1.16	6.89	2.56	-4.33
Finance, Insurance and Real Estate	3.72	2.53	-1.19	6.86	2.74	-4.11
Government; Community, Social and Personal Services	1.97	1.81	-0.16	4.58	2.62	-1.96
Total	3.31	1.17	-2.15	5.19	1.53	-3.67

Table 3. Median Growth Rates of Employment

Sector	Industrialized			Developing		
	2 yrs before	2 yrs after	Change	2 yrs before	2 yrs after	Change
Agriculture, Forestry and Fishing	-3.20	-3.03	0.18	-0.50	1.02	1.52
Mining and Quarrying	-3.71	-4.13	-0.42	1.16	2.37	1.21
Manufacturing	-0.54	-3.07	-2.53	3.39	0.40	-2.99
Public Utilities	0.00	-0.30	-0.30	4.03	2.20	-1.83
Construction	1.65	-2.92	-4.57	7.41	-0.71	-8.12
Wholesale and Retail Trade, Hotels and Restaurants	1.53	-1.01	-2.54	4.88	4.41	-0.47
Transport, Storage and Communication	0.59	0.55	-0.04	4.61	2.70	-1.91
Finance, Insurance and Real Estate	4.41	1.79	-2.63	7.58	3.43	-4.14
Government; Community, Social and Personal Services	4.85	3.50	-1.35	3.95	3.68	-0.27
Total	1.44	-0.49	-1.93	3.09	2.39	-0.70

Table 4. Median Growth Rates of Value Added (Currency Crisis vs. No Crisis)

	Currency Crisis			Developing, No Crisis		
Sector	2 yrs before	2 yrs after	Change	2 yrs before	2 yrs after	Change
Agriculture, Forestry and Fishing	1.54	-0.15	-1.69	2.84	2.26	-0.58
Mining and Quarrying	5.12	2.15	-2.96	3.56	3.44	-0.11
Manufacturing	5.13	-3.47	-8.60	6.05	2.76	-3.29
Public Utilities	8.04	5.01	-3.03	6.74	5.03	-1.71
Construction	6.96	-11.83	-18.79	8.39	1.20	-7.20
Wholesale and Retail Trade, Hotels and Restaurants	4.38	-4.00	-8.38	6.14	2.19	-3.96
Transport, Storage and Communication	7.24	-0.47	-7.72	7.35	4.38	-2.97
Finance, Insurance and Real Estate	6.12	-0.78	-6.89	7.74	4.43	-3.31
Government; Community, Social and Personal Services	4.25	1.05	-3.20	4.76	2.68	-2.08
Total	4.95	-1.81	-6.77	5.28	2.89	-2.39

Table 5. Value Added Regression Coefficients

Sector	β Coefficients (all reversals)					γ Coefficients (developing)					δ Coefficients (currency crisis)				
	r(-2)	r(-1)	r(0)	r(+1)	r(+2)	d(-2)	d(-1)	d(0)	d(+1)	d(+2)	c(-2)	c(-1)	c(0)	c(+1)	c(+2)
Agriculture, Forestry and Fishing	1.73 (3.31)	-0.50 (1.84)	-0.68 (2.65)	-4.67** (2.09)	1.00 (1.94)	-0.07 (3.43)	-0.05 (2.13)	-0.78 (3.02)	3.97* (2.19)	-2.89 (2.14)	-4.33** (1.90)	0.39 (1.39)	0.26 (1.69)	-1.29 (1.25)	-0.86 (1.60)
Mining and Quarrying	-0.06 (2.78)	0.46 (3.37)	2.43 (4.03)	1.17 (3.30)	-3.16 (3.28)	1.16 (3.16)	-2.00 (3.79)	-1.86 (4.31)	3.56 (3.85)	4.80 (3.80)	3.09 (2.57)	2.84 (2.76)	0.59 (2.09)	-4.19 (2.56)	-3.51 (3.08)
Manufacturing	-0.58 (0.92)	-1.50 (1.33)	-0.76 (0.93)	-2.78*** (1.00)	-1.63 (1.54)	3.31** (1.53)	1.66 (1.71)	0.24 (1.48)	1.29 (1.66)	-0.97 (1.91)	-4.89 (3.35)	0.89 (1.49)	-0.23 (1.47)	-4.39** (1.91)	-2.85 (2.75)
Public Utilities	0.33 (1.07)	1.53 (2.32)	-0.38 (2.31)	-2.09 (1.44)	0.66 (2.42)	0.77 (1.67)	1.13 (2.51)	0.86 (2.51)	2.76 (1.71)	-2.39 (2.66)	-1.32 (1.57)	-1.49 (1.45)	2.08 (1.67)	-3.00* (1.80)	1.16 (2.21)
Construction	2.55 (1.99)	0.47 (1.28)	-1.22 (1.61)	-3.54* (2.03)	-4.07** (1.99)	1.37 (3.07)	3.43 (2.73)	4.26 (2.71)	1.26 (3.12)	0.53 (3.48)	-4.97 (5.37)	1.55 (3.99)	-0.15 (3.64)	-8.33* (4.67)	-6.81 (6.28)
Wholesale and Retail Trade, Hotels and Restaurants	-0.53 (1.08)	-0.20 (1.03)	-2.34* (1.41)	-2.02** (0.94)	-1.75* (0.99)	2.06 (1.66)	1.11 (1.45)	1.73 (1.83)	-0.68 (1.51)	-0.62 (1.65)	-5.00 (3.47)	-1.24 (1.38)	1.13 (1.84)	-5.57*** (2.13)	-3.20 (3.19)
Transport, Storage and Communication	2.14** (0.93)	-1.51 (1.01)	-1.06 (0.70)	0.44 (1.30)	-0.39 (0.79)	-0.94 (1.33)	3.23** (1.30)	1.29 (1.13)	-2.75* (1.62)	-1.79 (1.19)	-4.03** (1.87)	-1.22 (1.25)	-1.40 (1.20)	-2.50 (1.67)	-1.42 (2.47)
Finance, Insurance and Real Estate	-1.12 (0.94)	-0.26 (1.01)	-1.90 (1.22)	-1.07 (1.13)	-1.53 (1.11)	3.35* (2.01)	2.90 (2.22)	5.05** (2.25)	1.19 (1.83)	-0.06 (1.99)	-2.20 (2.99)	-8.55 (7.97)	-2.16 (2.42)	1.99 (5.67)	-7.70** (3.82)
Government; Community, Social and Personal Services	0.55 (0.61)	0.12 (0.42)	-0.17 (0.63)	-0.18 (0.53)	0.23 (0.50)	0.12 (0.90)	0.43 (1.10)	-0.61 (1.09)	-1.57 (0.96)	0.08 (0.82)	-1.31 (1.55)	0.37 (1.04)	0.94 (1.01)	0.89 (1.04)	-2.45 (1.53)
Total	0.12 (0.46)	-0.27 (0.62)	-0.94* (0.56)	-1.35** (0.52)	-0.84 (0.59)	1.45* (0.88)	0.75 (0.97)	0.89 (1.05)	0.04 (0.99)	-0.63 (0.96)	-2.51 (2.50)	0.20 (1.33)	0.27 (1.15)	-2.78* (1.54)	-2.17 (2.23)

Std. errors in parentheses; * p<0.1; ** p<0.05; *** p<0.01

Table 6. Employment Regression Coefficients

Sector	β Coefficients (all reversals)					γ Coefficients (developing)					δ Coefficients (currency crisis)				
	r(-2)	r(-1)	r(0)	r(+1)	r(+2)	d(-2)	d(-1)	d(0)	d(+1)	d(+2)	c(-2)	c(-1)	c(0)	c(+1)	c(+2)
Agriculture, Forestry and Fishing	-0.93 (0.92)	-0.56 (1.24)	-1.34 (0.93)	-1.29 (1.12)	0.05 (1.15)	1.03 (1.56)	-1.76 (1.89)	0.47 (1.34)	1.98 (1.53)	0.21 (1.49)	-1.57 (2.15)	2.75 (1.76)	1.48 (1.16)	3.60 (2.55)	5.95** (2.96)
Mining and Quarrying	-2.12 (1.64)	-1.92 (2.04)	-1.50 (2.66)	-0.80 (1.63)	-2.61 (1.78)	5.24 (4.11)	4.03 (3.60)	5.24 (4.08)	3.67 (4.45)	5.89 (4.88)	2.13 (6.29)	-8.05* (4.78)	-3.70 (3.63)	5.69 (5.36)	-0.79 (6.45)
Manufacturing	-0.39 (0.84)	-0.99 (1.06)	-1.75* (1.04)	-2.12*** (0.68)	-2.32** (1.03)	0.75 (1.86)	4.71*** (1.73)	1.89 (1.48)	1.55 (1.34)	1.31 (1.44)	0.63 (2.95)	-3.37** (1.61)	0.47 (1.51)	-1.40 (2.19)	-1.86 (2.44)
Public Utilities	1.22 (1.91)	0.28 (1.36)	2.52 (1.82)	0.88 (1.80)	-1.52 (1.75)	2.29 (4.74)	2.18 (3.20)	-1.30 (3.48)	-7.23 (5.01)	2.33 (3.53)	-2.50 (4.86)	-5.32 (3.73)	-5.59 (3.59)	8.81 (5.56)	-7.90 (5.30)
Construction	0.85 (1.52)	-1.73 (1.48)	-0.49 (2.18)	-4.16** (1.83)	-6.52*** (1.82)	2.70 (3.43)	7.81** (3.52)	4.40 (3.45)	4.12 (3.08)	7.06** (3.22)	1.94 (5.67)	-2.42 (4.24)	2.35 (4.22)	-4.93 (4.56)	-5.44 (4.45)
Wholesale and Retail Trade, Hotels and Restaurants	-0.08 (0.62)	-0.67 (0.76)	-0.66 (0.82)	-2.19*** (0.78)	-2.61*** (0.76)	-2.72 (1.95)	0.75 (1.63)	1.62 (1.36)	3.16** (1.31)	2.54* (1.34)	4.04** (1.92)	-0.51 (1.95)	-1.72 (1.90)	-2.54 (2.37)	-0.71 (1.59)
Transport, Storage and Communication	-0.70 (0.80)	-0.42 (0.64)	0.39 (0.82)	-1.16 (1.17)	-1.03 (1.02)	0.34 (1.91)	2.45 (2.04)	-0.20 (1.62)	3.03 (1.95)	-2.41 (1.85)	2.67 (3.29)	-4.56 (3.34)	-0.22 (1.97)	-3.02 (2.14)	-0.09 (3.11)
Finance, Insurance and Real Estate	0.52 (0.81)	0.48 (1.03)	0.51 (0.97)	-2.83 (1.93)	-3.76*** (0.96)	0.92 (1.80)	1.24 (2.48)	1.44 (1.84)	3.18 (2.36)	1.84 (2.15)	0.06 (3.01)	-2.47 (2.22)	-0.73 (2.36)	-1.24 (2.62)	-2.06 (2.41)
Government; Community, Social and Personal Services	0.07 (0.44)	-0.05 (0.62)	-0.89 (0.58)	-0.94** (0.43)	-0.17 (0.56)	1.71 (1.11)	0.20 (1.58)	0.99 (1.03)	1.66* (0.88)	0.61 (1.06)	-0.44 (1.74)	3.09* (1.73)	-0.99 (1.42)	0.60 (1.11)	1.61 (2.06)
Total	0.07 (0.34)	-0.30 (0.51)	-0.70 (0.69)	-1.61*** (0.41)	-1.58*** (0.52)	-0.45 (0.69)	0.62 (0.69)	1.09 (0.83)	2.05*** (0.62)	0.98 (0.67)	1.65* (0.98)	0.57 (0.75)	-0.36 (0.86)	-0.18 (1.37)	0.22 (0.96)

Std. errors in parentheses; * p<0.1; ** p<0.05; *** p<0.01

Table 7. Employment Regressions With Informality

Sector	β Coefficients (all reversals)					φ Coefficients (informality)					δ Coefficients (currency crisis)				
	r(-2)	r(-1)	r(0)	r(+1)	r(+2)	d(-2)	d(-1)	d(0)	d(+1)	d(+2)	c(-2)	c(-1)	c(0)	c(+1)	c(+2)
Agriculture, Forestry and Fishing	-1.50 (1.13)	-3.76** (1.71)	-2.83** (1.11)	-0.88 (1.68)	0.88 (1.43)	4.73 (3.27)	5.91 (4.07)	5.87* (3.21)	3.65 (4.71)	-1.62 (3.54)	-1.49 (2.07)	2.32 (1.60)	1.67 (1.11)	4.00 (2.47)	5.87** (2.94)
Mining and Quarrying	-2.77 (3.71)	-5.77 (3.92)	-2.73 (4.07)	-8.09* (4.56)	-3.79 (8.05)	16.76 (13.68)	23.70 (14.70)	18.99 (13.98)	32.07* (16.36)	17.97 (19.64)	2.47 (5.88)	-8.11* (4.59)	-3.60 (3.39)	6.04 (4.67)	0.33 (6.02)
Manufacturing	1.12 (1.98)	0.47 (1.72)	-1.71 (1.49)	-0.87 (1.82)	-0.69 (1.62)	-3.47 (6.76)	5.45 (5.57)	3.69 (4.96)	-0.70 (5.27)	-1.87 (5.19)	0.85 (2.93)	-2.26 (1.56)	0.84 (1.42)	-1.21 (2.10)	-1.93 (2.35)
Public Utilities	-0.34 (3.97)	-1.69 (3.74)	2.32 (3.89)	-1.96 (5.58)	-10.78** (4.90)	10.46 (15.75)	13.05 (15.18)	-0.44 (15.17)	-5.20 (21.49)	33.96** (17.03)	-1.77 (4.31)	-5.14 (3.59)	-6.47* (3.37)	6.27 (4.95)	-6.81 (4.52)
Construction	0.75 (2.99)	-2.96 (2.84)	0.33 (2.63)	-2.82 (3.42)	-9.38*** (3.50)	7.04 (11.15)	21.41** (10.41)	7.28 (10.21)	5.76 (10.38)	24.35** (11.61)	2.39 (5.83)	-0.75 (3.94)	3.14 (4.14)	-4.55 (4.50)	-3.65 (4.26)
Wholesale and Retail Trade, Hotels and Restaurants	1.98 (1.85)	-1.02 (1.62)	1.22 (1.45)	-2.95* (1.54)	-2.45 (1.51)	-11.36 (7.03)	2.96 (6.38)	-1.87 (5.20)	8.62 (5.39)	5.06 (4.52)	2.97* (1.56)	-0.36 (1.70)	-1.54 (1.78)	-1.48 (2.29)	-0.06 (1.41)
Transport, Storage and Communication	3.14 (2.00)	-0.84 (2.01)	-0.50 (1.30)	-3.03* (1.72)	-1.16 (2.14)	-10.31 (6.76)	6.66 (7.89)	2.96 (4.98)	12.01** (5.55)	-4.23 (7.51)	2.49 (3.06)	-3.91 (3.11)	-0.60 (1.84)	-2.01 (1.87)	-1.14 (3.03)
Finance, Insurance and Real Estate	-1.01 (2.01)	-1.50 (2.80)	0.08 (2.20)	-1.30 (2.48)	-7.91*** (2.93)	7.34 (7.77)	9.83 (11.23)	5.51 (7.73)	3.66 (8.04)	16.74 (11.25)	0.13 (2.94)	-2.50 (1.74)	-0.68 (2.15)	-0.84 (2.58)	-1.46 (2.03)
Government; Community, Social and Personal Services	0.53 (1.20)	1.07 (1.72)	-0.93 (0.99)	-1.07 (0.98)	0.01 (1.06)	2.16 (4.61)	-2.84 (6.72)	2.35 (3.35)	4.03 (3.10)	1.02 (3.80)	-0.15 (1.67)	2.80** (1.43)	-0.90 (1.32)	0.93 (1.00)	1.54 (1.99)
Total	0.67 (0.60)	-0.19 (0.63)	-0.17 (0.69)	-1.42* (0.83)	-1.05 (0.67)	-2.64 (2.13)	0.94 (2.21)	0.71 (2.07)	3.66 (2.41)	0.57 (2.04)	1.38 (0.94)	0.64 (0.71)	-0.17 (0.85)	0.37 (1.34)	0.35 (0.93)

Std. errors in parentheses; * p<0.1; ** p<0.05; *** p<0.01

Fig. 1

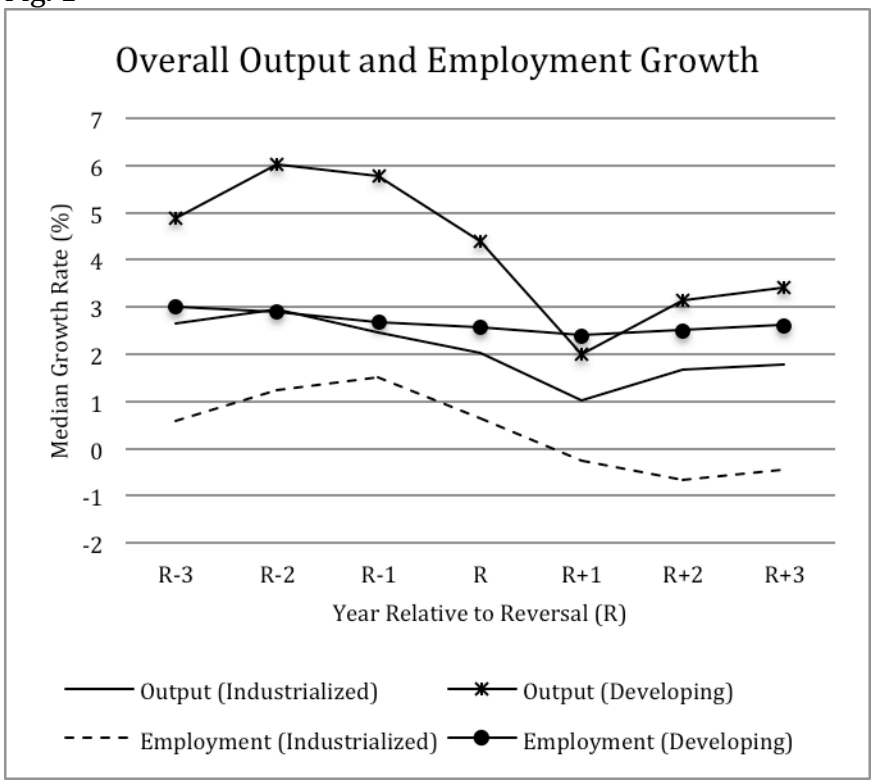

Overall Output and Employment Growth
Median Growth Rate (%)
7
6
5
4
3
2
1
0
-1
-2
R-3
R-2
R-1
R
R+1
R+2
R+3
Year Relative to Reversal (R)
Output (Industrialized)
Output (Developing)
Employment (Industrialized)
Employment (Developing)

Fig. 2

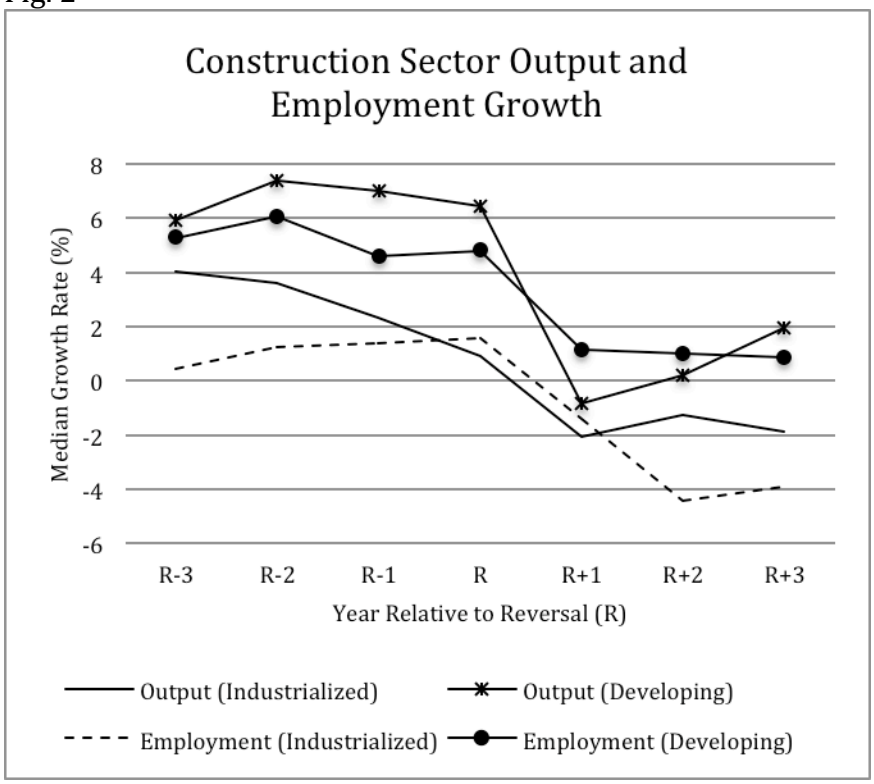

Construction Sector Output and Employment Growth
Median Growth Rate (%)
8
6
4
2
0
-2
-4
-6
R-3
R-2
R-1
R
R+1
R+2
R+3
Year Relative to Reversal (R)
Output (Industrialized)
Output (Developing)
Employment (Industrialized)
Employment (Developing)

Fig. 3

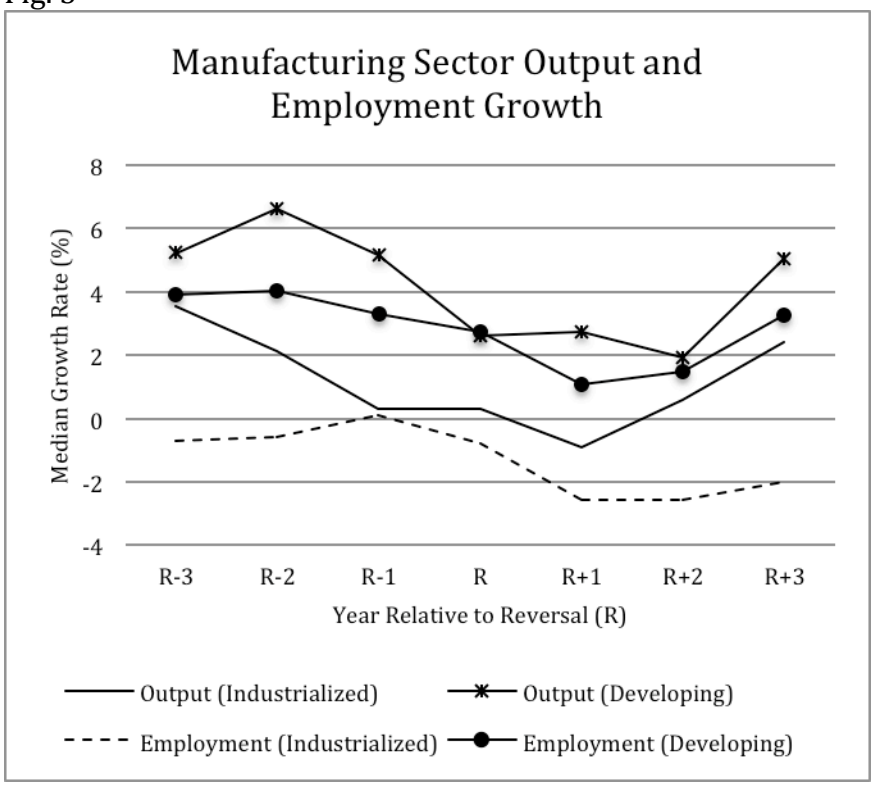

Manufacturing Sector Output and Employment Growth
Median Growth Rate (%)
8
6
4
2
0
-2
-4
R-3
R-2
R-1
R
R+1
R+2
R+3
Year Relative to Reversal (R)
Output (Industrialized)
Output (Developing)
Employment (Industrialized)
Employment (Developing)

Fig. 4

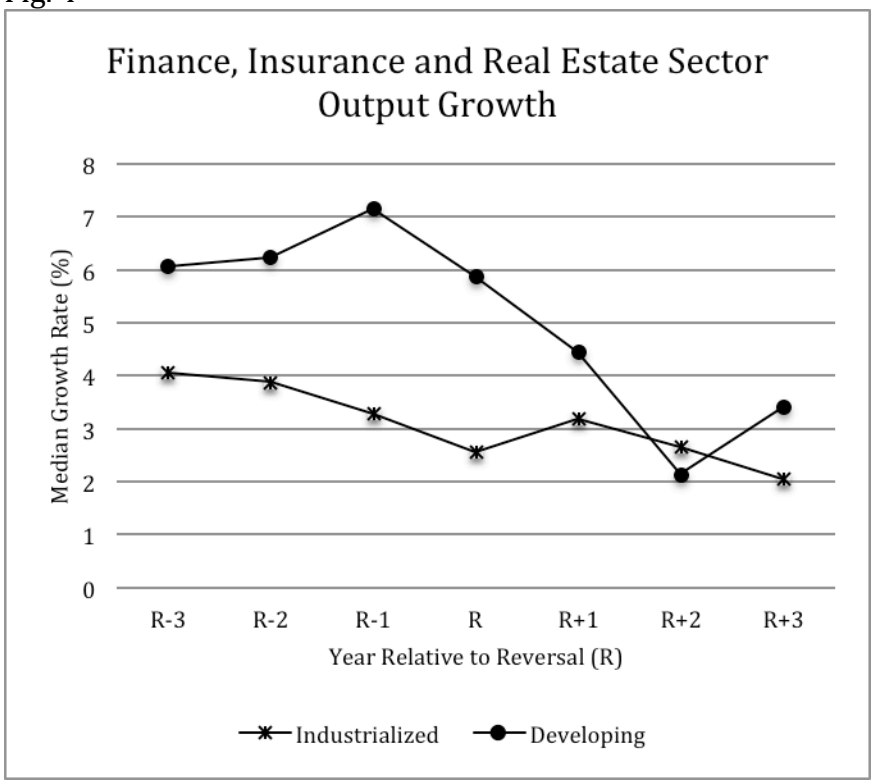
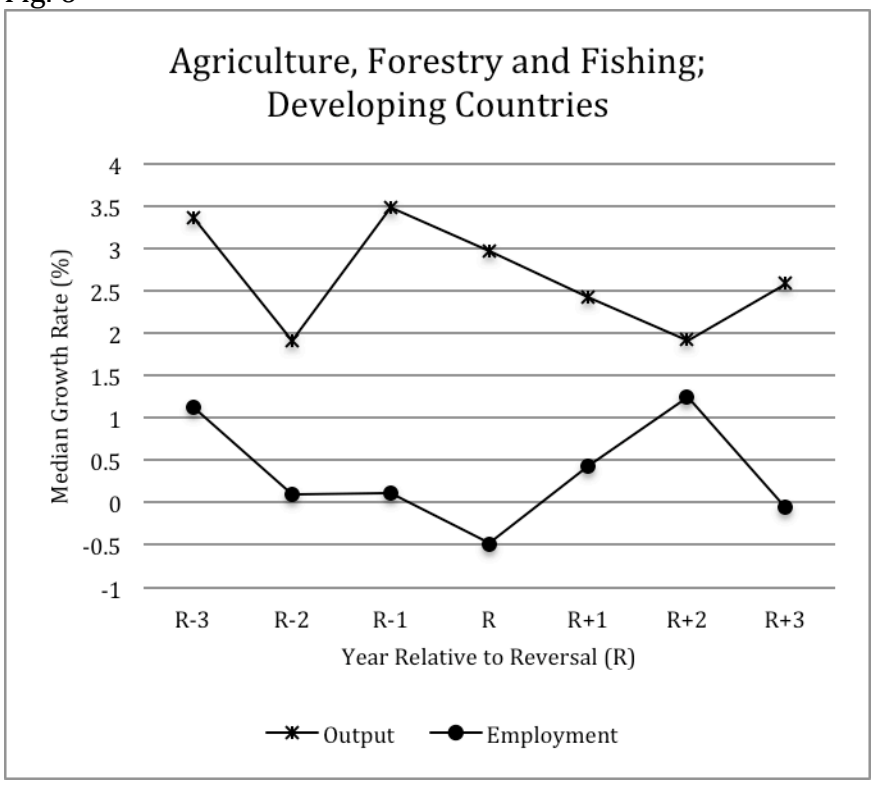

Finance, Insurance and Real Estate Sector Output Growth
Median Growth Rate (%)
8
7
6
5
4
3
2
1
0
R-3
R-2
R-1
R
R+1
R+2
R+3
Year Relative to Reversal (R)
Industrialized
Developing

Fig. 5


Wholesale/Retail Trade, Hotels and Restaurants; Developing Countries
Median Growth Rate (%)
6
5
4
3
2
1
0
R-3
R-2
R-1
R
R+1
R+2
R+3
Year Relative to Reversal (R)
Output
Employment

Fig. 6


Agriculture, Forestry and Fishing; Developing Countries
Median Growth Rate (%)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
R-3
R-2
R-1
R
R+1
R+2
R+3
Year Relative to Reversal (R)
Output
Employment