SLOWDOWN 2011: A Quantitative Analysis

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Abstract: The paper looks at how the recession has spread across the Indian economy in 2010-11. This exercise has been undertaken by systematically studying the overall growth rates of Indian Gross Domestic Product (GDP), deciphering the sectoral trends and analyzing the Index of Industrial Production (IIP) data to identify slowdown-affected industries. The year that acted as the turning point for each of these sectors were identified using semi-log regression and graphical analysis. Then an analysis was done on the input-output matrix of India to generate the coefficient and multiplier matrix to understand the interconnectivity between sectors. The analysis shows that 23 out of 30 sectors have been affected.

Index Terms – 2011 Recession, Indian Economy, Input-Output Matrix.

I. INTRODUCTION

India has gone through a roller coaster ride in last two decades. After liberalization, through the decade of 1990s, Indian economy grew at around 6-7% p.a. The pace picked up to about 8-9% p.a. from 2003-2008. The great recession of 2008 affected the Indian growth rate and it declined but quickly recovered within a year in 2009-10. The upward trend did not last for long: Indian economy started faltering from 2011 onwards. The growth rates slowed down to 5-6%. Although India did better than most economies of the world during this period, the slowdown cannot be denied.

The Indian government generally avoided discussions on this slow down. No finance minister confessed that Indian economy has entered recession. Interestingly, the national income figures also showed minimal impact on the growth trajectory. Industry-wise estimates of Gross Domestic Product (GDP) at Factor cost (obtained from Central Statistics Office, referred as CSO) gives a smooth curve for each of the nine main economic sectors with no major downward fluctuations. Figure 1 demonstrates how Transport, Storage and Communications industries data shows a trouble free sector. Similar were the trends for all the nine industry groups mentioned in CSO. The government, with such data, could afford to ward off all discussions on recession.

However, a distinct slowing trend is noticed when we look at the semi log regressions of these nine sectors pre and post 2008. The R-square and t-statistics remain high for all the nine sectors in both the periods (2000-2007 and 2008-2015) showing that the hit is satisfactory and the results are statistically significant. The value of β, indicating the growth rate, shows a decline. We find slowing down in the growth rates and hence a somewhat flatter growth curve for mining, manufacturing, trade, transport and construction after 2008. For example, in Table 1, for Trade, hotels and restaurants sector the growth rate (estimated β) decreased from 4% to 3%. This cannot be called a crash, but it definitely indicates a slowdown.
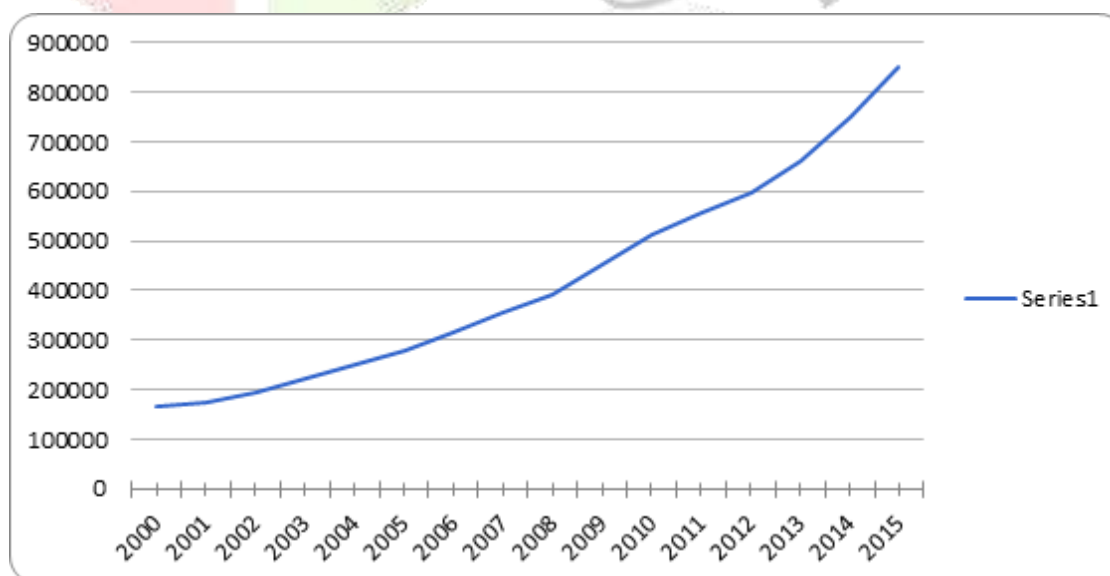

Figure 1: Trends in Transport, storage and communication

Table 1: Comparison of Regression Equations for 2000-07 vs. 2008-15

Regression Equation : Log(Sectoral GDP) = a + β Year			
Regression Stats for Years	**R square**	**β**	**T- statistics**
2000-2007	0.996	0.040	36.71
2008-2015	0.992	0.0308	27.63

Table 2 gives an overall picture of the slowdown. The highest decline came in construction industry (it is well known that construction gets affected during recession): 30% decline in growth rate. Manufacturing and Trade also saw a fall in growth rate to the extent of 25%. Only financial services show growth during this period. But all other sectors show a decline. It should be noted here that not all industries slowed down due to external shocks or decrease in demand. Some slowed down for endogenous reasons like government policies or resource exhaustion. But since the slowdown in such sectors happened at the same time when some industries were slowing down due to the world recession, it all added together to aggravate the slowdown.

Table 2: Decline In Calculated Growth Rates (β * 100) Of Various Sectors

Sector	β in 2000-2007	β in 2008-2015	% change
Mining	0.020	0.017	-15%
Manufacturing	0.035	0.026	-25%
Trade, Hotels and Restaurants	0.040	0.030	-25%
Transport, Storage and Communication	0.049	0.045	-10%
Construction	0.047	0.033	-30%
Finance, Insurance and Real Estate, etc	0.038	0.042	10%

Index of Industrial Production (IIP) captures the production trends of 682 industries. The growth rate in IIP declined 5-folds from 15.356 in 2007-08 to below 3 in years following 2011-12 as fig. 2 clearly indicates. There is a slow recovery from 2013 onwards but the recessionary effect still prevails. The industrial production is not picking up much yet.
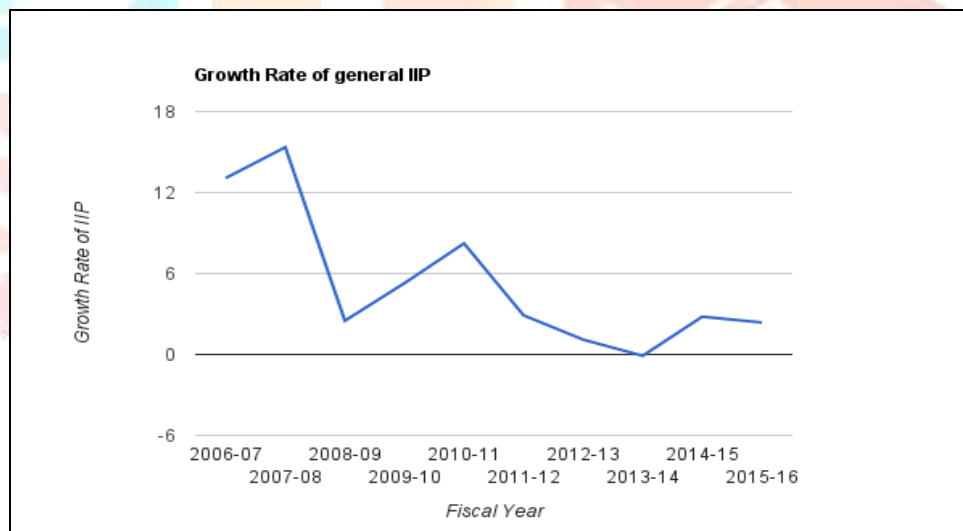

Figure 2: Growth rate of Index of Industrial Production (Source: Ministry of Statistics and Program Implementation)

Similarly, in Table 3 the data of Annual Survey of Industries (ASI) also shows that the growth rates in profits declined from 24% in 2007-08 to -22% in 2014-15. There is a decline in capital formation too. Here also we see a fleeting recovery in 2009-10 but the values fall again from 2011. From table 3, it is clear that, more than production and capital formation, the profits have taken the maximum hit. The lagged response of capital formation is evident. This is exactly what C.Rangarajan and Alok Sheel (2013) pointed out when they said that private investment and consumer confidence, which alone drive the sustainable recovery, has not returned.

The slowdown in industrial activities from 2011 onwards should have caused a downward movement in prices too. But Wholesale Price Index (WPI) showed a downward trend only after September 2014. We feel that prices must be going down since 2012 (because it is a lagged response) but the impact of recession was not easily visible because of the upward movement in food prices. When we compare the headline and core inflation, we see this phenomenon clearly in fig. 4. The core WPI (which excludes food and fuel sectors from inflation calculation) has almost stagnated since July 2012 and started going down from January 2014. But the WPI for all sectors (headline inflation) was still rising in 2012 may be due to the supply side constraints in the food/fuel sector. As the prices of fuel crashed and the normal monsoon brought in good harvest, food and fuel inflation must have eased. Thus the impact of industrial recession must have become visible on headline WPI from September 2014 onwards.

Table 3: Calculated Percentage Growth rate of selected characteristics from Annual Survey of Industries

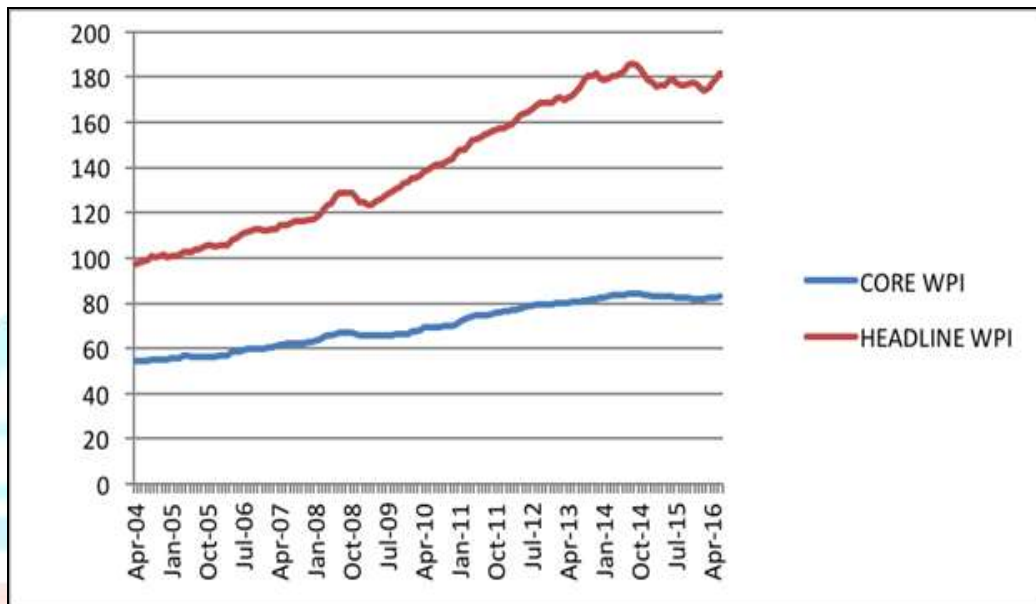| Characteristic	Year-wise percentage growth rates							
	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15
Output Value	13.84	13.71	13.40	19.04	17.66	6.16	7.32	4.86
Net Value	9.42	14.82	20.48	12.85	14.29	9.45	8.51	10.43
Fixed Capital Formation	17.65	5.95	11.34	15.96	3.92	12.73	4.29	7.41
Profits	24.01	-0.27	27.71	18.85	-8.99	8.42	-5.90	-22.41

Figure 4: Comparing core and headline WPI (Source: The Office of Economic Adviser)

Whether the above figures indicate a deep recession has become a point of debate among economists. R Nagaraj (2013) argues that the boom experienced by India from 2003 to 2008 was largely due to increased flow of Foreign Direct Investment (FDI), which in turn happened because of unprecedented rise in world trade. The boom engulfed Indian economy. It saw growth rates around 8-9% for five years and was the second fastest growing economy in the world, next only to China.

But then the great recession hit the world in 2008. Alok Sheel (2013) confirms that India's growth dipped sharply and continuously over seven quarters from 9.9% in quarter 4 of 2010-11 to an estimated 4.5% in quarter 3, 2012-13. Nagaraj (2013) feels that as the boom ended in the western world, the money became scarce and hence the FDI inflow decreased for India. India went back to its "normal" growth path. What was unusual was the boom, not the recent years.

Chandrasekhar (2013) agrees with this, adding that most of FDIs were in the form of secondary equity and debt markets. Thus the overall investment in productive capacity did not rise that much although the pressure on current account eased. R Nagaraj (2013) reports that even when the FDIs went into manufacturing, most of the incremental investment ended up increasing excess capacity rather than production. Thus the "normal growth path" of India was not enhanced too much by the heightened inflow of FDI. The supply side constraints remained. All three authors (Nagaraj, Sheel and Chandrasekhar) concur that the best solution in this situation is to concentrate on removing supply side constraints. That would lead to higher growth rate for the economy.

The above studies convincingly establish why the slowdown happened. This paper takes this discussion further by asking how the slowdown spread in the economy. Since the initial shock itself was not extremely strong (figures given in table 3 show a decline, but not a crash), Indian economy managed to grow by 5-6% even in such difficult times. The initial decline in production was about 15-30% for the major industries. But the rate of growth of GDP declined by about 38% - due to multiplier effect. This paper studies how this multiplier worked, which industries were initially affected and how their decline affected other industries. Input-output tables and multipliers are used to understand the diffusion of the slowdown.

II. THE INPUT OUTPUT ANALYSIS

Input output (I-O) analysis is a quantitative economic technique that shows the interdependency between different sectors of an economy. The I-O analysis helps in estimating the impacts of the positive or negative economic shocks and analyzing the ripple effects throughout an economy.

2.1 The I-O Matrix

In I-O matrix, each column represents the expenditure made by a sector while each row represents the incomes from different sectors for that sector. Since the matrix follows the double entry system, income equals expenditure.

Another important point to be noted about the I-O matrix is that the interdependencies are more as the economy becomes more complex – i.e. if a nation produces almost all products that are needed by its industries. It produces many varieties hence its economy is "complex". If we look at complexity index of the world, Japan and Germany are at the top. India is ranked 45. Russia is somewhere in the middle. The difference in complexities among these nations is reflected in the I-O matrix. All the cells in the German I-O table are filled, showing that interdependency exists among all industries. Their interaction is intense. For Indian and Russian I-O table, these linkages are not so strong. So these matrices are relatively sparse.

The input-output matrix of 2011 given by world input-output database is used for this analysis. To make the table more readable, some industries similar in their trade have been merged like merging financial and insurance services or merging land, water and air transport together. Also, the sector columns/rows that only had values zero were deleted (like scientific research and development, advertising and market research, etc.).

Glossary 1 gives the I-O matrix with these changes (Source: World Input Output Database, http://www.wiod.org/database/wiots16). It should be mentioned here that I-O tables from this source were compared with I-O tables given by other websites and it was found that the data was comparable and hence reliable. This particular source was selected because it gave tables for many years.

It is easy to identify the most important industries of India from this matrix. These are: construction; crop and animal production; basic metal, machinery and equipment; wholesale and retail trade; transport; manufacture of food, tobacco and beverages; coke and refined petroleum products, pharmaceutical and chemical products; textile and leather products; financial services; motor vehicles and other transport and real estate.

Given that construction is the sector with the highest output, India still seems to be in the phase of constructing. The real estate sector appearing in the list of 12 largest sectors of India further proves this point. Interesting thing to note is that in terms of value, agriculture emerges as the second most important sector (when its contribution in GDP has been just around 15%). This is because unlike industry and service sectors, whose industries are listed separately, the entire production of agriculture sector is clubbed under one title.

Among industries, machinery and equipment; refined petroleum products; pharmaceutical and chemicals; textile and leather are important export sectors too. Any slowdown in these industries would affect not just the incomes but foreign exchange reserves too.

2.2 The I-O Coefficient Matrix

To analyze the I-O matrix, some sectors are assumed to be exogenous and the rest are taken as endogenous. Exogenous sectors are to be left out for further calculations, however are important for the whole structure. I-O matrix is rearranged by arranging the rows and columns so that the endogenous sectors occupy the leading rows and columns.

The core industries are accounted as endogenous because they affect and get affected by the events in the economic system. The services like transportation, electricity supply, trade, telecommunications, finance, real estate and legal services are also included as endogenous because they are intensely related with the overall production activities in the country.

Apart from classifying imports/exports and household consumption as exogenous, the sectors directed by the government such as water collection and treatment, education, administration and support services, human health and social activities, defense and social securities are also taken as exogenous because their outcomes are decided by exogenous forces like government.

In table 4, S1, S2 and S3 are endogenous sectors and D is the cumulative exogenous sector. X1, X2, X3 and X4 would represent the total income of the sectors. Similarly, An, Bn, Cn and Dn would represent the total expenditure of the respective sectors. An = X1, Bn = X2 and so on since double entry system is followed.

Table 4: Example of an Input Output Matrix

	Endogenous			Exogenous	
Sectors	**S1**	**S2**	**S3**	**D**	**Total**
S1	A1	B1	C1	D1	X1
S2	A2	B2	C2	D2	X2
S3	A3	B3	C3	D3	X3
Exogenous	A4	B4	C4	D4	X4
Total	An	Bn	Cn	Dn	

The coefficients in a column of the coefficient matrix represent the products of different industries required by that industry to produce its own one unit of output. The coefficient matrix is obtained by dividing each column in the matrix by that column's sum (i.e. An, Bn and Cn). It has the property that when multiplied with the respective row sum and added together they give the row's sum themselves. Thus the matrix can be explained as the system of linear equations. For coefficient matrix, only endogenous sectors are considered. Since each column of the coefficient matrix sums up to unity, it is singular. The calculation for coefficient matrix is illustrated in table 5.

The calculated coefficient matrix is given in Glossary 2.

Since the coefficient matrix represents the inter dependencies between various industries, it becomes an appropriate indicator for analyzing how closely one industry is connected to the other. That in turn tells how much will each industry affect the overall economy as well as how closely inter connected the whole economy is.

Table 5: Calculation for Coefficient Matrix

Sectors	S1	S2	S3
S1	A1/An	B1/Bn	C1/Cn
S2	A2/An	B2/Bn	C2/Cn
S3	A3/An	B3/Bn	C3/Cn

For example, in Glossary 2 crop and animal production industry is expected to be very highly linked to the industry for manufacture of food and tobacco products. The table validates this hypothesis - the value in row 1, column 5 is 0.345, which implies 34% dependency between the two. Similarly, manufacture of basic and fabricated metal products (row 15) and machinery & manufacture of computer, electronic, optical and electrical equipment (column 14) have coefficient of 0.187 which means the two sectors are linked with a dependency of 18.7%.

2.3 The Multiplier Matrix

The coefficient matrix can be converted into multiplier matrix to understand the exact impact any withdrawal/investment into an industry can have on the overall economy. From table 4 and 5, the following can be inferred as An=X1, Bn=X2, Cn=X3:

X1 = A1/An *X1 + B1/Bn*X2 + C1/Cn*X3 + D1
X2 = A2/An*X1 + B2/Bn*X2 + C2/Cn*X3 + D2
X3 = A3/An*X1 + B3/Bn*X2 + C3/Cn*X3 + D3

The coefficient matrix (T) hence can also be denoted as –

$$\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix}$$

Where a_{11} = A1/An, a_{12} = B1/Bn and so on.

So in generalized form,

=

In other words,
Total Income (X_i) = D_i (Income from exogenous sectors) + coefficient (T matrix) x Income from that endogenous sector (X_n)

Now, applying matrix algebra
X - TX = D
X (I-T) = D
X = (I-T)$^{-1}$D

(I-T)$^{-1}$ matrix is the multiplier matrix. Multiplier matrix shows the magnitude by which the change in an endogenous sector will reflect on the whole economy. Hence the production multiplier (sum of all multipliers in a column) of a particular sector gives its importance for the whole economy.

Glossary 3 gives the multiplier matrix.

2.4 Multiplier Analysis

If we look at the multipliers of major industries of India (identified in section 2.1), we find that most of them have very high multipliers. Table 6 gives the list.

All the manufacturing industries (except coke and petroleum products) have high multipliers, indicating that any slowdown affecting them would have considerable effect for the entire economy. Services like trade, financial services and real estate show lower multiplying effects compared to the manufacturing. Thus a crisis affecting financial services could cause less disruption than machinery and equipment sector.

To identify the sectors that have been hit by recession in India, the Index of Industrial Production data was used. The IIP data consists of 25 sectors at 2 digit classification. Out of these 25, 9 sectors were hit by the slow down after 2011. The only parameter used to identify these sectors was decrease in production. The production multipliers of these sectors were examined to ascertain how much the economy must have been affected by the slowdown in these sectors. The results are given in table 7.

As can be seen, the multipliers decreased for each of the recession hit sector between 2011 and 2014. For example, rubber and plastic had multiplier of 2.35 in 2011 which came down to 2.28. Similarly, multiplier for printing and reproduction of

recorded media came down from 2.25 to 2.19. Thus interaction of industries with each-other declined over the three years of recession. They tried to decrease demand for raw materials and services.

Table 6: Cumulative Multiplier of Major Industries

Industry	Multiplier
Construction	2
Agriculture	1.38
Machinery and equipment	1.98
Wholesale and retail trade	1.24
Transport	1.81
Food and tobacco	2.35
Coke & Petroleum Products	1.48
Pharmaceutical and chemicals	2.14
Textiles and leather	2.32
Financial services	1.26
Motor vehicles & other transport	2.21
Real Estate	1.25

Table 7: Cumulative Multiplier of Recession Hit Industries

Industry	2011 multiplier	2014 multiplier
Rubber and Plastic	2.347	2.281
Printing and reproduction of recorded media	2.258	2.188
Motor Vehicles	2.208	2.146
Paper and Paper Products	2.177	2.1
Computer, Electronic, Optical and Electrical Instruments	2.115	2.105
Basic & Fabricated Metal Products & Machinery and Equipment	1.981	1.923
Manufacture of Furniture	2.049	2.172
Wood and Wood Products	1.766	1.718
Mining and Quarrying	1.302	1.327

Most recession hit industries, (except mining and quarrying and to an extent, the wood products) had sizeable multipliers, implying that the overall effect on the economy was considerable. All the downward shocks in each sector had at least twice as much impact generated for the economy. Thus total decline in the economy generated by these nine sectors was manifolds.

A. The slowdown diffusion (first round)

For each of these nine industries, we have examined the coefficient matrix to see how much percentage of its expenditure was spent on other industries. Only coefficients of .02 and more are taken, because the impact of smaller coefficients would be too less to be counted. The results are presented below:

Rubber and Plastic - Crop and Animal Production (4%), Textiles (2.88%), Pharmaceuticals (23.8%), Trade (5.99%), Transport (3.32%)

Printing and Reproduction of Recorded media - Paper and Paper Products (19%), Pharmaceuticals (5.52%), Construction (3.83%), Trade (5%), Transport (6.65%), Financial Services (2.8%)

Motor Vehicles - Basic & Fabricated Metal (23.6%), Computer Electronic Electrical Optical Instruments (3.77%), Trade (5.56%), Transport (2.8%), Financial Services (4.88%)

Paper and Paper Products - Printing and Reproduction of Recorded Media(3.25%), Coke and Petroleum Products(2.49%), Pharmaceuticals(6.03%), Electricity Gas Air supply(3%), Trade(8.41%), Transport(6.61%), Financial Services(2.36%)

Computer, Electronic, Optical and Electrical Instruments - Basic and Fabricated Metal (18.7%), Electricity Gas Air supply (2.05%), Trade (3.31%), Transport (2.9%), Telecommunications (3.93%), Financial Services (3.15%)

Furniture - Pharmaceuticals (2.23%), Computer Electronic Electrical Optical Instruments (2.01%), Basic and Fabricated Metal (5.43%), Trade (3.88%), Transport (10.8%), Financial Services (5.73%)

Wood and Wood Products - Forestry and Logging (28.7%), Pharmaceuticals (2.26%), Trade (10.6%), Financial Services (2.37%)

Basic & Fabricated Metal, Metal Products & Machinery and Equipment - Mining and Quarrying (2.04%), Coke and Petroleum Products (2.13%), Trade (8.12%), Transport (3.73%), Financial Services (2.2%)

Mining and Quarrying - Basic and Fabricated Metal (2.75%), Transport (2.19%)

Thus 16 sectors (including five of the initial nine sectors) got affected through the recession in nine industries. The most affected among these were trade, transport, pharmaceutical and finance. If we look at individual results, rubber and plastic industry reduced its demand by 24% for pharmaceuticals; recession in wood industry led to decline in demand for forestry to the tune of 29% and so on. According to this analysis, the slowdown affected seven industries really badly (pharmaceuticals, trade, transport, paper and paper products, financial services, basic and fabricated metals and forestry and logging). The effect on other nine industries (textiles, crop production, construction, printing and media, computer and electronics, coke and petroleum products, electrical instruments, telecommunication and mining) was milder.

B. The slowdown diffusion (second round)

The first round of impact added 11 more sectors to the list of affected. As these sectors slowed down, the sectors from which they were demanding their raw materials and services also must have gotten affected. We go through the I-O matrix, to find the industries that must have gotten affected in the second round of decline in demand. The results are given below:

Crop and Animal Production - Pharmaceuticals (2.04%), Trade (4.17%)

Forestry and Logging - None

Textile, Wearing Apparel and Leather Products - Crop and Animal Production(9.76%), Pharmaceuticals(4.96%), Electricity Gas Air Supply(2.31%), Trade(11.6%), Transport(6.83%), Financial Services(2.91%)

Coke and Petroleum Products - Mining and Quarrying (18.7%)

Pharmaceutical and Chemical Products - Food & Tobacco Products and Beverage(3.34%), Coke and Petroleum Products(4.8%), Electricity Gas Air supply(2.32%), Trade(6.02%), Transport(4.26%), Financial Services(2.48%)

Electricity, Gas & Air Supply - Mining and Quarrying (2.32%), Coke and Petroleum Products (7.49%), Computer Electronic Electrical Optical Instruments (2.48%), Trade (5.35%), Transport (2.78), Financial Services (4.99%)

Construction - Coke and Petroleum Products (2.21%), other non-metallic mineral products (8.74%), Basic & Fabricated Metal (11.5%), Trade (7.05%), Transport (3.79%), Financial Services (2.32%)

Trade - Transport (3.79%), Financial Services (3.78%)

Transport - Coke and Petroleum Products (17.2%), Rubber and Plastic Products (2.06%), Motor Vehicles (2.28%), Trade (5.55%), Accommodation and Food Service Activities (6.3%)

Telecommunications - Computer Electronic Electrical Optical Instruments (6.78%)

Financial Services - Accommodation and Food Service Activities (2.05%)

The second round of slowdown affected three more sectors not there in the previous rounds (food and tobacco products, other minerals and accommodation and food services). However, the secondary impact was felt strongly on six industries including trade, transport, finance, crop production, basic metals, coke and petroleum products, and other minerals.

In sum, few industries (like finance, trade, transport, basic metals, and pharmaceuticals) bore the brunt of recession again and again as the recession spread. Less important sectors like accommodation and food services also started feeling the pinch as the effects spread.

The third round of impacts generated from these three additional sectors did not spread to any sectors not included in the above rounds. Thus the effect now was travelling within this set of sectors only. Out of 30 sectors listed in the I-O table, 23 sectors got affected by the slowdown. The seven sectors that remained unaffected were fishing; technical testing and analysis; legal and accounting activities; real estate, warehousing and support; and computer program and IT activities. All of these sectors have the distinction of having extremely high coefficients for the rest of the world. Thus these sectors are not connected much with other sectors of the economy; they might be service sectors that mainly depend on the manpower (like technical testing or legal and accounting activities), on already existing infrastructure (like warehousing) or where most inputs are imported (computer and IT services).

III. CONCLUSION

This paper has tried to understand the diffusion of slowdown in Indian economy. Using the Leontief multiplier analysis, 23 sectors were identified that more or less got affected by the slow down. Given that the I-O table had just 30 sectors, our analysis shows that 78% of the production sectors of Indian economy were affected by the slowdown. The impact was found to be serious on some sectors like pharmaceuticals, transport, trade, basic metals, coke and petroleum and paper and paper products because they got affected by decline in demand from many sectors.

Among these, the banking sector presents an interesting case. In the initial post 2008 period, the consumer confidence was strong because the Indian banks were performing well. They were conservative in their approach and were strictly regulated by Reserve Bank of India (RBI), which saved them from acting recklessly. But with FDI flowing in during the fleeting recovery period of 2009-10 and resulting increase in money supply, the banks started lending money leniently. As the economy slowed down, Non-Performing Assets (NPAs) started increasing. The effect of slowdown on banks was lagged but severe. With the government's support and RBI measures, it is hoped that NPAs will be brought under control again.

It was also found that the slowdown happened in 2012 in some sectors because of other factors and not decline in demand. In case of natural gas, the production went down due to the ageing fields. For example, the gas production from the block Krishna Godavari Dhirubhai 6 (commonly called, KG-D6), which is operated by Reliance Industries, fell due to low yields to average 11.8 mmscm a day during the last quarter of 2014 as opposed to above 60 mmscm a day in 2010 (where mmscm stands for million metric standard cubic meters). However, reports about new discoveries of oil fields are on rise, so hopefully the production will recover.

Mining and quarrying declined due to increasing cases against illegal mining as well as movements against environmentally harmful mining. Thus the slowdown happened not only because of recession in the western world but also because of many other factors that happened to play out their effects around the same time period.

India is on recovery path now although the recovery is slow. Signs are showing that the investors' confidence is slowly building. Some infrastructural improvements like launching of five more ultra-mega power plants of 4000 MW and more can also enhance the confidence levels. If India takes care of its supply constraints in various sectors at this juncture, not only will the recovery be faster but the high growth rates could be maintained over a long period.

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GLOSSARY 1: INPUT – OUTPUT MATRIX

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Crop and animal production	1	49,278	1	0	1	73,852	13,900	19	90	2	10	1,551	2,221	81	21	80	21
Forestry and logging	2	13	52	0	0	362	22	4,619	1,897	2	3	83	14	6	4	11	10
Fishing and aquaculture	3	0	0	62	0	3,355	0	0	0	0	0	57	0	0	0	0	0
Mining and quarrying	4	0	0	0	75	31	115	19	90	0	36,511	738	10	1,209	25	7,093	19
Food products and tobacco products	5	3,278	1	19	33	35,753	773	29	229	56	202	5,081	593	638	61	778	73
Textiles	6	883	36	95	68	597	31,246	70	198	150	76	1,061	1,457	340	394	492	625
Wood products, Cork, Straw and plaiting materials	7	37	2	2	67	887	349	188	250	180	34	678	124	148	128	301	139
Paper and Paper Products	8	24	19	0	22	1,784	622	164	2,820	2,720	39	601	199	193	205	211	85
Printing and reproduction of recorded media	9	21	7	0	14	244	99	22	595	1,239	6	150	88	40	39	60	32
Coke and refined petroleum products	10	2,827	97	39	1,046	1,684	1,845	87	455	142	12,038	7,296	955	4,483	576	7,407	423
Pharmaceutical and Chemical Products	11	7,493	8	5	920	2,232	7,071	363	1,103	789	3,671	42,344	12,041	1,762	1,458	3,004	1,322
Rubber and Plastic products	12	310	21	2	172	1,015	1,674	127	217	243	192	2,657	7,254	1,682	773	1,359	1,710
Other non-metallic mineral products	13	52	1	3	92	235	76	10	32	24	89	303	86	4,074	503	470	398
Computer, electronic, optical and electrical equipment	14	101	5	1	78	186	226	20	17	97	26	273	122	94	10,508	3,765	4,617
Basic and fabricated metal products and machinery	15	484	25	6	1,683	765	1,604	165	175	161	182	1,166	665	1,012	13,814	99,965	28,975
Motor vehicles, trailers and semi-trailers	16	401	38	31	345	824	573	52	49	33	92	354	590	248	693	2,922	17,451
Furniture; other manufacturing	17	251	22	1	132	358	783	82	58	118	99	990	372	171	855	1,430	1,339
Electricity, gas, steam and air conditioning supply	18	2,880	7	0	961	3,492	3,285	90	549	182	1,612	3,533	940	1,937	1,517	6,163	2,017
Construction	19	2,238	60	0	1,107	1,275	2,406	52	97	547	156	1,041	184	2,678	1,027	1,925	625
Wholesale and Retail trade	20	15,313	56	47	636	32,434	16,533	1,702	1,538	713	3,557	9,157	3,026	4,575	2,450	28,211	6,815
Transport	21	4,093	272	30	1,336	8,249	9,731	831	1,208	949	3,268	6,476	1,678	3,753	2,171	12,953	3,437
Warehousing and support activities for transportation	22	304	2	2	104	533	754	56	82	62	119	359	125	158	82	590	183
Accommodation and food service activities	23	19	109	0	130	0	13	0	0	0	0	0	0	0	0	0	0
Telecommunications	24	17	9	0	47	522	464	32	58	16	224	328	64	134	2,910	703	426
Computer programming, consultancy & related activities	25	0	26	0	16	571	628	22	66	190	327	425	101	96	382	1,473	394
Financial service activities	26	2,774	4	4	715	7,052	4,142	381	432	400	3,170	3,769	733	956	2,334	7,633	5,980
Real estate activities	27	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Legal & accounting activities; management consultancy	28	0	17	0	128	90	155	24	7	7	17	43	11	8	138	298	241
Architectural and engineering activities; technical testing	29	7	3	0	52	213	303	5	1	5	8	74	13	25	192	548	157
Other service activities	30	14	41	0	399	634	4,696	19	13	145	108	1,050	876	201	1,177	2,098	204
Exogenous	31	273,701	30,885	14,769	50,769	35,159	38,375	6,847	5,955	5,106	128,899	60,479	16,008	24,348	29,621	155,695	44,891
Output at basic prices	32	366,815	31,826	15,118	61,147	214,389	142,462	16,097	18,279	14,280	194,735	152,115	50,550	55,051	74,057	347,640	122,609

		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Crop and animal production	1	113	5	942	2	3,469	0	16,673	0	0	1	2	6	41	27	204,404	366,815
Forestry and logging	2	865	1	7,189	0	0	0	0	0	0	0	0	0	0	0	16,674	31,826
Fishing and aquaculture	3	0	0	0	0	0	0	176	0	0	0	0	0	0	0	11,468	15,118
Mining and quarrying	4	608	1,473	1,226	0	5	0	4	0	0	0	0	0	0	0	11,896	61,147
Food products and tobacco products	5	130	70	266	20	205	4	15,020	3	8	68	1	1	7	12	150,978	214,389
Textiles	6	787	130	1,219	222	3,255	43	742	18	78	97	3	9	67	48	97,957	142,462
Wood products, Cork, Straw and plaiting materials	7	1,327	29	4,256	245	138	13	41	4	13	17	1	1	34	68	6,394	16,097
Paper and Paper Products	8	259	84	487	829	647	170	290	73	14	382	5	17	97	39	5,176	18,279
Printing and Reproduction of recorded media	9	81	71	268	1,671	563	206	92	60	82	499	2	34	37	28	7,932	14,280
Coke and refined petroleum products	10	350	4,746	9,530	3,606	43,263	154	498	279	3	501	1	2	15	26	90,360	194,735
Pharmaceutical and Chemical Products	11	1,774	328	3,406	82	1,743	58	235	10	10	21	3	5	71	116	58,666	152,115
Rubber and Plastic products	12	1,335	36	435	164	5,202	96	44	34	5	53	2	1	12	14	23,708	50,550
Other non-metallic mineral products	13	202	36	37,733	20	342	2	39	2	13	7	2	4	27	24	10,151	55,051
Computer, electronic, optical and electrical equipment	14	1,598	1,573	2,996	71	1,160	53	280	1,724	485	366	10	30	848	426	42,297	74,057
Basic and fabricated metal products and machinery	15	4,327	1,128	49,794	3,010	3,807	36	441	188	83	301	11	21	217	171	133,258	347,640
Motor vehicles, trailers and semi-trailers	16	387	452	2,012	189	5,740	84	197	77	282	481	10	31	399	127	87,446	122,609
Furniture; other manufacturing	17	12,040	406	2,054	614	1,368	16	491	151	214	255	19	8	544	1,018	53,379	79,638
Electricity, gas, steam and air conditioning supply	18	832	9,927	3,685	1,974	2,918	422	822	394	1,800	1,428	5	284	495	192	9,034	63,376
Construction	19	659	1,166	53,418	1,559	3,121	244	1,681	250	2,132	1,414	6,535	1	1,075	311	342,567	431,548
Wholesale and Retail trade	20	3,087	3,391	30,441	1,941	14,001	116	6,913	189	231	328	5	17	236	206	152,829	340,696
Transport	21	8,615	1,765	16,348	12,899	5,248	1,273	2,314	277	488	2,469	6	92	368	443	139,123	252,164
Warehousing and support activities for transportation	22	305	77	1,141	1,322	255	36	195	4	7	21	0	1	11	7	7,301	14,201
Accommodation and food service activities	23	0	320	134	3,982	15,877	1,005	2,908	58	1,044	2,571	396	105	2,563	208	51,252	82,694
Telecommunications	24	348	339	258	704	1,816	348	154	138	375	2,417	58	3	600	429	11,469	25,411
Computer programming, consultancy & related activities	25	357	11	41	375	240	50	100	23	2,845	160	2	1	105	37	74,975	84,040
Financial service activities	26	4,567	3,165	9,993	12,882	3,176	454	1,613	70	1,921	5,260	1,197	217	891	1,289	38,262	125,435
Real estate activities	27	0	0	566	0	6	0	0	5	0	0	1,009	0	1,270	0	114,383	117,241
Legal & accounting activities; management consultancy	28	192	4	122	179	35	83	29	10	220	61	824	262	708	104	3,856	7,872
Architectural and engineering activities; technical testing	29	246	4	1,141	553	1,187	42	18	9	641	89	0	10	1,286	213	29,923	36,966
Other service activities	30	922	152	165	36	362	130	199	50	216	261	168	73	237	1,924	36,259	52,829
Exogenous	31	33,326	32,489	190,279	291,544	133,013	9,063	30,485	21,310	70,829	105,907	106,964	6,635	24,702	45,322	573,029	
Output at basic prices	32	79,638	63,376	431,548	340,696	252,164	14,201	82,694	25,411	84,040	125,435	117,241	7,872	36,966	52,829		

GLOSSARY 2: INPUT – OUTPUT COEFFICIENT MATRIX

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Crop and animal production	1	1.34E-01	4.58E-05	1.49E-05	8.49E-06	3.44E-01	9.76E-02	1.17E-03	4.90E-03	1.33E-04	5.16E-05	1.02E-02	4.39E-02	1.47E-03	2.85E-04	2.31E-04
Forestry and logging	2	3.63E-05	1.62E-03	0	0	1.69E-03	1.54E-04	2.87E-01	1.04E-01	1.33E-04	1.60E-05	5.44E-04	2.84E-04	1.09E-04	4.73E-05	3.06E-05
Fishing and aquaculture	3	0	0	4.08E-03	0	1.57E-02	0	0	0	0	0	3.72E-04	0	0	1.01E-06	0
Mining and quarrying	4	0	0	0	1.22E-03	1.44E-04	8.10E-04	1.16E-03	4.94E-03	1.18E-05	1.87E-01	4.85E-03	1.88E-04	2.20E-02	3.44E-04	2.04E-02
Food products and tobacco products	5	8.94E-03	1.90E-05	1.26E-03	5.47E-04	1.67E-01	5.42E-03	1.78E-03	1.25E-02	3.90E-03	1.04E-03	3.34E-02	1.17E-02	1.16E-02	8.23E-04	2.24E-03
Textiles	6	2.41E-03	1.13E-03	6.26E-03	1.11E-03	2.79E-03	2.19E-01	4.35E-03	1.08E-02	1.05E-02	3.88E-04	6.98E-03	2.88E-02	6.17E-03	5.32E-03	1.42E-03
Wood products, Cork, Straw and plaiting materials	7	1.02E-04	5.88E-05	1.11E-04	1.09E-03	4.14E-03	2.45E-03	1.17E-02	1.37E-02	1.26E-02	1.77E-04	4.46E-03	2.45E-03	2.68E-03	1.73E-03	8.66E-04
Paper and Paper Products	8	6.55E-05	5.94E-04	2.95E-06	3.60E-04	8.32E-03	4.36E-03	1.02E-02	1.54E-01	1.90E-01	2.01E-04	3.95E-03	3.94E-03	3.51E-03	2.77E-03	6.08E-04
Printing and Reproduction of recorded media	9	5.67E-05	2.12E-04	1.79E-06	2.23E-04	1.14E-03	6.92E-04	1.39E-03	3.25E-02	8.68E-02	3.34E-05	9.87E-04	1.74E-03	7.35E-04	5.28E-04	1.73E-04
Coke and refined petroleum products	10	7.71E-03	3.05E-03	2.61E-03	1.71E-02	7.86E-03	1.30E-02	5.42E-03	2.49E-02	9.95E-03	6.18E-02	4.80E-02	1.89E-02	8.14E-02	7.78E-03	2.13E-02
Pharmaceutical and Chemical Products	11	2.04E-02	2.46E-04	3.38E-04	1.50E-02	1.04E-02	4.96E-02	2.26E-02	6.03E-02	5.52E-02	1.89E-02	2.78E-01	2.38E-01	3.20E-02	1.97E-02	8.64E-03
Rubber and Plastic products	12	8.46E-04	6.65E-04	1.60E-04	2.81E-03	4.74E-03	1.18E-02	7.86E-03	1.19E-02	1.70E-02	9.85E-04	1.75E-02	1.44E-01	3.06E-02	1.04E-02	3.91E-03
Other non-metallic mineral products	13	1.42E-04	2.42E-05	1.72E-04	1.51E-03	1.10E-03	5.35E-04	6.33E-04	1.74E-03	1.68E-03	4.55E-04	1.99E-03	1.70E-03	7.40E-02	6.79E-03	1.35E-03
Computer, electronic, optical and electrical equipment	14	2.75E-04	1.58E-04	3.40E-05	1.28E-03	8.69E-04	1.58E-03	1.26E-03	9.48E-04	6.80E-03	1.34E-04	1.79E-03	2.42E-03	1.71E-03	1.42E-01	1.08E-02
Basic and fabricated metal products and machinery	15	1.32E-03	7.88E-04	3.91E-04	2.75E-02	3.57E-03	1.13E-02	1.02E-02	9.57E-03	1.13E-02	9.35E-04	7.66E-03	1.32E-02	1.84E-02	1.87E-01	2.88E-01
Motor vehicles, trailers and semi-trailers	16	1.09E-03	1.19E-03	2.05E-03	5.64E-03	3.84E-03	4.02E-03	3.21E-03	2.70E-03	2.33E-03	4.70E-04	2.33E-03	1.17E-02	4.50E-03	9.36E-03	8.41E-03
Furniture; other manufacturing	17	6.84E-04	6.93E-04	7.14E-05	2.15E-03	1.67E-03	5.49E-03	5.12E-03	3.16E-03	8.27E-03	5.10E-04	6.51E-03	7.36E-03	3.10E-03	1.15E-02	4.11E-03
Electricity, gas, steam and air conditioning supply	18	7.85E-03	2.08E-04	0	1.57E-02	1.63E-02	2.31E-02	5.60E-03	3.00E-02	1.27E-02	8.28E-03	2.32E-02	1.86E-02	3.52E-02	2.05E-02	1.77E-02
Construction	19	6.10E-03	1.88E-03	0	1.81E-02	5.95E-03	1.69E-02	3.21E-03	5.28E-03	3.83E-02	8.02E-04	6.84E-03	3.63E-03	4.86E-02	1.39E-02	5.54E-03
Wholesale and Retail trade	20	4.17E-02	1.77E-03	3.13E-03	1.04E-02	1.51E-01	1.16E-01	1.06E-01	8.41E-02	5.00E-02	1.83E-02	6.02E-02	5.99E-02	8.31E-02	3.31E-02	8.12E-02
Transport	21	1.12E-02	8.56E-03	1.98E-03	2.19E-02	3.85E-02	6.83E-02	5.16E-02	6.61E-02	6.65E-02	1.68E-02	4.26E-02	3.32E-02	6.82E-02	2.93E-02	3.73E-02
Warehousing and support activities for transportation	22	8.29E-04	5.75E-05	1.41E-04	1.70E-03	2.49E-03	5.30E-03	3.49E-03	4.48E-03	4.37E-03	6.14E-04	2.36E-03	2.48E-03	2.86E-03	1.11E-03	1.70E-03
Accommodation and food service activities	23	5.24E-05	3.44E-03	0	2.12E-03	0	9.46E-05	0	0	0	0	0	0	0	0	0
Telecommunications	24	4.52E-05	2.97E-04	0	7.66E-04	2.43E-03	3.26E-03	1.99E-03	3.19E-03	1.13E-03	1.15E-03	2.16E-03	1.27E-03	2.44E-03	3.93E-02	2.02E-03
Computer programming, consultancy & related activities	25	1.25E-07	8.09E-04	0	2.65E-04	2.66E-03	4.41E-03	1.36E-03	3.63E-03	1.33E-02	1.68E-03	2.79E-03	1.99E-03	1.75E-03	5.15E-03	4.24E-03
Financial service activities	26	7.56E-03	1.27E-04	2.51E-04	1.17E-02	3.29E-02	2.91E-02	2.37E-02	2.36E-02	2.80E-02	1.63E-02	2.48E-02	1.45E-02	1.74E-02	3.15E-02	2.20E-02
Real estate activities	27	2.35E-06	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Legal & accounting activities; management consultancy	28	0	5.40E-04	0	2.10E-03	4.18E-04	1.09E-03	1.49E-03	3.68E-04	4.90E-04	8.59E-05	2.81E-04	2.11E-04	1.48E-04	1.86E-03	8.57E-04
Architectural and engineering activities; technical testing	29	1.93E-05	9.59E-05	0	8.47E-04	9.92E-04	2.13E-03	3.03E-04	3.03E-05	3.69E-04	4.34E-05	4.85E-04	2.54E-04	4.48E-04	2.59E-03	1.58E-03
Other service activities	30	3.93E-05	1.30E-03	0	6.52E-03	2.96E-03	3.30E-02	1.16E-03	7.00E-04	1.02E-02	5.54E-04	6.90E-03	1.73E-02	3.65E-03	1.59E-02	6.03E-03
Exogenous	31	7.46E-01	9.70E-01	9.77E-01	8.30E-01	1.64E-01	2.69E-01	4.25E-01	3.26E-01	3.58E-01	6.62E-01	3.98E-01	3.17E-01	4.42E-01	4.00E-01	4.48E-01
Output at basic prices	32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Crop and animal production	1	1.72E-04	1.42E-03	7.49E-05	2.18E-03	4.65E-06	1.38E-02	7.91E-06	2.02E-01	6.06E-06	2.25E-06	6.91E-06	1.68E-05	7.32E-04	1.12E-03	5.19E-04
Forestry and logging	2	8.36E-05	1.09E-02	1.08E-05	1.67E-02	0	2.64E-07	0	0	0	0	0	0	0	0	0
Fishing and aquaculture	3	9.40E-08	0	2.78E-08	0	0	0	0	2.13E-03	0	0	0	0	0	0	0
Mining and quarrying	4	1.54E-04	7.64E-03	2.32E-02	2.84E-03	0	2.15E-05	0	4.40E-05	0	0	0	1.41E-07	6.53E-06	1.24E-05	5.75E-06
Food products and tobacco products	5	5.94E-04	1.63E-03	1.11E-03	6.17E-04	5.77E-05	8.14E-04	2.75E-04	1.82E-01	1.19E-04	1.01E-04	5.41E-04	6.02E-06	1.62E-04	1.99E-04	2.21E-04
Textiles	6	5.09E-03	9.88E-03	2.05E-03	2.82E-03	6.52E-04	1.29E-02	3.00E-03	8.97E-03	7.06E-04	9.30E-04	7.76E-04	2.68E-05	1.21E-03	1.82E-03	9.13E-04
Wood products, Cork, Straw and plaiting materials	7	1.14E-03	1.67E-02	4.54E-04	9.86E-03	7.20E-04	5.48E-04	9.34E-04	4.99E-04	1.51E-04	1.53E-04	1.36E-04	1.16E-05	6.77E-05	9.22E-04	1.30E-03
Paper and Reproduction of recorded media	8	6.97E-04	3.25E-03	1.32E-03	1.13E-03	2.43E-03	2.57E-03	1.19E-02	3.51E-03	2.88E-03	1.64E-04	3.05E-03	3.94E-05	2.17E-03	2.63E-03	7.29E-04
Printing	9	2.61E-04	1.01E-03	1.12E-03	6.21E-04	4.90E-03	2.23E-03	1.45E-02	1.11E-03	2.37E-03	9.74E-04	3.98E-03	1.51E-05	4.30E-03	1.01E-03	5.24E-04
Coke and refined petroleum products	10	3.45E-03	4.40E-03	7.49E-02	2.21E-02	1.06E-02	1.72E-01	1.08E-02	6.03E-03	1.10E-02	3.91E-05	3.99E-03	5.70E-06	2.72E-04	3.99E-04	4.84E-04
Pharmaceutical and Chemical Products	11	1.08E-02	2.23E-02	5.18E-03	7.89E-03	2.41E-04	6.91E-03	4.11E-03	2.84E-03	3.93E-04	1.22E-04	1.66E-04	2.98E-05	6.87E-04	1.92E-03	2.19E-03
Rubber and Plastic products	12	1.40E-02	1.68E-02	5.71E-04	1.01E-03	4.80E-04	2.06E-02	6.75E-03	5.30E-04	1.34E-03	6.50E-05	4.20E-04	1.30E-05	1.50E-04	3.32E-04	2.64E-04
Other non-metallic mineral products	13	3.24E-03	2.53E-03	5.73E-04	8.74E-02	5.74E-05	1.36E-03	1.37E-04	4.75E-04	8.92E-05	1.56E-04	5.74E-05	1.40E-04	4.71E-04	7.31E-04	4.51E-04
Computer, electronic, optical and electrical equipment	14	3.77E-02	2.01E-02	2.48E-02	6.94E-03	2.09E-04	4.60E-03	3.73E-03	3.38E-03	6.78E-02	5.77E-03	2.92E-03	8.81E-05	3.83E-03	2.29E-02	8.07E-03
Basic and fabricated metal products and machinery	15	2.36E-01	5.43E-02	1.78E-02	1.15E-01	8.83E-03	1.51E-02	2.53E-03	5.33E-03	7.40E-03	9.82E-04	2.40E-03	9.79E-05	2.64E-03	5.87E-03	3.23E-03
Motor vehicles, trailers and semi-trailers	16	1.42E-01	4.85E-03	7.14E-03	4.66E-03	5.56E-04	2.28E-02	5.94E-03	2.38E-03	3.01E-03	3.35E-03	3.84E-03	8.28E-05	3.89E-03	1.08E-02	2.40E-03
Furniture; other manufacturing	17	1.09E-02	1.51E-01	6.41E-03	4.76E-03	1.80E-03	5.43E-03	1.15E-03	5.93E-03	5.94E-03	2.55E-03	2.03E-03	1.61E-04	1.06E-03	1.47E-02	1.93E-02
Electricity, gas, steam and air conditioning supply	18	1.64E-02	1.05E-02	1.57E-01	8.54E-03	5.80E-03	1.16E-02	2.97E-02	9.94E-03	1.55E-02	2.14E-02	1.14E-02	3.90E-05	3.61E-02	1.34E-02	3.63E-03
Construction	19	5.09E-03	8.27E-03	1.84E-02	1.24E-01	4.58E-03	1.24E-02	1.72E-02	2.03E-02	9.82E-03	2.54E-02	1.13E-02	5.57E-02	1.08E-04	2.91E-02	5.89E-03
Wholesale and Retail trade	20	5.56E-02	3.88E-02	5.35E-02	7.05E-02	5.70E-03	5.55E-03	8.16E-03	8.36E-02	7.43E-03	2.75E-03	2.61E-03	4.54E-05	2.14E-03	6.38E-03	3.90E-03
Transport	21	2.80E-02	1.08E-01	2.78E-02	3.79E-02	3.79E-02	2.08E-02	8.97E-02	2.80E-02	1.09E-02	5.81E-03	1.97E-02	5.06E-05	1.17E-02	9.95E-03	8.38E-03
Warehousing and support activities for transportation	22	1.49E-03	3.84E-03	1.22E-02	2.64E-03	3.88E-03	1.01E-03	2.53E-03	2.36E-03	1.76E-04	7.98E-05	1.70E-04	3.50E-06	1.53E-04	2.96E-04	1.37E-04
Accommodation and food service activities	23	0	0	5.05E-03	3.11E-04	1.17E-02	6.30E-02	7.07E-02	3.52E-02	2.29E-03	1.24E-02	2.05E-02	3.38E-03	1.33E-02	6.93E-02	3.94E-03
Telecommunications	24	3.47E-03	4.37E-03	5.35E-03	5.98E-04	2.07E-03	7.20E-03	2.45E-02	1.86E-03	5.43E-03	4.46E-03	1.93E-02	4.95E-04	3.89E-04	1.62E-02	8.11E-03
Computer programming, consultancy & related activities	25	3.21E-03	4.48E-03	1.81E-04	9.45E-05	1.10E-03	9.52E-04	3.54E-03	1.21E-03	9.16E-04	3.39E-02	1.27E-03	1.43E-05	1.62E-04	2.85E-03	7.07E-04
Financial service activities	26	4.88E-02	5.73E-02	4.99E-02	2.32E-02	3.78E-02	1.26E-02	3.20E-02	1.95E-02	2.74E-03	2.29E-02	4.19E-02	1.02E-02	2.75E-02	2.41E-02	2.44E-02
Real estate activities	27	0	0	0	1.31E-03	0	2.24E-05	0	0	2.13E-04	0	0	8.61E-03	0	3.43E-02	0
Legal & accounting activities; management consultancy	28	1.96E-03	2.41E-03	5.57E-05	2.83E-04	5.25E-04	1.39E-04	5.86E-03	3.51E-04	3.90E-04	2.61E-03	4.90E-04	7.03E-03	3.33E-02	1.92E-02	1.97E-03
Architectural and engineering activities; technical testing	29	1.28E-03	3.09E-03	5.63E-05	2.64E-03	1.62E-03	4.71E-03	2.96E-03	2.16E-04	3.54E-04	7.62E-03	7.09E-04	2.04E-06	1.22E-03	3.48E-02	4.04E-03
Other service activities	30	1.67E-03	1.16E-02	2.40E-03	3.81E-04	1.04E-04	1.44E-03	9.13E-03	2.41E-03	1.96E-03	2.57E-03	2.08E-03	1.43E-03	9.27E-03	6.42E-03	3.64E-02
Exogenous	31	3.66E-01	4.18E-01	5.13E-01	4.41E-01	8.56E-01	5.27E-01	6.38E-01	3.69E-01	8.39E-01	8.43E-01	8.44E-01	9.12E-01	8.43E-01	6.68E-01	8.58E-01
Output at basic prices	32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

GLOSSARY 3: INPUT – OUTPUT MULTIPLIER MATRIX

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Crop and animal production	1	1.16E+0	1.99E-03	1.83E-03	4.18E-03	4.87E-01	1.60E-01	9.41E-03	2.72E-02	1.96E-02	3.81E-03	4.76E-02	8.85E-02	1.95E-02	9.24E-03	7.86E-03
Forestry and logging	2	5.58E-04	1.00E+0	7.97E-05	1.10E-03	5.75E-03	3.50E-03	2.93E-01	1.30E-01	3.32E-02	5.47E-04	4.51E-03	3.89E-03	3.60E-03	2.53E-03	1.34E-03
Fishing and aquaculture	3	2.50E-04	2.78E-05	1.00E+0	7.51E-05	1.91E-02	3.57E-04	1.37E-04	4.91E-04	3.57E-04	8.27E-05	1.49E-03	7.46E-04	3.95E-04	1.43E-04	1.43E-04
Mining and quarrying	4	4.12E-03	1.18E-03	8.07E-04	1.01E+0	9.02E-03	1.45E-02	7.46E-03	2.17E-02	1.50E-02	2.04E-01	2.72E-02	1.76E-02	5.12E-02	1.65E-02	4.04E-02
Food products and tobacco products	5	1.47E-02	1.14E-03	1.76E-03	3.42E-03	1.21E+0	1.84E-02	6.56E-03	2.68E-02	1.81E-02	3.94E-03	6.02E-02	3.67E-02	2.20E-02	6.80E-03	7.36E-03
Textiles	6	4.71E-03	1.82E-03	8.20E-03	3.01E-03	9.08E-03	1.29E+0	9.00E-03	2.24E-02	2.43E-02	2.10E-03	1.67E-02	5.03E-02	1.41E-02	1.22E-02	5.44E-03
Wood products, Cork, Straw and plaiting materials	7	6.09E-04	1.64E-04	1.75E-04	1.75E-03	6.19E-03	5.00E-03	1.01E+0	1.85E-02	1.96E-02	8.27E-04	7.62E-03	6.02E-03	4.84E-03	3.69E-03	2.12E-03
Paper and Paper Products	8	9.90E-04	9.08E-04	1.36E-04	1.30E-03	1.46E-02	9.97E-03	1.45E-02	1.20E+0	2.52E-01	1.11E-03	9.44E-03	1.03E-02	7.35E-03	6.35E-03	2.86E-03
Printing and Reproduction of recorded media	9	6.70E-04	3.46E-04	6.89E-05	7.71E-04	3.99E-03	3.46E-03	3.37E-03	4.44E-02	1.11E+0	6.07E-04	3.33E-03	4.51E-03	2.74E-03	2.33E-03	1.73E-03
Coke and refined petroleum products	10	1.80E-02	5.65E-03	3.88E-03	3.02E-02	3.78E-02	5.63E-02	2.68E-02	6.87E-02	5.69E-02	1.08E+0	9.70E-02	6.93E-02	1.29E-01	4.03E-02	5.36E-02
Pharmaceutical and Chemical Products	11	3.59E-02	1.50E-03	1.56E-03	2.62E-02	4.07E-02	1.08E-01	4.13E-02	1.20E-01	1.26E-01	3.51E-02	1.41E+0	4.03E-01	7.38E-02	4.91E-02	2.64E-02
Rubber and Plastic products	12	2.85E-02	1.21E-03	5.13E-04	5.49E-03	1.11E-02	2.46E-02	1.32E-02	2.44E-02	3.31E-02	3.74E-03	3.28E-02	1.18E+0	4.46E-02	2.03E-02	1.02E-02
Other non-metallic mineral products	13	1.34E-03	3.33E-04	2.60E-04	4.18E-03	3.63E-03	4.83E-03	1.96E-03	4.78E-03	8.92E-03	1.77E-03	5.34E-03	5.14E-03	1.09E+0	1.22E-02	4.09E-03
Computer, electronic, optical and electrical equipment	14	1.55E-03	5.42E-04	2.75E-04	4.15E-03	4.97E-03	8.18E-03	4.08E-03	6.58E-03	1.44E-02	2.07E-03	7.32E-03	9.35E-03	7.67E-03	1.18E+0	2.17E-02
Basic and fabricated metal products and machinery	15	7.70E-03	2.88E-03	1.96E-03	4.95E-02	2.20E-02	4.29E-02	2.57E-02	3.48E-02	4.79E-02	1.45E-02	3.16E-02	4.69E-02	5.55E-02	3.28E-01	1.43E+0
Motor vehicles, trailers and semi-trailers	16	2.72E-03	1.82E-03	2.61E-03	8.78E-03	9.79E-03	1.22E-02	7.44E-03	9.67E-03	1.02E-02	3.46E-03	8.64E-03	2.17E-02	1.18E-02	1.99E-02	1.76E-02
Furniture; other manufacturing	17	1.94E-03	1.09E-03	2.69E-04	4.18E-03	5.49E-03	1.34E-02	8.42E-03	8.88E-03	1.64E-02	2.27E-03	1.38E-02	1.68E-02	8.07E-03	2.10E-02	9.60E-03
Electricity, gas, steam and air conditioning supply	18	1.41E-02	9.96E-04	6.28E-04	2.32E-02	3.58E-02	4.88E-02	1.36E-02	5.52E-02	3.92E-02	1.75E-02	4.83E-02	4.71E-02	5.77E-02	4.42E-02	3.72E-02
Construction	19	1.01E-02	2.70E-03	3.97E-04	2.36E-02	1.76E-02	3.42E-02	8.76E-03	1.74E-02	5.85E-02	7.40E-03	1.80E-02	1.58E-02	6.81E-02	2.75E-02	1.50E-02
Wholesale and Retail trade	20	5.85E-02	4.26E-03	5.34E-03	2.49E-02	2.23E-01	1.89E-01	1.25E-01	1.40E-01	1.17E-01	3.07E-02	1.18E-01	1.30E-01	1.28E-01	8.73E-02	1.33E-01
Transport	21	2.07E-02	1.01E-02	3.39E-03	3.14E-02	7.30E-02	1.17E-01	7.05E-02	1.09E-01	1.19E-01	2.91E-02	8.22E-02	8.04E-02	1.01E-01	6.57E-02	6.98E-02
Warehousing and support activities for transportation	22	1.48E-03	1.50E-04	2.38E-04	2.22E-03	4.90E-03	8.69E-03	4.59E-03	7.20E-03	7.70E-03	1.39E-03	4.70E-03	5.40E-03	4.82E-03	2.95E-03	3.50E-03
Accommodation and food service activities	23	2.68E-03	4.37E-03	3.44E-04	5.46E-03	9.69E-03	1.30E-02	8.54E-03	1.15E-02	1.19E-02	3.56E-03	8.90E-03	8.86E-03	1.01E-02	7.85E-03	8.13E-03
Telecommunications	24	1.02E-03	5.09E-04	1.41E-04	2.18E-03	6.19E-03	8.65E-03	4.38E-03	7.58E-03	6.39E-03	2.60E-03	6.39E-03	5.88E-03	6.10E-03	5.02E-02	6.26E-03
Computer programming, consultancy & related activities	25	4.03E-04	9.28E-04	9.01E-05	8.73E-04	4.36E-03	7.35E-03	2.53E-03	6.61E-03	1.78E-02	2.29E-03	5.28E-03	4.94E-03	3.44E-03	8.65E-03	7.10E-03
Financial service activities	26	1.54E-02	1.29E-03	1.25E-03	1.97E-02	6.26E-02	6.30E-02	3.69E-02	5.12E-02	5.98E-02	2.58E-02	5.42E-02	4.76E-02	4.12E-02	6.09E-02	4.72E-02
Real estate activities	27	2.90E-05	1.09E-05	2.74E-06	7.95E-05	1.07E-04	2.03E-04	5.43E-05	7.28E-05	1.51E-04	3.07E-05	8.90E-05	8.45E-05	1.57E-04	2.10E-04	1.36E-04
Legal & accounting activities; management consultancy	28	1.22E-04	5.94E-04	2.93E-05	2.39E-03	9.30E-04	2.09E-03	2.02E-03	1.03E-03	1.26E-03	6.56E-04	8.65E-04	9.11E-04	6.93E-04	3.04E-03	1.73E-03

Architectural and engineering activities; technical testing	29	3.51E-04	2.01E-04	6.08E-05	1.36E-03	2.30E-03	4.41E-03	1.16E-03	1.32E-03	2.01E-03	5.68E-04	1.78E-03	1.74E-03	1.82E-03	4.67E-03	3.28E-03
Other service activities	30	8.53E-04	1.56E-03	3.55E-04	7.95E-03	5.49E-03	4.68E-02	3.28E-03	4.92E-03	1.58E-02	2.77E-03	1.27E-02	2.74E-02	7.59E-03	2.37E-02	1.08E-02
Total	31	1.39E+00	1.05E+00	1.04E+00	1.30E+00	2.35E+00	2.32E+00	1.77E+00	2.18E+00	2.26E+00	1.48E+00	2.14E+00	2.35E+00	1.97E+00	2.12E+00	1.98E+00

		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Crop and animal production	1	9.28E-03	1.62E-02	7.49E-03	1.09E-02	6.85E-03	4.51E-02	3.14E-02	3.39E-01	2.91E-03	5.98E-03	9.29E-03	1.96E-03	7.34E-03	2.85E-02	3.83E-03
Forestry and logging	2	1.87E-03	2.02E-02	1.55E-03	2.35E-02	1.03E-03	1.63E-02	3.31E-03	2.74E-03	1.12E-03	9.36E-04	1.08E-02	1.36E-03	6.81E-04	2.16E-03	1.19E-03
Fishing and aquaculture	3	1.34E-04	2.00E-04	1.28E-04	1.35E-04	1.05E-04	4.68E-04	5.08E-04	5.90E-03	4.36E-05	9.85E-05	1.58E-04	3.05E-05	1.07E-04	4.63E-04	5.20E-05
Mining and quarrying	4	1.70E-02	2.13E-02	5.02E-02	2.24E-02	4.91E-03	3.96E-02	9.57E-03	7.36E-03	5.52E-03	2.51E-03	3.25E-03	1.36E-03	3.11E-03	4.11E-03	1.87E-03
Food products and tobacco products	5	6.43E-03	9.41E-03	5.94E-03	6.71E-03	4.32E-03	1.94E-02	2.06E-02	2.33E-01	1.97E-03	4.04E-03	6.60E-03	1.29E-03	4.43E-03	1.86E-02	2.27E-03
Textiles	6	1.23E-02	2.07E-02	5.65E-03	8.27E-03	2.37E-03	2.07E-02	8.64E-03	1.62E-02	2.64E-03	2.26E-03	2.41E-03	6.14E-04	2.72E-03	5.30E-03	2.33E-03
Wood products, Cork, Straw and plaiting materials	7	2.92E-03	2.12E-02	1.61E-03	1.27E-02	1.16E-03	1.75E-03	2.31E-03	2.61E-03	8.74E-04	7.42E-04	6.61E-04	7.54E-04	4.35E-04	2.23E-03	2.03E-03
Paper and Paper Products	8	3.61E-03	7.74E-03	3.84E-03	4.20E-03	4.92E-03	5.66E-03	1.99E-02	8.73E-03	4.87E-03	1.11E-03	5.46E-03	4.14E-04	4.41E-03	5.15E-03	1.69E-03
Printing and Reproduction of Media	9	2.09E-03	3.28E-03	2.73E-03	2.38E-03	6.09E-03	3.77E-03	1.77E-02	3.29E-03	3.16E-03	1.54E-03	5.07E-03	2.60E-04	5.42E-03	2.17E-03	1.02E-03
Coke and refined petroleum products	10	3.62E-02	4.64E-02	1.11E-01	6.18E-02	2.23E-02	2.01E-01	4.09E-02	3.03E-02	2.09E-02	7.05E-03	1.29E-02	3.85E-03	8.98E-03	1.24E-02	5.91E-03
Pharmaceutical and Chemical Products	11	3.79E-02	5.67E-02	1.87E-02	2.92E-02	4.30E-03	3.17E-02	1.92E-02	2.44E-02	7.28E-03	3.02E-03	4.01E-03	1.89E-03	4.22E-03	1.01E-02	6.30E-03
Rubber and Plastic products	12	2.55E-02	3.05E-02	4.44E-03	9.90E-03	2.38E-03	2.81E-02	1.28E-02	5.58E-03	4.07E-03	1.16E-03	2.00E-03	6.42E-04	1.38E-03	3.22E-03	1.84E-03
Other non-metallic mineral products	13	7.14E-03	6.19E-03	4.40E-03	1.10E-01	1.04E-03	4.26E-03	3.42E-03	4.36E-03	2.32E-03	3.48E-03	1.81E-03	6.24E-03	1.06E-03	5.44E-03	1.64E-03
Computer, electronic, optical and electrical equipment	14	6.06E-03	3.36E-02	3.81E-02	1.51E-02	1.98E-03	1.04E-02	1.07E-02	7.58E-03	8.19E-02	9.65E-03	6.79E-03	1.17E-03	7.16E-03	3.29E-02	1.22E-02
Basic and fabricated metal products and machinery	15	4.16E-01	1.16E-01	5.56E-02	2.05E-01	1.77E-02	4.51E-02	2.22E-02	2.55E-02	3.91E-02	1.33E-02	1.24E-02	1.21E-02	1.10E-02	3.44E-02	1.40E-02
Motor vehicles, trailers and semi-trailers	16	1.17E+0	1.44E-02	1.36E-02	1.23E-02	2.69E-03	3.03E-02	1.20E-02	7.50E-03	6.02E-03	5.52E-03	6.21E-03	9.43E-04	6.20E-03	1.59E-02	4.24E-03
Furniture; other manufacturing	17	2.04E-02	1.18E+0	1.16E-02	1.02E-02	3.23E-03	9.78E-03	4.99E-03	1.02E-02	9.27E-03	4.46E-03	3.76E-03	9.05E-04	2.70E-03	2.08E-02	2.45E-02
Electricity, gas, steam and air conditioning supply	18	4.06E-02	2.81E-02	1.19E+0	2.71E-02	1.03E-02	2.48E-02	4.45E-02	2.64E-02	2.36E-02	2.92E-02	1.72E-02	2.22E-03	4.69E-02	2.42E-02	7.35E-03
Construction	19	1.66E-02	2.02E-02	3.08E-02	1.15E+0	8.20E-03	2.16E-02	2.81E-02	3.28E-02	1.49E-02	3.28E-02	1.61E-02	6.52E-02	3.27E-03	4.26E-02	9.18E-03
Wholesale and Retail trade	20	1.20E-01	8.52E-02	8.46E-02	1.24E-01	1.02E+0	8.96E-02	4.05E-02	1.54E-01	2.08E-02	1.30E-02	1.36E-02	7.87E-03	1.18E-02	3.19E-02	1.14E-02
Transport	21	6.83E-02	1.54E-01	5.12E-02	7.48E-02	4.50E-02	1.04E+0	1.09E-01	5.92E-02	2.09E-02	1.27E-02	2.70E-02	4.97E-03	1.85E-02	2.61E-02	1.59E-02
Warehousing and support activities for transportation	22	3.63E-03	6.00E-03	2.48E-03	4.73E-03	4.25E-03	2.44E-03	1.00E+0	4.49E-03	6.80E-04	4.45E-04	5.57E-04	2.99E-04	4.88E-04	1.20E-03	4.70E-04
Accommodation and food service activities	23	8.66E-03	1.43E-02	1.27E-02	8.78E-03	1.68E-02	7.08E-02	8.30E-02	1.04E+0	4.57E-03	1.58E-02	2.45E-02	4.44E-03	1.68E-02	7.82E-02	6.57E-03
Telecommunications	24	1.06E-02	1.09E-02	1.06E-02	4.43E-03	3.76E-03	1.00E-02	2.80E-02	5.14E-03	1.01E+0	6.24E-03	2.12E-02	1.03E-03	2.07E-03	2.00E-02	1.01E-02
Computer programming, consultancy & related activities	25	6.89E-03	7.24E-03	1.44E-03	2.07E-03	1.61E-03	2.45E-03	4.86E-03	2.81E-03	1.86E-03	1.04E+0	1.78E-03	1.70E-04	5.69E-04	3.99E-03	1.20E-03
Financial service activities	26	8.47E-02	8.90E-02	7.53E-02	4.75E-02	4.41E-02	3.16E-02	4.76E-02	4.55E-02	1.15E-02	3.03E-02	1.05E+0	1.40E-02	3.55E-02	3.89E-02	3.12E-02
Real estate activities	27	1.40E-04	2.19E-04	7.83E-05	1.68E-03	8.51E-05	2.52E-04	1.87E-04	9.45E-05	2.70E-04	3.39E-04	6.44E-05	1.01E+0	6.00E-05	3.60E-02	1.76E-04
Legal & accounting activities; management consultancy	28	3.26E-03	3.63E-03	5.49E-04	9.77E-04	7.24E-04	7.03E-04	6.47E-03	8.16E-04	7.27E-04	3.09E-03	6.71E-04	7.41E-03	1.03E+0	2.11E-02	2.37E-03

Architectural and engineering activities; technical testing	29	3.30E-03	5.39E-03	9.81E-04	4.37E-03	2.09E-03	5.70E-03	4.09E-03	1.38E-03	9.37E-04	8.49E-03	1.09E-03	2.85E-04	1.58E-03	1.04E+0	4.66E-03
Other service activities	30	7.80E-03	1.82E-02	5.35E-03	3.92E-03	8.92E-04	4.55E-03	1.17E-02	5.08E-03	4.25E-03	3.57E-03	2.99E-03	1.86E-03	1.07E-02	9.12E-03	1.04E+0
Total	31	2.21E+0	2.05E+0	1.81E+0	2.00E+0	1.24E+0	1.81E+0	1.65E+0	2.12E+0	1.31E+0	1.26E+0	1.26E+0	1.15E+0	1.25E+0	1.57E+0	1.23E+0