CHARACTERISING THE DISAGGREGATE EFFECTS OF RECESSIONS.

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Abstract

There is a renewed interest in analyzing the effects of recessions and whether those temporary events can shape the productivity structure of the economy and somehow have a long-run impact. Most of the existing literature focuses on the impact of recessions at aggregate (e.g. banking and financial crises). This paper aims at analysing the impact of recessions on sectoral restructuring for a large set of developed and emerging markets. In particular, the paper analyses the reallocation of output, employment and productivity during and after recessions between industries, and whether this reallocation occurs in a systematic way leading to permanent productivity effects.

JEL Classification: E32, O14, O47

Keywords: recessions, sectoral restructuring, permanent productivity effects.

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1) Introduction-Motivation:

There is a renewed interest in analyzing the effects of recessions and whether those temporary events can shape the productivity structure of the economy and somehow have a long-run impact. Most of the existing literature focuses on the impact of recessions at aggregate (e.g. banking and financial crises). Recent contributions along these lines include Cerra and Saxena (2007), Reinhart and Rogoff (2008, 2009) and Claessens et al. (2008). They show that financial distress can lead to highly persistent (sometimes permanent) and deep recessions. There is also a large body of evidence on volatility and growth, as reviewed by Loayza et al. (2007), focusing on the impact of amplitude and duration of cycles on growth.

There is also another dimension to the analyses of recessions. What effects do recessions have on the supply side of the economy: productivity, employment, and structural change?

Theoretical literature has gone a long way to explain the relationship between cycles and growth, and more precisely the potential permanent effects of recessions. On the one hand we have the Schumpeterian models of Caballero and Hammour (1994) and Hall (1991). From those models we can distinguish between the cleansing effect and the opportunity cost literatures respectively. Much of these models reflect empirical findings related to job flows and firm dynamics over the business cycle, emphasising the importance of REC for the pace of restructuring and productivity change. On the other hand, we have the Learning by doing models of Stadler (1990) and R&D models of Aghion et al (2005) and Barlevy (2007). The idea that learning through investment and/or production reduces average costs was first introduced in a growth model by Arrow (1962). Models of endogenous growth that depend on this mechanism can generate permanent effects of recessions. One such pioneeiring model is Stadler (1990). Similar conclusions can be reached by models of endogenous R&D with financial constraints, as shown by the two above mentioned authors. In these theoretical models, recessions can influence productivity, although the sign of the impact will depend on a variety of technology and institutional parameters.

The aim of this paper is to dissect the impact of recession at a disaggregated level to see: if there are patterns in output, employment, and productivity growth and sectoral shares; if there are marked differences between sectors; and if there are significant differences between developed and emerging markets. At this stage, we are undergoing a purely descriptive analysis to try to uncover data patters and find stylized facts and not to give a structural interpretation to all results. Although this study is time consuming, it is a necessary and important step towards developing

structural models to explain sectoral differences from the impact of recessions. As such this work is still unfinished and results are preliminary.

Section 2 will present the data; Section 3 will show the methodology used for this descriptive analyses; Section 4 presents the results; and finally section 5 concludes.

2) Data description:

In this study, we are making use of the UNIDO Industrial statistics database (INDSTAT). The INDSTAT in accordance with Revision 2 of the International Standard Industrial Classification of All Economic Activities (ISIC) presents the dataset arranged in accordance with the 3-digit level of the code of the International Standard Industrial Classification of All Economic Activities (Revision 2) (ISIC), which provides for the 28 industrial branches of the manufacturing sector. This represents also the main disadvantage of this dataset: it only consists of data of the manufacturing sector. on the other hand, there is a big advantage compensating for that: these data are available for a large set of developed and emerging countries.

This dataset consists of 181 countries and 28 industries and data span the time period of 1963 to 2004. The data are annually distributed. The ISIC 3-digit level data set of the INDSTAT includes annual figures measuring:

(1) Number of establishments
(2) Number of employees
(3) Number of female employees
(4) Wages and salaries
(5) Output
(6) Value added
(7) Gross fixed capital formation
(8) Index numbers of industrial production

The clearing of the dataset was based on data availability. 20 observations needed to be available for each country and for at least 15 industrial branches of the manufacturing sector. If there was a small gap of 2 to 3 years in the observations then the data were interpolated. Then, we collected data for the GDP growth (annual %) from the World Bank, in order to establish recession periods for the selected countries. those countries were required to have faced at least one recession, defined as negative annual GDP growth (different from NBER recessions), during the available time period. The selected countries must have faced at least one recession in the same time period that data are available from the UNIDO dataset. Based on those criteria, we ended up with 38 countries; 22 are developed countries and the remaining 16 are emerging.

From 1970 to 2002, 128 recessions were faced by the total amount of countries analysed; 74 of them were faced by developed countries and the remaining 54 were faced by emerging. In our study, recessions are defined as negative annual GDP growth (different from NBER recessions). 37 out of the 128 recessions were found to be deep; 6 of them took place in developed countries and the remaining 37 in the emerging markets. A recession is said to be deep when the average drop of output is higher than that of the whole group. When focusing only on the developed group of countries, 31 out of the 74 recessions seem to be deep, while when considering only the emerging group, 21 out of the 54 are deep recessions. Moreover, as expected, the mean drop of output of developed countries is more than half that of the total group (when analysing both developed and emerging groups), while for emerging it is approximately double. When comparing developed to emerging countries, the mean drop of output of the developed countries is ¼ of that of emerging countries. Similar conclusions can be drawn for the sum drop of output, which is much lower for the developed than the emerging group.

COUNTRY	SUM DROP OF OUTPUT	MEAN DROP OF OUTPUT	Nb. of RECESSIONS	Nb. of Deep RECESSIONS
DEVELOPED	-91.834000	-1.2155670	74	6/31
EMERGING	-248.08000	-4.8616392	54	31/21
TOTAL	-339.92900	-2.7508157	128	37

Finally, UNIDO does not have sectoral deflators or VA Manufacturing deflator data for each country. EU KLEMS provides data for VA Manufacturing deflator at a disaggregated level from 1970 to 2005 for the US. For some other countries, data at an aggregate level were available at the World Bank. For those countries what we did was to simply deflate the nominal VA with the sectoral price.

$$RVAi = \frac{NVAi}{Defi}$$

Where RVAi is the real Value added of a sector I, NVAi is the nominal Value added of a sector I, and Defi is the manufacturing deflator of a sector I when considering the US or of total manufacturing when considering the rest of the countries.

For the rest of the countries we collected PPI data from the World Bank. Since the Manufacturing sector is highly traded, there is correlation between US relative price changes and specific countries relative price changes. Using US deflators only would mean a kind of sectoral deflator, without considering country characteristics. So, if one country experiences general hyperinflation affecting all sectors then, deflating

by the US sectoral deflators would ignore that fact, and we'd be deflating by something that doesn't correspond to general inflation effects. For this reason,

we deflate everything by their PPI and then correct it with the US relative price for each sector. So if NVA(i) is the nominal value added of a sector i in a country A (other than the US), what we'd do is simply:

$$RVAi = NVAi * \frac{PPIdefUS}{PPIdefA} * \frac{1}{DefiUS}$$

3) Methodology:

The main aim of this paper is to analyze the impact of recessions on sectoral restructuring for a large set of developed and emerging markets. To do this we identified recessions for each country. We then averaged VA, Employment and Productivity growth from REC-3 to REC+3. The same was performed for the shares of VA and Employment. This enabled us to show the evolution of those variables for pre- and post-recession periods and to observe whether some industries are most affected than others.

In particular, we analyze the reallocation of output, employment and productivity 3 years before to 3 years after recessions. We first ranked the industries in terms of productivity levels from the most productive to the less productive ones. Industries were then divided into 4 groups, namely most productive, very productive, productive, and less productive groups. We averaged the values of the industries in each group to observe the evolution of VA, Employment and Productivity growth, and also VA and Employment share and to see whether they face permanent productivity losses and whether some groups gain and others loose shares.

We have also rearranged our results in terms of industries to check whether there are significant differences between emerging and developed countries. These results will however not be presented at this stage because of time pressure, and most importantly because there are no important differences observed between those set of countries when comparing their respective industries.

We then wanted to check whether recessions are affecting the concentration of VA and labour of the manufacturing sector. For that we made use of 2 different measures: the Gini coefficient and the Herfindahl-Hirschman Index.

The Gini coefficient here uses information on how VA and Employment shares are distributed across the different industries. "The use of employment shares as a measure of sector size is common in the empirical literature concerned with sectoral

specialization. However, results obtained using sectoral shares in VA can provide a generalization of the evidence based on sectoral labor inputs."[1]

The standard Gini index measures twice the surface between the Lorenz curve, which maps the cumulative VA/Employment share on the vertical axis against the distribution of the industries on the vertical axis, and the line of equal distribution. So, in my data I firstly ranked the VA/Employment share for each time period and found the cumulative share of all industries and then we attributed a proportional share to each industry (1/28) in order to find the cumulative share of all industries when equally weighted.

A large number of mathematical expressions have been proposed for the Gini index, but the easiest to manipulate is based on the covariance between the ranked industries VA/Employment share, Y, of an industry and F rank that the industry occupies in the distribution of VA/Employment share (this rank takes a value between zero for the lowest VA/Employment share and one for the highest one). The covariance is then multiplied by 2 and divided through by the average VA/Employment share.

Denoting by y the mean VA/Employment share, the standard Gini index is defined as:

$$Gini = 2\,\mathrm{cov}(Y, F)/\,y$$

The Herfindahl-Hirschman Index (HHI) is a good indicator of the level of concentration among industries of a sector. It is defined as the sum of the market shares of each industry in the market. We made use of both VA shares and employment shares to estimate the HHI. A decrease in the HHI indicates decrease in the concentration (or a more diversified market) of VA or labour respectively, whereas an increase implies the opposite. The formula of HHI can be expressed as follows:

$$H = \sum_{i=1}^{N} s_i^2$$

Where s_i is the market share of industry i in the manufacturing sector, and N is the number of industries. The Herfindahl Index (H) ranges from 1/N to one. Equivalently, the index can range up to 10000 if percents as whole numbers are used to express market shares.

[1] Imbs and Wacziarg (2003), Stages of Diversification, American Economic Review, Vol.93 No.1.

A small HHI indicates an unconcentrated manufacturing sector in our case. If all industries have an equal share, the reciprocal of the index shows the number of industries in the sector. The HHI takes into account the relative size and distribution of the industries in a sector and approaches zero when a sector consists of a large number of industries of relatively equal size. The HHI increases both as the number of industries in the market decreases and as the disparity in size between those industries increases.

The normalized Herfindahl-Hirschman Index normalizes the HHI as shown in the equation below:

$$H^* = \frac{\left(H - 1/N\right)}{1 - 1/N}$$

where again, N is the number of industries in the sector, and H is the usual HHI, as above.

While the HHI ranges from 1/N to 1, the normalised HHI (NHHI) ranges from 0 to 1 whatever the number of industries in the manufacturing sector. The NHHI takes into account the relative size of the firms in a market and approaches zero when a market consists of industries of relatively equal size. Therefore, this index is unaffected by the number of industries in the sector. Since the HHI depends on the number of industries, this index will not be suitable for the comparison of different countries having unequal number of industries in their manufacturing sector. Given that this is the case in our study (as some countries did not have data for particular industries in the manufacturing sector and were therefore omitted from the sector), we will make use of the NHHI to estimate the level of VA and Employment concentration in the manufacturing sector of the 38 countries under consideration. [2]

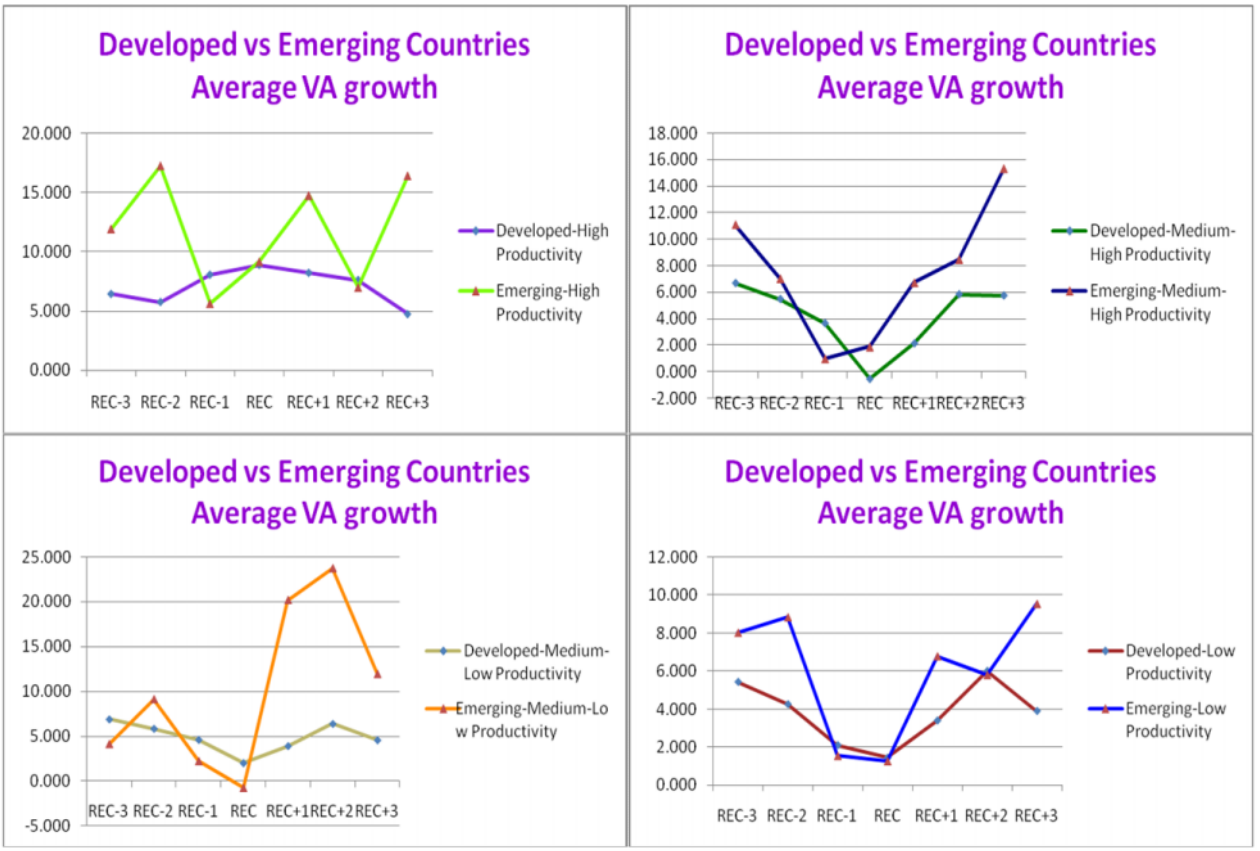
We have chosen one representative country from each group, with US representing developed countries and Turkey representing the emerging ones.

4) Results:

As previously mentioned, we aim at analyzing the impact of recessions on sectoral restructuring for a large set of developed and emerging markets. To do this we identified recessions for each country and averaged VA, EMPL and Productivity growth from REC-3 to REC+3. The same was performed for the shares of VA and Employment. This enabled us to show the evolution of those variables for pre- and post-recession periods. In the set of results that follow we have ranked the industries of each country in terms of productivity levels from the most productive

[2] This follows the methodology of Khurshid, Rohit and Singh (2009), Levels and Trends of Competition among the Mutual Funds in India, Research Journal of Business Management, Vol.3 Nb.2.

to the less productive ones. Industries were divided into 4 groups, namely most productive, very productive, productive, and less productive groups. We averaged the values from REC-3 to REC+3 of the industries in each group to observe the evolution of VA, EMPL and Productivity growth, and also VA and Employment share and to see whether they face permanent productivity losses or gains, and whether some groups permanently gain or lose shares. Then, averages were taken for the developed and emerging countries for the 4 different productive groups to observe whether there are significant differences between the two groups of countries. The latter results are the ones analysed below.



Developed vs Emerging	REC-3	REC-2	REC-1	REC	REC+1	REC+2	REC+3
Developed-High Prod	6.445	5.771	8.055	8.873	8.211	7.606	4.751
Emerging-High Prod	11.933	17.251	5.662	9.170	14.749	7.008	16.406
Developed-Medium-High Prod	6.658	5.463	3.651	-0.529	2.145	5.820	5.728
Emerging-Medium-High Prod	11.083	7.022	0.990	1.885	6.711	8.463	15.302
Developed-Medium-Low Prod	6.900	5.855	4.618	2.023	3.926	6.398	4.574
Emerging-Medium-Low Prod	4.129	9.131	2.242	-0.762	20.185	23.723	11.942
Developed-Low Prod	5.422	4.250	2.103	1.444	3.396	6.000	3.894
Emerging-Low Prod	8.032	8.848	1.537	1.247	6.789	5.805	9.552

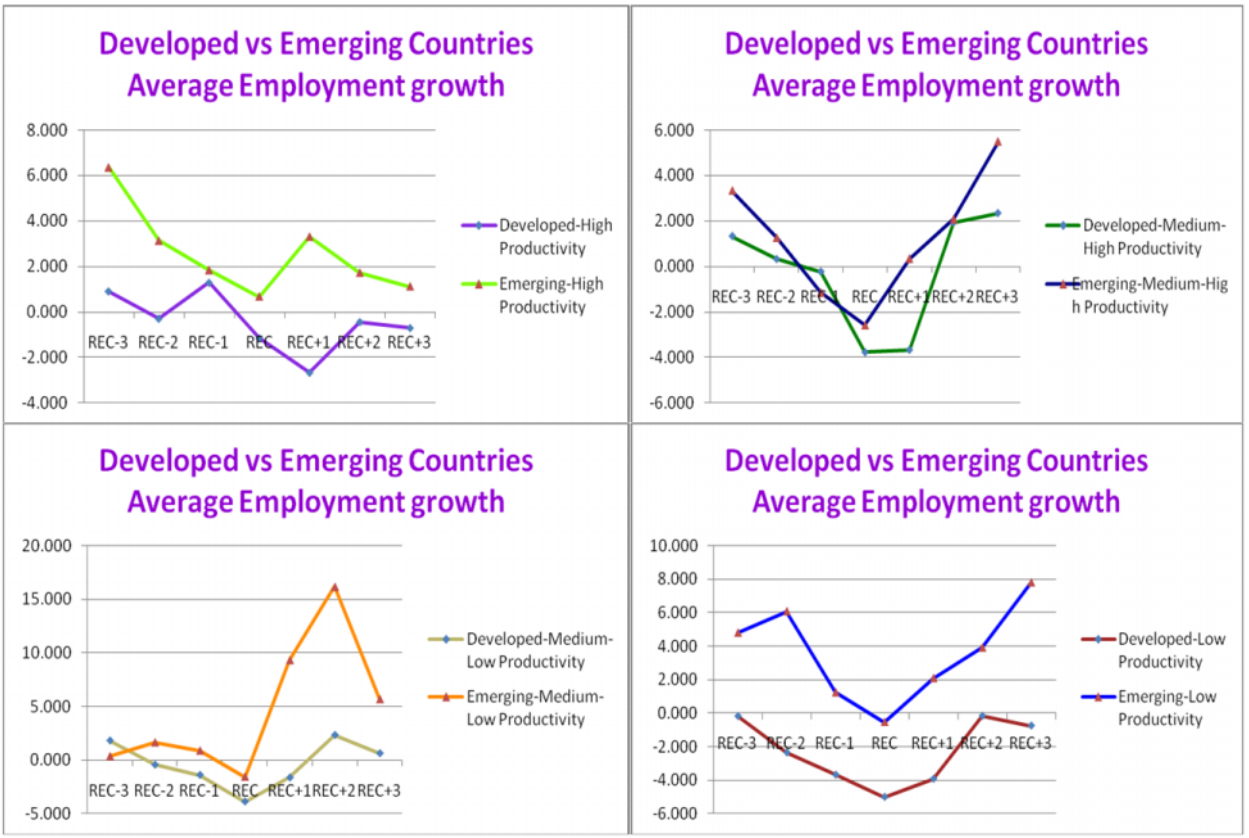
As we can observe from the above graphs, for the developed countries we usually observe a V shaped pattern around REC except for the most productive group, which

displays a countercyclical pattern with the highest VA growth faced the year of the recession. This result is not shocking as the most productive group usually includes industries, such as petroleum refineries and petroleum and coal, which are themselves found to be countercyclical as they depend very much on oil prices. Overall, all productivity groups seem to have faced permanent losses in VA levels, as post recession growth has not caught up pre-recession one. The highest contraction is faced by the medium-low productivity group (≈2.3%), followed by the highly productive group (≈1.7%), the low productivity group (≈1.5%), and finally the medium-high productivity group (≈0.9%). But these patterns are quite distinct: for the high productivity group, the recession starts earlier as the lowest VA growth is faced at REC-2, and then displays a countercyclical pattern where VA growth increases up to REC and then falls to lower growth than the pre-recession one. For medium-high productivity group, the pattern is V shaped, but growth post-recession is stabilizing and slightly lower, so levels are permanently affected; exactly the same patterns and conclusions are observed for the medium-low and the low productivity groups, with the only difference being the observed unstable right tail of the V shape. Overall, growth does not seem to recover to pre-recession rates within the 3 years, implying that all groups face permanent losses in VA levels.

Straightforwardly, one can observe very different patterns for the different groups. The two most productive groups face their lower average growth one year before REC, while the two less productive ones are "coordinated" with the REC point. Emerging markets do have many more industries that are non-coordinated with the REC point than developed ones[3]; it must therefore be the case that those type of industries are either highly productive or medium-high productive. All groups have higher post- than pre-recession growth with the biggest expansion being faced by the medium-low productive group (≈7.8%), followed by high productivity sectors (≈4.5%) and medium-high ones (≈4.2%). The low productivity group faced the lowest expansion (≈1.5%). As previously mentioned, these patterns are very distinct: for the highly productive industries we observe a clear W shaped pattern, where recession is the shortest lasting as it reaches the lowest growth at REC-1 and starts recovering before facing another downturn at REC+1 which is clearly recovered up to REC+3. The medium-high productive industries display a V shaped pattern, which is leading the recession; moreover, the right tail of the V is much longer than the left one, therefore VA levels are permanently positively affected. Both medium-low and low productive groups display a kind of a V shaped pattern with very unstable tails. Despite this instability, what is important to observe is that both of them face higher

[3] It is important to note here that many of those sectors that are "non-coordinated" are basic consumption goods and this may reflect a shift into basic products in consumption patterns during a recession. This might therefore represent a shift from luxury to necessity goods, but it might also be representing a drop in investment that reduces the output of industries producing capital goods.

growth post-recession therefore implying a permanent gain in VA levels. Overall, we can conclude that VA growth in emerging countries recovers within the observed 3 years after REC and for all groups, recessions lead to permanent gains in VA levels.



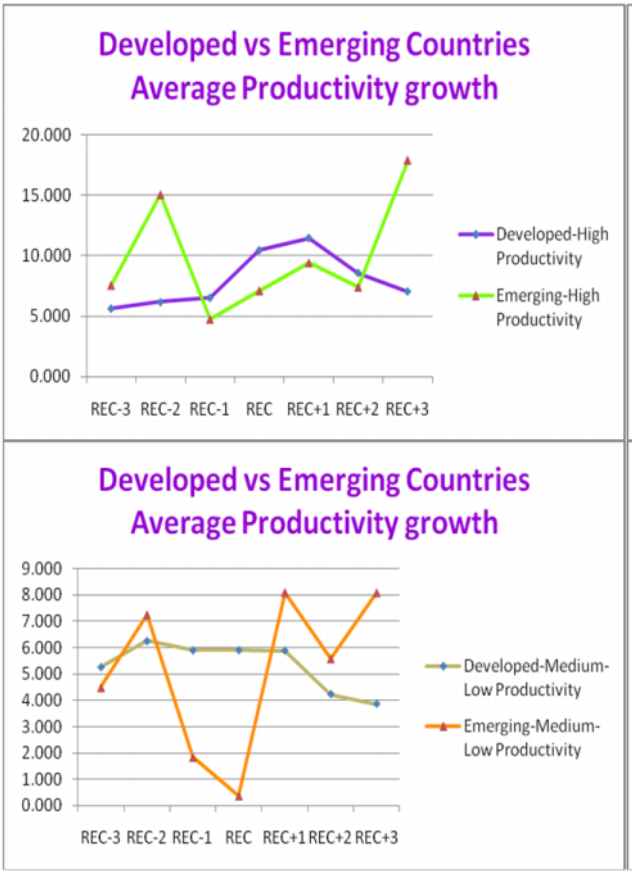
Developed vs Emerging	REC-3	REC-2	REC-1	REC	REC+1	REC+2	REC+3
Developed-High Prod	0.918	-0.290	1.299	-1.153	-2.676	-0.439	-0.702
Emerging-High Prod	6.374	3.136	1.842	0.674	3.315	1.728	1.122
Developed-Medium-High Prod	1.325	0.315	-0.233	-3.773	-3.664	1.925	2.332
Emerging-Medium-High Prod	3.332	1.261	-1.146	-2.582	0.343	2.080	5.486
Developed-Medium-Low Prod	1.832	-0.436	-1.400	-3.888	-1.637	2.354	0.637
Emerging-Medium-Low Prod	0.339	1.634	0.872	-1.578	9.317	16.167	5.670
Developed-Low Prod	-0.175	-2.351	-3.678	-5.001	-3.922	-0.163	-0.746
Emerging-Low Prod	4.780	6.057	1.226	-0.544	2.073	3.898	7.781

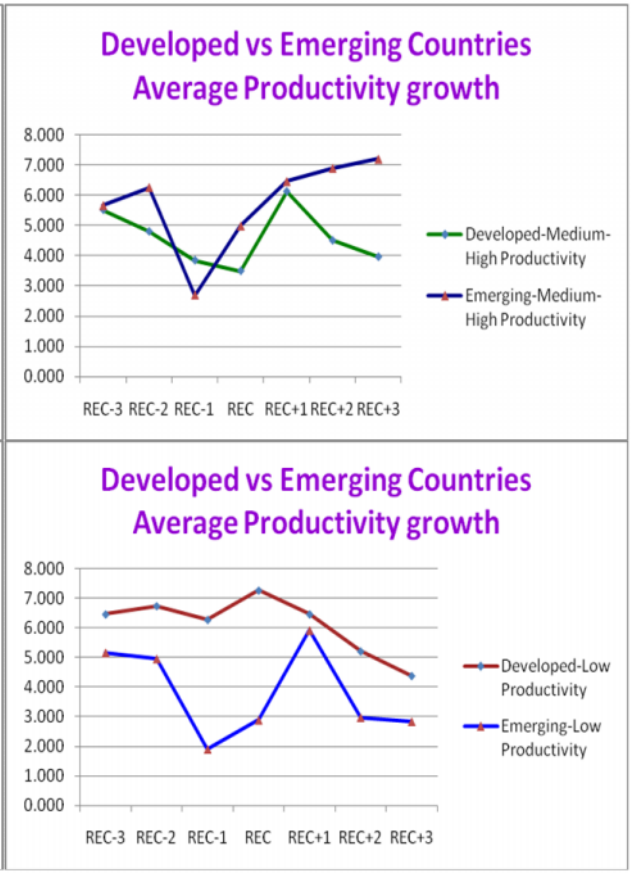
From those graphs, we can observe quite pronounced V pattern for all groups of the developed countries. Contractions taking place at the REC point, except for the high-productivity group which is now lagging recession and faces the contraction at REC+1. For the remaining groups the picture is quite similar to the one observed for VA growth. Most importantly, post-recession growth is very close to pre-recession one but it is not quite there yet for most groups. Only medium-high productive industries seem to have recovered within the 3 years and therefore seem to face a permanent positive effect on employment levels. The highly productive group faces

the biggest contraction and therefore the biggest loss in employment levels, followed by the medium-low productive industries and then by the low ones. Overall, employment growth has not recovered in 3 out of 4 groups, implying that those 3 groups are facing permanent employment losses.

For the emerging countries, all groups are facing distinct V shaped patterns with the contraction taking place at the recession point for all groups whatever their productivity. More precisely the highly productive group, while recovering from REC to REC+1 it then faces another downward pattern up to REC+3. This is also observed by the fact that the left tail of this V is much longer than the right one, implying that this group faces permanent losses in employment level. However, this group represents the exception. The remaining ones, although facing very distinct V shaped patterns (very stable V pattern for medium-high productive industries, a very strange countercyclical left tail for medium-low group and very long right tail with a big fall at REC+3, and a quite stable V for the low productive group with much longer right tail), the overall conclusion is the same: for all groups post-recession growth is higher than pre-recession growth, showing that employment levels are permanently positively affected for all those groups.[4]

[4] There might be a threshold productivity level for which employment and VA will gain from a recession. So it might be the case that the productivity level faced by the highly productive group of emerging countries is at similar levels to the one faced by low productivity industries in developed countries and therefore that is why we obtain similar conclusions for this group to the ones obtained for developed countries.





Developed vs Emerging	REC-3	REC-2	REC-1	REC	REC+1	REC+2	REC+3
Developed-High Prod	5.645	6.179	6.524	10.445	11.451	8.579	7.056
Emerging-High Prod	7.553	15.053	4.750	7.115	9.416	7.404	17.896
Developed-Medium-High Prod	5.510	4.795	3.846	3.497	6.115	4.500	3.961
Emerging-Medium-High Prod	5.656	6.259	2.687	4.977	6.458	6.899	7.200
Developed-Medium-Low Prod	5.253	6.251	5.893	5.902	5.887	4.222	3.852
Emerging-Medium-Low Prod	4.480	7.245	1.844	0.378	8.091	5.577	8.077
Developed-Low Prod	6.460	6.739	6.273	7.266	6.460	5.212	4.383
Emerging-Low Prod	5.163	4.954	1.910	2.892	5.913	2.980	2.844

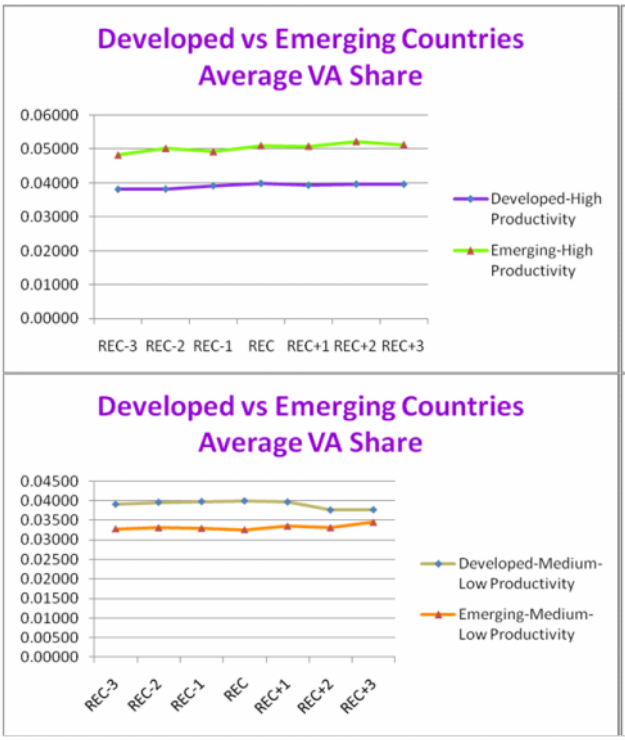
At a first glance, this picture looks strange for the developed countries. For all groups, except the medium-high productivity one, productivity growth follows a countercyclical pattern; although this pattern is not as much pronounced in the medium-low productive group where a more stable growth is observed around the recession point, as it is for the other groups. Out of those groups the 2 less productive are showing lower post- than pre-recession growth, implying that they are facing permanent productivity losses. The high productive group displays the opposite effect with therefore permanent productivity gains. Finally, the medium-high productivity group we observe a kind of a V shaped pattern with contraction taking place at the REC point. However, the right tail of V faces a fall a year after

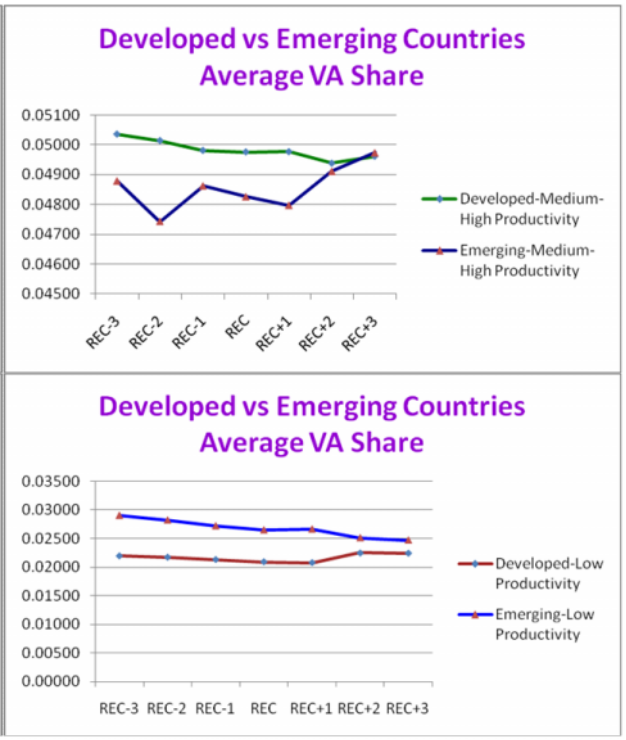
recession making the post-recession growth being lower than post-recession one. So this group is also facing permanent productivity losses.

Putting everything together, for developed countries the recovery for medium-high productivity group the recovery is employment driven as this group faces permanent employment gains while facing productivity losses. For the high productive group, recovery is mostly productivity driven. The two remaining groups face losses in both employment and productivity but they are smaller for the former than the latter. Overall, we can conclude that recovery is as much productivity as employment driven.

For the emerging markets, the graphs show a huge similarity in the patterns with VA growth. All groups are facing distinct shaped patterns with the contraction taking place at REC-1 for all groups, except for the medium-low productivity one which is coordinated with the recessions point and therefore is not a leading indicator as the remaining groups. This confirms the observation previously made that emerging markets do have many more industries that are non-coordinated with the REC point than developed ones. All groups have higher post- than pre-recession growth, except for the low productivity one, with the biggest expansion being faced by the high productivity sectors (≈10.3%), followed by the medium-low productive group (≈3.6%) and medium-high one (≈1.5%). On the opposite, the low productivity group faced a contraction of 2.3% approximately. As previously mentioned, these patterns are very distinct: for the highly productive industries we observe a clear W shaped pattern, where recession is short-lasting as it reaches the lowest growth at REC-1 and starts recovering before facing another downturn at REC+1 which is clearly recovered up to REC+3. This group has therefore faced permanent productivity gains. The medium-high productive industries display a V shaped pattern, which is leading the recession; moreover, the right tail of the V is much longer than the left one, therefore productivity is permanently positively affected. Both medium-low and low productive groups display a kind of W shaped pattern with quite unstable tails. Despite this instability, what is important to observe is that the medium-low productivity group faces higher growth post-recession therefore implying a permanent gain in productivity. On the other hand, the low productivity group displays an unfinished W shape, the last tail is missing, which straightforwardly indicates that pre-recession growth was higher. So this is the only group facing permanent losses in productivity. Overall, we can conclude that Productivity growth in emerging countries recovers within the observed 3 years after REC and for the majority of the groups, recessions lead to permanent gains in productivity levels.

From the recovery point of view, we can conclude that as for developed countries is as much productivity as employment driven. What is however important to note is that recovery seems to be faster in emerging rather than developed countries.

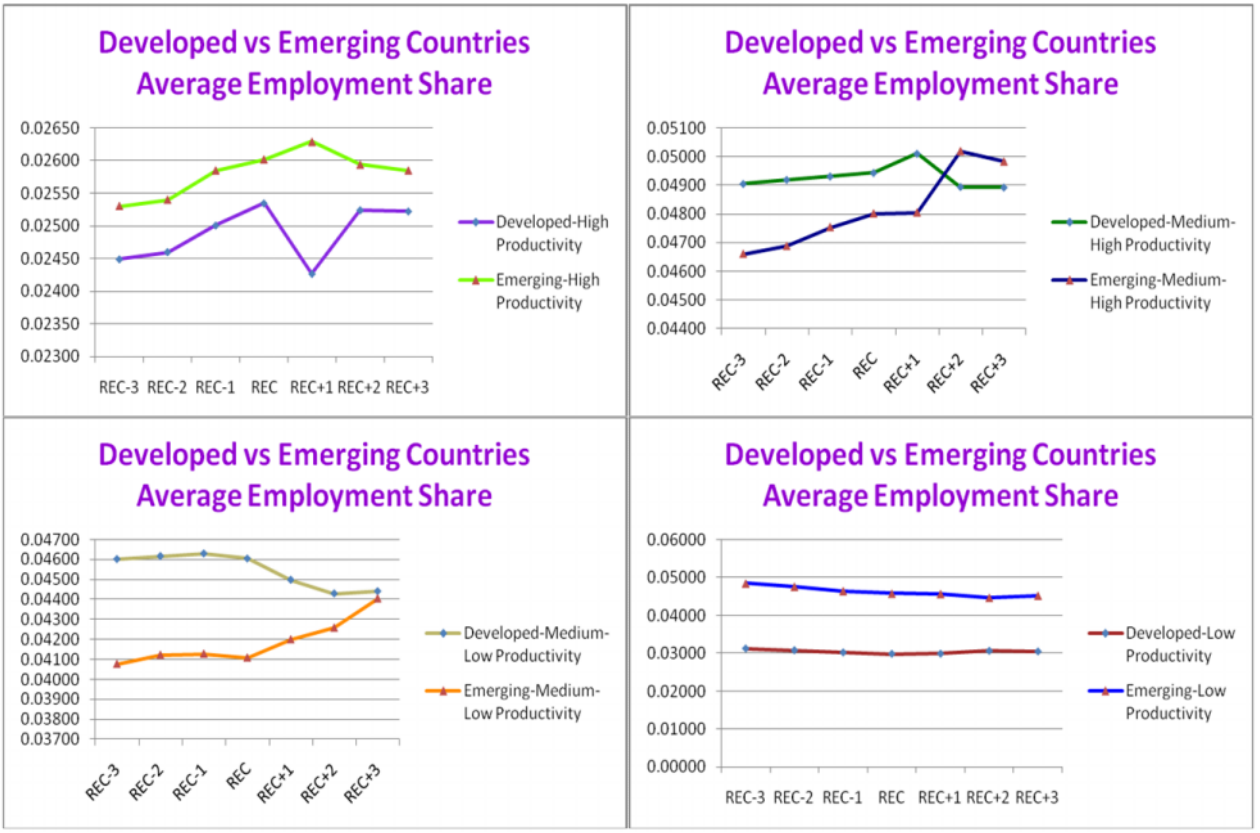




Developed vs Emerging	REC-3	REC-2	REC-1	REC	REC+1	REC+2	REC+3
Developed-High Prod	0.03814	0.03822	0.03914	0.03983	0.03928	0.03962	0.03957
Emerging-High Prod	0.04818	0.05017	0.04920	0.05101	0.05081	0.05222	0.05126
Developed-Medium-High Prod	0.05035	0.05014	0.04981	0.04976	0.04977	0.04938	0.04962
Emerging-Medium-High Prod	0.04879	0.04743	0.04863	0.04826	0.04797	0.04911	0.04974
Developed-Medium-Low Prod	0.03912	0.03961	0.03979	0.03995	0.03968	0.03767	0.03775
Emerging-Medium-Low Prod	0.03283	0.03311	0.03295	0.03260	0.03354	0.03314	0.03454
Developed-Low Prod	0.02197	0.02174	0.02132	0.02092	0.02077	0.02248	0.02245
Emerging-Low Prod	0.02905	0.02821	0.02721	0.02649	0.02663	0.02511	0.02470

The VA shares of the developed countries seem to follow a trend and do not show much of a cyclical pattern whatever the productivity group. There doesn't seem to be much movement overall around the REC point, so one can perhaps conclude that the distribution of output is not experiencing changes around the recession period and seems to be unaffected by such episodes. Despite that, when comparing the values from REC-3 to REC+3 we can see that the two extreme groups –high productivity and low productivity- seem to have gained some shares, while the two middle groups have lost some. Again, those changes are really small -approximately 0.1 to 0.2 percentage points for each industry in the group- so one cannot say much about those results. Overall the main observation for the developed countries is that there seems to be a shift in the shares from the two middle groups to the two extreme ones.

For the emerging markets, we observe that for some groups VA shares are following a trend and for some other groups shares seem to be changing around REC point so the distribution of output is experiencing changes around that period. More precisely, the shares of the high productivity group are following an upward trend so they seem to be gaining shares overall. The medium-high productivity group is showing a kind of a W shaped pattern with the contraction being faced at REC-2 and a second contraction at REC+1, followed by an increase. This group has also gained output shares. The medium-low productivity group shows a very stable and slightly upward trend so this group also gains some shares from REC-3 to REC+3. Finally the low productivity group follows a downward trend and therefore is the only group facing a loss of output shares. Overall, we can conclude that there is a redistribution of shares from the less productive to the most productive groups.



Developed vs Emerging	REC-3	REC-2	REC-1	REC	REC+1	REC+2	REC+3
Developed-High Prod	0.02449	0.02460	0.02501	0.02535	0.02426	0.02524	0.02523
Emerging-High Prod	0.02530	0.02540	0.02585	0.02602	0.02629	0.02594	0.02585
Developed-Medium-High Prod	0.04905	0.04919	0.04931	0.04944	0.05011	0.04895	0.04893
Emerging-Medium-High Prod	0.04660	0.04687	0.04754	0.04801	0.04804	0.05019	0.04983
Developed-Medium-Low Prod	0.04601	0.04616	0.04629	0.04604	0.04497	0.04428	0.04440
Emerging-Medium-Low Prod	0.04076	0.04121	0.04127	0.04108	0.04199	0.04257	0.04404
Developed-Low Prod	0.03125	0.03078	0.03019	0.02983	0.02987	0.03062	0.03046
Emerging-Low Prod	0.04842	0.04763	0.04647	0.04581	0.04573	0.04472	0.04527

Immediately, one can observe that the cyclical pattern dominates the trend for the distribution of employment shares for both developed and emerging groups, with the exception of the low productivity group.

In developed countries, the highly productive group is showing an italic N pattern: from REC-3 to REC there is an increase in employment shares; the year after the recession they lose shares, which are regained the following two years. Overall this group is gaining shares during recession periods. The employment shares of the medium-high productivity group are following a countercyclical pattern: there is an increase in the shares up to REC+1, followed by a fall to approximately pre-recession levels. So overall this group faces a small gain in employment shares. The medium-low group shows also a kind of a countercyclical pattern although it is not as much pronounced as it was for the previous group. The increase in the distribution of shares that takes place before the recession is not enough to compensate for the observed fall after it; in that sense, this group clearly faces a loss in employment shares during recessions. Finally, the low-productive group displays almost a straight line for the distribution of employment shares. However, when looking at the table we can see that, if graphed on a different scale, there would be a kind of a V shape pattern as shares slightly decrease from REC-3 to REC and then increase to slightly lower levels the years after. This group also faces a slight fall in employment shares. So overall, one can conclude that for developed countries there is a redistribution of employment shares from the less productive to the most productive groups.

For emerging countries, we observe a countercyclical pattern for the high productivity group: this group gains shares up to REC+1 and then loses some; the increase compensates the loss, therefore this group gains shares during recession periods. The medium-high productivity group displays a kind of a mirrored Z shape pattern: there is a regular increase in employment shares from REC-3 to REC+1 and then the two following years there is a big upward jump followed by a slight fall. Clearly this group is gaining employment shares during recessions. The medium-low productivity group displays a kind of a V pattern but with an unpronounced left tail. In fact, the left tail is rather countercyclical while the right one is upward sloping, implying that the group faces gains in employment growth. Finally, the low productivity group displays a slight downward trend obviously implying loss in employment shares. So overall, for emerging countries, there is a redistribution of employment shares from the low productivity group to the 3 highest productivity groups.

5) Conclusion:

We have analyzed the impact of recessions on sectoral restructuring for a large set of developed and emerging markets. This enabled us to show the evolution of VA, Employment and Productivity growth for pre- and post-recession periods and to observe whether some industries are most affected than others[5]. We then ranked the industries in terms of productivity levels from the most productive to the less productive ones and averaged the values of the industries in each group to observe the reallocation of VA, Employment and Productivity growth, and also VA and Employment share and to see whether they face permanent productivity losses and whether some groups gain and others loose shares.

From this analysis we drew 8 stylized facts:

Stylized Fact 1: VA growth recovers much quicker in emerging than in developed countries, implying that, 3 years after recession (the time period considered as the recovery one in this study), while emerging markets face permanent gains in their VA levels after a recession, developed countries face a permanent loss.

Stylized Fact 2: It seems that employment growth recovers quicker in emerging than developed countries. The majority of manufacturing sectors in developed countries face permanent employment losses after a recession. The opposite is true for the emerging markets.

Stylized Fact 3: It seems that productivity growth recovers quicker in emerging than developed countries; as expected given VA and employment growth recovery. The majority of manufacturing sectors in developed countries face permanent productivity losses after a recession. The opposite is true for the emerging markets.

Stylized Fact 4: For both groups of countries, recovery is as much productivity as employment driven. However recovery seems to be faster in emerging rather than in developed countries.

Stylized Fact 5: The distribution of output shares in emerging countries seem to be more affected by recessions than developed countries, as cyclical patterns are observed for the former while trend dominates the latter.

Stylized Fact 6: For developed countries, there is a redistribution of output shares from the two middle groups to the two extreme ones. For emerging countries, there is a redistribution of shares from the less productive to the most productive groups.

Stylized Fact 7: For developed countries, although changes are very pronounced, there is a shift in employment shares from the 3 lowest productive groups to the high

[5] Results are available upon request.

productivity one. For emerging countries, there is a redistribution of employment shares from the low productivity group to the 3 highest productivity groups. For both group of countries one can say that the low-productivity group is the loser of shares while the highly-productive group is the winner of shares.

Stylized Fact 8: Employment share are more volatile than output shares around recession periods. The former is dominated by cyclical patterns and the latter by trends.

The next step was to check whether recessions are affecting the concentration of VA and labour of the industries in the manufacturing sector. For that we made use of 2 different measures: the Gini coefficient and the Herfindahl-Hirschman Index. Results have not been presented as numbers are not tedious and do not really show any significant change. Despite that I have pointed the main differences from the two different measure and the main conclusions are illustrated below.

The Gini coefficient showed that:

- the manufacturing sector of developed countries faces a more equal distribution of the shares across industries for both VA and Employment, when compared to the manufacturing sector of the emerging markets (0.48 vs 0.53 for VA and 0.50 vs 0.54 for Employment).
- for developed countries, employment shares are in general more unequally distributed than VA shares. However, for emerging markets those two measures are very close to each other and therefore do not indicate any significant difference in the distribution of VA and Employment shares. This implies that somehow productivity is more unequally distributed in rich countries than in poor countries. The difference is just one percentage point, so maybe one cannot make much about this issue.
- whether considering the developed or the emerging countries, some industries face productivity gains, others face losses, and others have an equal distribution.

The HHI index showed that:

- to the exception of Fiji and Panama, all countries indexes indicate an unconcentrated environment (HHI<0.1).
- overall for both variables, VA and EMPL, concentration is higher among developing countries than developed ones (0.07 vs 0.03).

In general, we can conclude that there isn't much change in concentration, but maybe some patterns that are common for both indexes can be extracted:

a) for some countries recessions increase of VA and employment and for other countries they decrease concentration; this being the case for both developed and emerging countries.

b) these have implications for the concentration of productivity so to speak, as differences in the concentration of VA and Employment will reflect on the productivity concentration; from the HHI index we can see that concentration of VA and Employment are equal across the sector implying that productivity for all countries except Fiji and Panama is unconcentrated; recessions do not seem to produce any significant differences. From the Gini coefficient, we concluded that whether considering the developed or the emerging countries, some industries face productivity gains, others face losses, and others have an equal distribution.

c) finally, concentration is higher among emerging countries than developed ones.

	GINI COEFFICIENT	HHI INDEX
MAIN RESULTS	-DC more equal distribution of shares across industries -DC: EMPL shares more unequally distributed than VA shares; EC: Gini coef very close for both VA & EMPL; SO Productivity more unequally distributed in rich countries than in poor countries	-All countries indexes indicate an unconcentrated environment (except Fiji and Panama) -Overall for both variables, VA and EMPL, concentration is higher among developing countries than developed ones
COMMON CONCLUSIONS	-Not much change in sectoral concentration during REC -For some countries REC increase concentration of VA and employment and for other countries they decrease it. -Some industries face productivity gains, others face losses, and others have an equal distribution -Concentration is higher among emerging countries than developed ones.	

Stylized Fact 9: There is not much change in sectoral concentration during recessions for both developed and emerging countries.

Stylized Fact 10: Concentration is higher among emerging markets than it is among developed countries.

To conclude, this is a preliminary work and further research will be implemented in this study. The next steps are to decompose productivity gains into between and within country variation and see how these different components affect the Business Cycle (BC).to look at the frequency and impact of industry specific versus economic wide recessions.

References:

- Aghion, P., G.M. Angeletos, A. Banerjee and K. Manova, 2005, Volatility and Growth: Credit Constraints and Productivity-Enhancing Investment. NBER Working Papers 11349.
- Arrow, J.K., 1962, The Economic Interpretation of Learning-by-doing. Review of Economics Studies 29, 155-173.
- Barlevy, G., 2007, On the Cyclicality of Research and Development. American Economic Review 97, 1131-1164.
- Caballero, R.J. and Hammour, 1994, The Cleansing Effects of Recessions. American Economic Review 84, 1350-1368.
- Claessens, S., Kose, M.A. and M.E. Terrones, 2008, What Happens During Recessionsm Crunches and Busts? IMF Working Paper 08/274.
- Cerra, V. and S.C. Saxena, 2007, Growth Dynamics: the Myth of Economic Recovery. BIS Working Paper, No. 226.
- Hall, R.E., 1991, Recessions as Reorganizations. NBER Macroeconomics Annual.
- Khurshid, Rohit and Singh, 2009, Levels and Trends of Competition among the Mutual Funds in India. Research Journal of Business Management, Vol.3 Nb.2.
- Loayza, N.V., Ranciere, R., Serven, L. and J. Ventura, 2007, Macroeconomic Volatility and Welfare in Developing Countries: An Introduction. World Bank Economic Review 24, 343-357.
- Reinhart, C.M. and K.S. Rogoff, 2008, Banking Crises: An Equal Opportunity Menace. NBER Working Paper 14587.
- Reinhart, C.M. and K.S. Rogoff, 2009, The Aftermath of Financial Crises. American Economic Review 99, 466-472.
- Stadler, G.W., 1990, Business Cycle Models with Endogenous Technology. American Economic Review 80, 763-778.