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Domestic Value Added Content of India's Exports: Estimates for 112 Sectors, 1999-2000 to 2012-13

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Abstract

Using Input-Output (IO) analysis, this study provides the time series estimates of domestic value added (DVA) content of India's merchandise and services exports for the period 1999-2000 to 2012-13 and for 112 sectors. The study makes use of the official input-output tables (IOTs) for the benchmark years 1998-99, 2003-04, 2007-08 as well as the recently published Supply Use Tables (SUTs) for the years 2011-12 and 2012-13. The IOTs and SUTs, compiled by the CSO, do not distinguish imported inputs from domestic inputs. Using a proportionality assumption we separate domestic and imported inputs. Further, for the intervening years (i.e., the years for which IOTs and SUTs are not available), we construct the domestic use tables by making use of detailed production and trade data from various official sources. This enables us to make use of year-specific domestic use tables in our estimation.

The estimates show that the DVA content of India's exports increased from US$46 billion in 1999-00 to US$ 295 billion in 2012-13, with a growth rate of 17.7% per annum. The ratio of DVA to gross exports steadily declined from 0.86 in 1999-00 to 0.65 in 2012-13. The decline in the ratio of DVA to gross exports has been particularly sharp for manufacturing sectors, suggesting that Indian industries have become more integrated with the global production networks (GPNs) and value chains, especially since the second half of the 2000s. Backward linkages, particularly from manufacturing to agriculture and services, have become an important source of export related DVA in the country. An implication is that the industries which are less export oriented are not necessarily protected from negative external shocks. Finally, using an econometric analysis, we show that greater participation in GPNs, as captured by the share of DVA in gross exports of a sector, leads to higher absolute values of gross exports and DVA.

Keywords: Exports, Domestic Value Added, India, Global Production Networks, Input Output Tables

JEL Code: C67, F14, F15

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1. Introduction

Global value chains and production networks are a central feature of the international economy today. World-wide reduction in tariff barriers and technology-led decline in the costs of transportation and communication has made it possible to unbundle the production processes in several industries, with various stages occurring in different countries[1]. Rapid growth of international fragmentation, notably since the 1980s, has led to a major change in the nature and pattern of world trade. Countries increasingly engage in trade by specializing in particular stages of good's production sequence or tasks rather than in final goods. Trade in parts and components (P&C) has grown much faster than trade in final goods as intermediate products cross national borders multiple times during the production process (see, for example, Feenstra, 1998, Hummels et al, 2001, Athukorala, 2012, Baldwin and Lopez-Gonzalez, 2013). The type of trade that result from interconnected production processes involving a sequential, vertical trading chain stretching across many countries, is described under various terminologies such as trade in value added, fragmentation trade, trade in middle products, task trade and vertical specialisation trade.

In certain industries, such as electronics and automobiles, technology makes it possible to sub-divide the production process into discrete stages. In such industries, fragmentation of production process into smaller and more specialised components allows firms to locate parts of production in countries where intensively used resources that are available at lower costs. The concept of global production network (GPN) has been developed as a way to analyse the complex link between a lead or a key firm and its suppliers in different countries[2]. Firms located in labour abundant countries ("factory economies") like China tend to specialize in low skilled labour-intensive activities involved in the production of a final good while capital and skill-intensive activities are being carried out in countries where those factors are abundant ("headquarter economies"). Thus, international firms might retain skill and knowledge-intensive stages of production (such as R& D and marketing) in the

[1] See for example, Hummels et al. (2001), Johnson and Noguera (2012), Koopman et al. (2014), Los et al. (2015) for details.

[2] The concepts of global commodity chain (GCC) and global value chain (GVC) have also been used to describe the interconnected production process in a given industry across countries. Compared to GPN, the conceptualization of GCC/GVC is more restricted focusing on the governance of inter-firm transactions and on the linear structures with sequential stages in the value chain. The GPN is a broader framework encompassing both intra- and inter-firm relationships, both linear and non-linear linkages, and all relevant sets of actors.

high-income headquarters (e.g., the U.S.A, E.U. and Japan) but locate all or parts of their production in a low wage country (e.g., China and Vietnam)[3].

The fragmentation of production and the new patterns of trade have major implications for a wide range of issues ranging from the usual practice of collecting and recording trade data, to the nature of industrial policies, to the influence of global supply chains on income distribution and welfare and to the ways in which trade theories are traditionally formulated. Multi-country production networks imply that intermediate inputs cross borders several times during the manufacturing process. Unlike the recording of domestic transactions, trade data are usually collected and reported as gross flows at each border crossing rather than the net value added between border crossings. This leads to double (or multiple) counting, which means that published trade data does not capture the domestic value added (DVA) content of exports. Ideally, trade statistics should be collected and reported on value added basis rather than in gross terms. Domestic value addition is what matters for employment and income generation within a country. Further, the use of DVA estimates makes trade statistics consistent with the System of National Accounts (SNA), which is based on the value added principle.

The concept of "value-added trade" is useful not only to understand where economic activity and jobs are generated, but also to gauge the nature and extent of a country's participation in GPNs and value chains. In general, countries (and sectors) with greater participation in GPNs/GVCs tend to record relatively low share of DVA in gross exports and vice versa. The DVA share of gross exports is a measure that illustrates how much value-added is generated throughout the economy for a given unit of exports. A lower ratio of DVA to exports implies that the foreign value added content of exports is proportionately higher. It must be noted that while greater participation in GPNs/GVCs may imply that DVA *per unit* of good produced is low, the *total* DVA from these activities is considerably high due to the scale effect of producing for the world market. For example, the often-cited case study by Dedrick et al (2010) shows that although the factory-gate price of an assembled

[3] This pattern is clearly evident from analysis, based on World Input Output Database (WIOD), by Baldwin and Lopez-Gonzalez (2013). It is found that China's participation in international supply chains lie heavily in labor-intensive final assembly while the high-income countries specialize in the production of technologically sophisticated P&C within the value chain. Based on the technological asymmetry in the international production network, Baldwin and Lopez-Gonzalez make the distinction between 'headquarter economies' and 'factory economies'. They note that "…firms in the headquarter economies (mostly the US, Japan and Germany) arrange the production networks while factory economies provide the labour" (Baldwin and Lopez-Gonzalez, 2013, pp 19).

iPod from a Chinese factory is $144, only about $4 of this constitutes of Chinese value added with much of the rest being captured by US, Japan and Korea. However, despite the low DVA per unit, the aggregate DVA in China from iPod assembly is very high due to the scale effect[4].

Driven by the concerns on the use (and misuse) of official international trade statistics, attempts have been made by different agencies (OECD, WTO etc) as well as individual researchers to estimate value added content of exports using Input-Output (I-O) Tables. The major advantage of the I-O framework is that, in addition to the direct value added within a given industry, value added generated in other industries as a result of linkage effects can be taken into consideration. For India, some estimates are available in World Input Output Database (WIOD), OECD-WTO TiVA data base, and in Goldar et al (2017)[5]. In order to obtain comparable estimates across countries, both WIOD and TiVA make use of harmonized inter-county (world) I-O tables with rather aggregated level of sector classification and estimates of domestic content are provided for these aggregate sectors[6]. The national IO tables, prepared by the statistical agencies in different countries, form the basis of the construction of these inter-country I-O tables. For India, WIOD and TiVA use the official I-O tables prepared by Central Statistical Organization (CSO) for the benchmark years 1998-99, 2003-04 and 2007-08[7].

Using the official IOTs prepared by the CSO, Goldar et al (2017) provide estimates of domestic (and foreign) value added share in India's gross exports for the benchmark years 1998-99, 2003-04, and 2007-08. While this study make use of more disaggregated IOTs (as compared to WIOD and TiVA), it suffers from some limitations: (i) the estimates are provided only for the years for which

[4] Consider the following simple back-of-the-envelope calculation. In 2008 (close to the years for which Dedrick provided the estimates) Apple sold 54.83 million units of iPods. Assuming that the whole assembly was done in China, the aggregate DVA in China from the assembly of this single product was 219 million dollars ($4 × 54.83 million units), which accounts for 0.015% of China's gross merchandise exports and about 0.022% of aggregate domestic value added in China in 2008.

[5] The other data sources that have commonly been used in the literature on 'trade in value added' include: the Asian Input-Output Table (IDEJETRO) and the GTAP database.

[6] WIOD and TiVa database make use of 35×35 and 34×34 I-O tables, respectively. India's official I-O table for the year 2007-08, published by the Central Statistical Organization (CSO), is much more disaggregated with a 130 ×130 matrix.

[7] Note that official IOTs are infrequently available (usually in five year intervals) and are often not harmonized over time. However, WIOD and TiVA estimates are provided based on a time series of inter-country IOTs. In order to construct the time series of IOTs, the available official IO tables are benchmarked on consistent time-series from the National Accounts Statistics (NAS). The NAS data on gross output and value added by industry, total imports and total exports and final use by use category are used to generate time series of IOTs using an algorithm, known as RAS method (Temurshoev and Timmer, 2011).

official IOT are available, with the latest year being 2007-08; (ii) estimates are not provided for the more recent years and (iii) inter-temporal comparisons of their estimates at the sectoral level is problematic, as the sector classification for the year 1998-99 is not harmonized with that for 2003-04 and 2007-08[8].

Recently, the CSO has brought out Supply-Use Tables (SUT) for the years 2011-12 and 2012-13. These tables suggest that Indian economy had undergone significant changes since 2007-08 in terms of the various structural characteristics, including inter-industry relationships. These changes are not captured in any of the available estimates, including the estimates by WIOD, TiVA and Goldar et al (2017).

The present study contributes to the literature dealing with the estimation of DVA content of India's exports in a number of ways. First, we provide consistent time series estimates for 112 sectors (covering the whole economy) of DVA content of India's exports (merchandise plus services) for the period 1999-2000 to 2012-13. Second, our estimates are based on IOTs with considerably more disaggregated sector classification than the estimates based on WIOD and TiVA. Third, our estimates are obtained by making use of a harmonized time series of inter-industry use tables, separating domestic and imported input uses, for each year spanning the time period from 1999-2000 to 2012-13. For constructing these tables, we have made use of information on the changing input-output relations and other structural features as reflected in available official IOTs since 1998-99 and the latest SUTs for the years 2011-12 and 2012-13[9]. Finally, this paper makes a contribution by undertaking an econometric analysis to test the hypothesis that greater participation in GPNs/GVCs, as captured by a declining share of DVA in gross exports, leads to higher absolute values of gross exports and DVA.

Rest of the paper is organized as follows. Section 2 discusses the IO methodology used to estimate the DVA content of gross exports. Section 3 discusses the data and methodology involved in the construction of harmonized time series of inter-industry use tables. Section 4 presents the estimates of DVA content of exports at the aggregate and disaggregated levels. Section 5 carries out a

[8] Goldar et al (2017) provides the estimates for 115 sectors for the year 1998-99 and for 130 sectors for 2003-04 and 2007-08. The number of sectors is determined by the sector classification in the respective IOTs.

[9] Using the same approach and database, another study carried out by the authors for the EXIM Bank of India provided the time series estimates of employment supported by India's merchandise and services exports for the period 1999-2000 to 2012-13 and for 112 sectors (see Veeramani, 2016).

regression analysis, in a simultaneous equation framework, to answer the question whether a decline in the ratio of DVA to gross exports (implying greater participation in GPNs/GVCs) leads to higher absolute dollar values of gross exports and DVA.

2. Input-Output Methodology for Estimating the DVA Content of Exports

The DVA content of exports from '*n*' sectors can be estimated as:

$$\boldsymbol{dva_1 = v\left(I - A^d\right)^{-1}\widehat{X}} \qquad (1)$$

where:

$\boldsymbol{v}$ is a $1 \times n$ vector containing value added to output ratio for each sector *n*

$\boldsymbol{\widehat{X}}$ is an $n \times n$ diagonal matrix of exports from *n* sectors

$\boldsymbol{\left(I - A^d\right)^{-1}}$ is the inverse Leontief matrix that measures the total direct and indirect uses of each commodity *i* by each sector *j*[10].

$\boldsymbol{A^d}$ is domestic coefficient matrix with dimensions $n \times n$. The elements of the A^d matrix (denoted as a_{ij}) measure the amount of domestic input from sector *i* required to produce one unit of output in sector *j*.

I is identity matrix with ones on the diagonal and zeros elsewhere

$\boldsymbol{dva_1}$ is the resulting $1 \times n$ vector of DVA content of exports. By summing the elements of this vector, we get the aggregate DVA for the economy.

The total DVA in (1) can be decomposed into direct and indirect (linkage) effects as shown below.

$$\boldsymbol{dva_1^d = v\left(\widehat{I - A^d}\right)^{-1}\widehat{X}} \qquad (2)$$

$$\boldsymbol{dva_1^{id} = dva_1 - dva_1^d} \qquad (3)$$

[10] Each element of Leontief inverse matrix indicates input requirement from i^{th} sector if there is a unit increase of the final-use (consumption, foreign trade, or investment) of j^{th} sector's output.

where $\widehat{\left(\boldsymbol{I}-\boldsymbol{A}^{\boldsymbol{d}}\right)}^{-\mathbf{1}}$ is a matrix consisting of the diagonal elements of $(I-A^d)^{-1}$ and zeros elsewhere; dva_1^d and dva_1^{id} are respectively vectors of direct and indirect DVA content of exports from *n* sectors.

The vector of foreign value added content of exports can be computed as:

$$\boldsymbol{fva_1 = x - dva_1'} \qquad (4)$$

where $\boldsymbol{x}$ is $(n \times 1)$ vector of exports from different sectors and dva_1' is the transposed vector of dva_1[11].

We estimate indirect DVA corresponding to two different concepts of linkages – backward and forward. First, dva_1^{id} in equation (3) measures the DVA attributable to sector *j*'s backward linkages with all upstream sectors *i*. For example, exports of 'automobile' embodies value added generated within the automobile sector (direct DVA) as well as in other sectors (such as 'iron and steel') which are used as inputs for producing the automobile (indirect DVA due to backward linkages). Second, using a slightly different approach, we can measure indirect DVA in sector *i* attributable to its forward linkages with all downstream sectors *j*. For example, DVA is generated in 'iron and steel' sector as a result of exports from all sectors (such as, automobiles, machine tools etc) where 'iron and steel' is used as an input. Indirect DVA in each sector due to such forward linkages is measured as:

$$\boldsymbol{dva_2^{id} = dva_2 - dva_2^d} \qquad (5)$$

where

$$\boldsymbol{dva_2 = \widehat{V}\left(I - A^d\right)^{-1} x} \qquad (6)$$

$$\boldsymbol{dva_2^d = \widehat{V}\left(\widehat{I - A^d}\right)^{-1} x} \qquad (7)$$

$\widehat{\boldsymbol{V}}$ is $n \times n$ diagonal matrix of value added to output ratios.

[11] Alternatively, foreign value added can be computed using this formula: $fva_1 = A^m(I - A^d)^{-1}x$, where A^m is the imported coefficient matrix with dimensions $n \times n$. The elements of the A^m matrix measure the amount of imported input from *i* required to produce one unit of output in sector *j*.

Note that dva_1 and dva_2 give the same values for the economy as a whole (when aggregated across sectors) but not for individual sectors. However, both the approaches give the same value of direct value added at the sector level. That is, the vectors dva_1^d and dva_2^d are identical across sectors but not dva_1^{id} and dva_2^{id} due to the difference in the type of linkages (backward versus forward) that they capture.

3. Annual Times Series of Domestic and Imported Use Tables: Data and Methodology

Making use of the IO based method outlined above, we estimate the DVA content in India's merchandise and services exports during the period 1999-2000 to 2012-13. However, official IOTs are available only once in five years and not for each year. Therefore, by making use of detailed production and trade data from various official sources, we construct annual time series of domestic use tables spanning the period 1999-2000 to 2012-13. For constructing these tables, we make use of information on the changing input-output relations and other structural features of the economy as reflected in available official IOTs since 1998-99 and the latest SUTs for the year 2011-12 and 2012-13. This section discusses in detail the data and methodology involved in the construction of these tables.

In India, the Central Statistics Office (CSO), under the Ministry of Statistics and Program Implementation, has been compiling and publishing IOT. The first IOT consistent with National Accounts Statistics was compiled for the year 1968-69. Since then, IOT have been prepared for the years 1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04 and 2007-08. The IOT for the year 1968-69 was published with 60 sectors and subsequently the tables consisted of 115 sectors since 1973-74 till 1998-99. The IOTs for 2003-04 and 2007-08 contain 130 sectors. In addition to these official IOT's, this study makes use of the recently published SUTs for the years 2011-12 and 2012-13[12]. The annual domestic use tables that we have constructed contain 112 sectors. In order to obtain a consistent time series data on domestic use, it was necessary to club some of the sectors in official IOT. Appendix Table A1 shows the sectoral classification, with description and IO codes of 112 sectors, used for constructing the annual time series of domestic use tables.

[12] The SUTs are not available for previous years. A major difference between IOT and SUT is that the former contains equal number of rows and columns (square matrix) while the number of rows exceeds the number of columns in SUT. For example, the IOT for the year 2007-08 contains 130 rows and 130 columns while the SUT for 2011-12 and 2012-13 include 140 rows and 66 columns. Thus, the sectors represented by SUT columns are more aggregated than the sectors represented by SUT rows.

3.2. Basic Framework for the Construction of Domestic and Imported Use Tables

The IOTs and SUTs record the use (as an input into another sector's production or as final demand) of each sector's output. In other words, these tables show the value of industry *i's* output used (i) as an input by industry *j*, (ii) as final products by households and governments (consumption) or firms (stocks and gross fixed capital formation) and (iii) as exports. For estimating the DVA or foreign value added content, it is important to separate imported input use from domestic input use in each sector. The IOTs compiled by CSO, however, reports total input use – that is, the sum of domestic and imported inputs. From the perspective of the present study, this is an important limitation. We overcome this limitation by using an imputation procedure to separate imported inputs from domestic inputs.

The basic idea of the IO model is that the structural characteristics of a national economy can be quantitatively described in terms of "technical input coefficients" – that is A^d and A^m matrices defined in Section 2. Technical coefficient measures the requirement of some input per unit of some output - for example, the amount of steel needed to produce one automobile. The IO table (IOT) provides the data required for the computation of the technical input coefficients for all sectors of the national economy.

Looking across the rows in the absorption matrix of IOT, we can observe how the output of each product *i* (y_i) is used for intermediate consumption by the various industries *j* and for the final demand purposes (i.e., for private consumption, government consumption, investment and exports). Each row records the total flows, meaning that the flows recorded as intermediate and final demand refer not only to domestically produced inputs but also to imported inputs. Each column records a given sector *j's* purchase of inputs from each sector *i* for producing the output of sector *j* (y_j). Sector *j's* purchase of inputs represents total flows – that is, without separating domestically sourced inputs from imported inputs. We can obtain the value of total output produced by each sector either by summing all entries in a given row (demand side) or by summing all entries in a given column (supply side).

Let z_{ij} denote the intermediate use of product *i* by industry *j*, F_i denote the final use of product *i* and m_i denote total import of product *i* for intermediate and final use. Note that F_i includes exports from sector *i* (x_i) along with final household consumption, government consumption and investment by firms. Assuming that there are *n* sectors in an economy, the gross value of output of each product *i*

(y_{it}) can be obtained by subtracting the value of imports from the sum of all row entries (i.e., the sum of all z_{ij} and F_i in a given row). This can be expressed for year *t* as follows:

$$\boldsymbol{y_{it} = z_{i1t} + z_{i2t} + \ldots + z_{iit} + \ldots + z_{int} + F_{it} - m_{it}} \qquad \textbf{(8)}$$

Similarly, by the supply perspective, the output of each product *j* (y_{jt}) can be obtained by summing the column entries – that is, the sum of the value of all input purchases and value added in sector *j*:

$$\boldsymbol{y_{jt} = z_{1jt} + z_{2jt} + \ldots + z_{jjt} + \ldots + z_{njt} + t_{jt} + v_{jt}} \qquad \textbf{(9)}$$

Where t_{jt} stands for net indirect taxes and v_{jt} stands for value added, defined as payments made for labor and capital.

Our major task is to construct the use tables for the years for which official IOTs are not available. To this end, using available official IOTs, we calculate the ratio of intermediate use to total availability (imports plus industry output) for each sector *i* and year *t*. This ratio (r_{it}) is defined as:

$$\boldsymbol{r_{it} = IIUSE_{it}/(y_{it} + m_{it})} \qquad \textbf{(10)}$$

where $\boldsymbol{IIUSE_{it}}$ stands for total intermediate use of sector *i*'s output for year *t* (i.e., the sum of all z_{ij}'s in equation 8 for a given sector *i* and for a given year *t*); *y* is gross value of output and *m* is imports.

For calculating this ratio, we have made appropriate adjustments for the Change in Stocks (CIS)[13]. We obtain these ratios for all sectors and for all years by interpolation[14]. Using these ratios, we can obtain total domestic use ($DIIUSE_{it}$) – that is, the total amount of a given sector's gross value of output used by other sectors for year *t*.

$$\boldsymbol{DIIUSE_{it} = r_{it} \times y_{it}} \qquad \textbf{(11)}$$

Note that $DIIUSE_{it}$ does not include imported intermediates. It is possible to obtain total imported intermediate use ($MIIUSE_{it}$) in an analogous manner.

[13] Whenever CIS is negative we have proportionately subtracted CIS value from IIUSE on the basis of percentage shares of IIUSE in total (final plus intermediate) use. Note that output (y_{it}) values in IOT are already net of CIS whenever CIS is negative.

[14] The ratios estimated from the IOTs for 2003-04 and 2007-08 have been interpolated for the intervening years. For the period 1999-2000 to 2002-03 we used the same ratios as that of 2003-04 and for the period 2008-09 to 2012-13 we used the same ratio as that of 2007-08.

$$\boldsymbol{MIIUSE_{it} = r_{it} \times m_{it}} \qquad \textbf{(12)}$$

By summing the two, we get total use:

$$\boldsymbol{IIUSE_{it} = DIIUSE_{it} + MIIUSE_{it}} \qquad \textbf{(13)}$$

We distribute the value of $DIIUSE_{it}$ across cells within a row on the basis of the share of each sector *j* in the total intermediate use of sector *i*'s output – that is, by using the following identities for each sector *i*.

$$\boldsymbol{IIUSE_{it} = z_{i1t} + z_{i2t} + z_{iit} + \ldots + \ldots z_{int}} \qquad \textbf{(14)}$$

Therefore, for each sector *i*

$$\boldsymbol{1 = \frac{z_{i1t}}{IIUSE_{it}} + \frac{z_{i2t}}{IIUSE_{it}} + \ldots + \frac{z_{iit}}{IIUSE_{it}} + \ldots \frac{z_{int}}{IIUSE_{it}}} \qquad \textbf{(15)}$$

We use the ratios in (15) to distribute $DIIUSE_{it}$ and $MIIUSE_{it}$ across sectors *j*. These ratios for distributing $DIIUSE_{it}$ and $MIIUSE_{it}$ have been computed for the years 1998-99, 2003-04 and 2007-08 using the IOTs and for 2011-12 and 2012-13 using SUTs. As noted earlier, unlike IOTs, the SUTs are not available as square matrices with equal number of rows and columns. The SUTs, prepared by the CSO for the years 2011-12 and 2012-13, contain 140 rows and 66 columns. We have converted the SUTs into square matrices (with 112 rows and columns) by splitting 66 SUT columns and by aggregating 140 SUT rows[15]. Thus, using 112×112 absorption matrices, we compute the ratios in (15) for years 1998-99, 2003-04, 2007-08, 2011-12 and 2012-13. The ratios thus obtained have been interpolated for the intervening years. Using these shares and *DIIUSEit* and *MIIUSEit* values, we obtain the annual time series of domestic and imported use tables for the period 1999-00 to 2012-13.

Thus, equation (2) can now be written as:

[15] Each of the 66 columns in SUT has been split into subcategories using a concordance table between our 112 sectors and 66 broad groups. The z_{ij} values at the broad group level have been split on the basis of the percentage shares (as per IOT for 2007-08) of sub categories within each broad group. Similarly, the 140 SUT rows have been aggregated and converted to 112 sector rows using a concordance table. The IOT for 1998-99 contains 115 sectors while the IOTs for 2003-04 and 2007-08 include 130 sectors. We have used a concordance table prepared by the CSO (available in CSO's website) for matching the sector descriptions in 1998-99 IOT with those in 2003-04. Some of the aggregate sectors in 1998-99 IOT have to be split into subcategories based on their percentage shares (as per IOT for 2003-04) within each of the aggregate sectors.

$$\boldsymbol{y_{jt} = z_{i1t} + z_{i2t} + \cdots + z_{iit} + \cdots + z_{int} + F_{it} - m_{it} = (d_{i1t} + m_{i1t}) + (d_{i2t} + m_{i2t}) + \cdots + (d_{iit} + m_{iit}) + \cdots + (d_{int} + m_{int}) + F_{it} - m_{it}} \quad \textbf{(16)}$$

Having obtained the domestic and imported use tables, we are now in a position to estimate the domestic technical coefficient matrix $\left(\boldsymbol{A^d}\right)$ needed for computing the domestic value added in exports. The elements of the $\boldsymbol{A^d}$ matrix (denoted as a_{ijt}) measure the amount of domestic input from sector *i* required to produce one unit of output in sector *j*.

$$\boldsymbol{A^d} = \begin{bmatrix} a_{11t} & a_{12t} & \cdots & a_{1nt} \\ a_{21t} & a_{22t} & \cdots & a_{2nt} \\ \cdots & \cdots & \cdots & \cdots \\ a_{n1t} & a_{n2t} & \cdots & a_{nnt} \end{bmatrix} = \begin{bmatrix} \frac{d_{11t}}{y_{1t}} & \frac{d_{12t}}{y_{2t}} & \cdots & \frac{d_{1nt}}{y_{nt}} \\ \frac{d_{21t}}{y_{1t}} & \frac{d_{22t}}{y_{2t}} & \cdots & \frac{d_{2nt}}{y_{nt}} \\ \cdots & \cdots & \cdots & \cdots \\ \frac{d_{n1t}}{y_{1t}} & \frac{d_{n2t}}{y_{2t}} & \cdots & \frac{d_{nnt}}{y_{nt}} \end{bmatrix}$$

The import coefficient matrix $\left(\boldsymbol{A^m}\right)$ can be constructed in an analogous manner.

3.3. Database

We need time series data for 112 sectors on gross value of output (GVO), gross value added (GVA), exports, and imports. This section discusses the data sources used and the details pertaining to the construction of each variable.

3.3.1. Gross Value of Output (GVO) and Gross Value Added (GVA)

The first step in the construction of the domestic use table is the compilation of time series data on GVO (at current prices) for 112 sectors. National Accounts Statistics (NAS), published by the CSO, along with Annual Survey of Industries (ASI) and unorganized sector surveys of NSSO are the main sources of data used to construct the GVO and GVA series (at current prices) for different sectors. The NAS data used for the purpose correspond to the 2004-05 series for the whole period[16].

[16] For the period 1999-2000 to 2003-04, we used the data from NAS back series which provide output and value added data for this period as per 2004-05 base year. Note that the output and value added values in official IOT for the year 2003-04 are as per 1999-00 base year and those in SUTs for 2011-12 and 2012-13 are according to 2011- 12 base year. We have converted the sectoral output and value added values in these tables as per the 2004-05 series by distributing

For manufacturing industries, time series on GVO and GVA is obtained by adding the values for registered and unregistered segments of manufacturing. The NAS data on GVO and GVA for manufacturing industries are available at a relatively aggregate level of classification. Therefore, in order to obtain data at the disaggregated industry level, we used the ASI plant level data for registered manufacturing sector and the NSSO surveys for unregistered manufacturing sectors. Using these two sources, we obtain output and value added data at the 5-digit NIC level for the period 1999-2000 to 2012-13. Using concordance tables between NIC and IOT classification, data at the 5-digit level have been aggregated to obtain GVO and GVA for 112 sectors. The NIC, used for reporting industrial production data, had undergone two revisions during the study period: NIC 1998 was used until 2003-04, followed by NIC 2004 until 2007-08 and NIC 2008 thereafter. We have prepared concordance tables to match the 112 sectoral classifications in our domestic use tables with the 5-digit codes in each version of the NIC.

We retrieved the 5-digit NIC level data on GVO and GVA for registered and unregistered manufacturing sectors as follows. First, using the ASI plant level data, we obtain 5-digit level data on GVO for the period 1999-2000 to 2012-13. We also obtain plant level data on the inputs used, for the same period. Plant level GVA is then obtained by subtracting the value of inputs from output. We notice that the aggregate GVO estimated from ASI plant level data match well with the values reported for registered manufacturing sector in the NAS. Nevertheless, to make sure that discrepancies with NAS data are zero, we split the NAS value of aggregate registered manufacturing output and value added (in current prices), on the basis of the percentage distribution of output and value added, respectively, at the 5-digit NIC level for each year.

For the unregistered manufacturing sector, using the NSSO surveys, we obtain the percentage distribution of output and value added at the 5-digit NIC level for four years: 1999-00 (55th round), 2000-01 (56th round), 2005-06 (62nd round) and 2010-11 (67th round). For the years for which the NSSO surveys have not been conducted, we assume that the percentage distribution of output at the 5-digit level remain constant for different sub-periods[17]. Unlike for registered manufacturing sector,

aggregate output and value added values (as per 2004-05 series) using the percentage shares of IO sectors in total output and total GVA. The values in 2007-08 IOT are already as per 2004-05 series.

[17] Specifically, we assume that the percentage distribution for the year 2000-01 holds for the period 2001-02 to 2004-05, the percentage distribution for the year 2005-06 holds for the period 2006-07 to 2008-09 and the percentage distribution for the year 2010-11 holds for the period 2009-10 to 2012-13. It was not possible to interpolate the shares for the intervening years of the NSSO survey rounds since the product classifications used to record data vary across the

we notice that aggregate GVO and GVA estimated from NSSO surveys differ significantly from that reported in NAS[18]. The NAS provides the break-up of output and value added for about 21 broad industry groups, with the corresponding NIC codes, within the unregistered manufacturing sector[19]. Having identified the 5-digit NIC codes corresponding to each of the broad industry groups for which data are available in NAS, we split the NAS value of output and value added for each of the 21 industry groups based on the percentage distribution at the 5-digit level. The above procedures ensure that the aggregate GVO and GVA for the manufacturing sector in our database is identical to those reported in NAS.

The NAS disaggregated statements provide detailed product level data on GVO for primary sectors (including agriculture, livestock, forestry & logging, fishing, and mining & quarrying) and for construction. Output series for all these sectors have been obtained directly from the NAS. For railways, gross earnings, as reported in NAS, is taken as a measure of output. For the rest of the sectors, however, the NAS provides only gross value added (GVA) but not GVO. In the case of these sectors ('electricity, gas & water supply'; 'trade, hotels & restaurants'; 'transport & storage'; 'communication'; 'banking & insurance'; 'real estate, ownership of dwellings & business services'; and 'other services') estimates of gross output were derived by applying output to value added ratios obtained from the official IOTs for the benchmark years 1999-2000, 2003-04 and 2007-08 along with the latest Supply-Use table prepared by the CSO for the year 2011-12. The GVA to GVO ratios obtained for these years are then linearly interpolated for the intervening years (and extrapolated for 2012-13) and applied to time series of GVA from NAS at current prices to obtain the output estimates at current prices. Using a concordance table to match the sectoral classification in our domestic use tables with the product classification in NAS, we obtain the time series on GVO at current prices for different product groups under primary and tertiary sectors.

In case of GVA, NAS provides only aggregate values for agriculture & allied activities and mining. Hence, to obtain GVA estimates for each sector, we multiply output numbers with value added to output ratio. Value added to output ratio for each sector is obtained in the following manner. First, we obtain the value added to output ratio from the official IOTs for the benchmark years 1998-99,

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different rounds of the survey: data for the year 2000-01, 2005-06 and 2010-11 were recorded according to NIC 1998, NIC 2004 and NIC 2008, respectively.

[18] In general, NAS reports significantly higher aggregate GVO than the values estimated from NSSO surveys.

[19] For unregistered manufacturing, value of output data is not available in NAS back series. Therefore, we used splicing technique to convert output data for the period 1999-00 to 2003-04 as per 2004-05 base year.

2003-04 and 2007-08 for all sectors that come under agriculture & allied activities and mining. These ratios are then interpolated for the intervening years. Second, for years after 2007-08 we compute annual growth rate of the aggregate value added to output ratio for agriculture & allied activities and mining. This growth rate is then applied to all the sub sectors within agriculture and mining to obtain the value added to output ratio. For other primary sectors, namely 'Forestry and Logging' and 'Fishing', GVA data is directly available. As mentioned above, GVA data for the services sectors are directly available from the NAS.

We validate our data by comparing our estimates of GVO and GVA with the corresponding values available in the official IOT for the year 2007-08. For this years, our estimate of GVO and GVA both match almost exactly with the corresponding values in IOTs at the aggregate level[20]. However, we notice certain discrepancy for some of the individual sectors, due to the fact that the concordance tables that we have used to obtain output values at the IO sector level may not exactly match with the ones used by the CSO for preparing the IOT. In order to rectify sector level discrepancy, we adopt the following procedure. First, we identify all the sectors for which the extent of mismatch between our estimates and the IOT estimates is above 1%. These sectors were then grouped into three broad categories: (i) agriculture, livestock and food manufacturing (ii) other manufacturing and (iii) services[21]. Second, using the official IOT and SUT data, we calculate output shares of sectors for which we find more than 1% mismatch within each of these broad categories. Output shares of these sectors for the intervening years have been obtained through linear interpolation[22]. Third, we sum the output of sectors (with more than 1% mismatch) within each of the above mentioned three broad categories and then the sum of each category was split among sectors based on their shares within each category. This procedure ensures that sector level mismatch in our final dataset remain below 1% for every sector. Same approach is used for rectifying the sector level discrepancy in the GVA data.

[20] At the aggregate level, our value of gross output is lower than the reported value in the IOT by 0.5% and our value of GVA is higher than that reported in NAS by 0.014% for the year 2007-08.

[21] We find exact match between our data and IOT data for forestry and logging, fishing, mining & quarrying, construction, almost all of the service sectors, and several manufacturing sectors. The sectors for which we get less than 1% mismatch are not included in the three broad categories considered here. We group food manufacturing with agriculture and livestock as we notice that the description of some of the agriculture and livestock related sectors also include some food products with certain degree of processing (for e.g., rice and wheat milling).

[22] The SUT provides output data for 140 sectors. The values were aggregated to obtain output for 112 sectors based on a concordance table.

3.3.2 Data on Exports and Imports

Having obtained the time series on GVO and GVA for 112 sectors, the next task is to construct a time series of import and export for each of the 112 sectors. Trade data used for this purpose comes from Directorate General of Commercial Intelligence and Statistics (DGCI&S) for merchandise and from the Reserve Bank of India (RBI) for services. Aggregating merchandise and services data from the two sources gives total export (and import) which matches exactly with the total export (and import) data given in the IOTs for the benchmark years. The percentage share of each of the 112 sectors in total exports has been computed using the IOTs for the benchmark years 1998-99, 2003-04, 2007-08 and SUT for 2011-12 and 2012-13. Shares for the intervening years have been obtained through linear interpolation. Using these shares, we have distributed the aggregate value of exports and imports for the 112 sectors[23].

Thus, we obtain a time series containing GVO, GVA, export and imports for 112 sectors for the period 1999-2000 to 2012-13.

4. Estimates of Domestic Value Added in Exports

4.1. Aggregate Level Estimates

Table 1 provides the estimates of the DVA content, in terms of billions of US dollar, of India's aggregate merchandise and services exports during the period 1999-2000 to 2012-13. Table 1 also reports India's total gross exports and the ratio of total DVA to gross exports. The average annual growth rates of DVA, gross exports and DVA to export ratios for different periods are shown in Table 2. In 1999-2000, India's gross exports stood at about 53.3 billion dollars, of which the contribution of DVA was 46 billion dollars, with the ratio of DVA to gross export being 0.86. In 2012-13, India's gross exports increased to 452.1 billion dollars, of which 295.4 billion dollars was the DVA content. It can be seen that the ratio of DVA to gross exports declined significantly to

[23] In order to obtain the sectoral values of exports and imports, we experimented with an alternative approach using a concordance table that we have prepared between 6-digit codes of Harmonized System (HS) and our 112 I-O sector classification. Using this concordance table, we estimated sector-wise merchandise export and import data for the corresponding non-service IOT sectors. However, for the majority of the non-service sectors, we noticed that our estimates were significantly higher than the corresponding values in the IOT. Given that our aggregate data (merchandise plus services) matches exactly with IOT aggregate (merchandise plus services), the mismatch that we observe for non-service sectors may imply that some portion of merchandise trade could have been assigned to services sectors while preparing the official IOTs. Due to these issues, we did not follow this approach for obtaining sectoral values of exports and imports.

0.65 in 2012-13 at the rate of 2 % per annum during the period 1999-2000 to 2012-13. In other words, the share of foreign value added increased steadily between 1999-2000 and 2012-13. The ratio of DVA to gross exports declined slowly but consistently from 0.86 in 1999-2000 to 0.81 in 2007-08. Since 2007-08, however, DVA to export ratio declined much faster reaching 0.73 in 2010-11 and 0.65 in 2012-13. This indicates that import content in India's exports has increased over the years or, stated differently, Indian industries have become more integrated with GPNs/GVCs, especially since the second half of the 2000s. Consistent with these trends, the estimates shown in column 5 of Table 1 suggest that the gross exports ($ billion) required to generate $1 billion worth of DVA increased from 1.16 billion dollars in 1999-2000 to 1.53 billion dollars in 2012-13.

Though the share of DVA in gross exports registered a decline, it is evident that the absolute value of DVA increased with a growth rate of 17.7% per annum during the period 1999-2000 to 2012-13. It increased steadily at the rate of 19.3% per annum during the first half of the 2000s (1999-00 to 2005-06) and at 10.2% per annum during the period 2006-07 to 2012-13. In the aftermath of the global financial crisis, the value of DVA declined briefly, from 229.4 billion dollars in 2008-09 to 213.2 billion dollars in 2009-10. However, the value of DVA recovered quickly, reaching a level of 278.1 billion dollars in 2010-11 and 304.2 billion dollars in 2011-12.

Turning to the relative importance of direct and indirect DVA, we find that the former contributed more than the latter throughout the period. Direct and indirect DVA grew at the same annual average growth rate of 17.7 percent during the period of 1999-2000 to 2012-13. However, the growth rates do differ for the two sub-periods: the first half of the 2000s recorded faster growth rate of direct DVA (21.3%) as compared to indirect DVA (16.8%) while the pattern got reversed during the second half as indirect DVA grew faster (14.8%) compared to direct DVA (7%). Column (4) in Table 1 shows the share of direct DVA in total DVA. It can be seen that share of direct DVA in total DVA increased steadily till 2007-08 after which it started declining. The share of direct DVA in total DVA stood at around 54% in 2012-13. Thus, value additions attributable to various linkages in the economy are not insignificant.

The ratio of exports in GDP is usually used as a measure of openness of an economy. However, this can lead to misleading results as the numerator of the ratio (exports) is a gross concept while GDP is a value added concept. It is more appropriate to use the ratio DVA in GDP as both the numerator and denominator, in this case, are based on the concept of value added. Figure 1 shows the changes

in the degree of India's trade openness based on these two alternative measures. Between 1999-2000 and 2012-13, the ratio of exports in GDP increased from 0.12 to 0.26 while the ratio of DVA to GDP increased rather slowly from 0.11 to 0.17. The gap between the two ratios have been widening since the mid-2000s.

4.2. Estimates for Broad Sectoral Groups

Using the data on gross exports from official IOTs, Table 3 reports the composition of exports across three broad sectoral groups: (i) Agriculture, mining and allied activities; (ii) manufacturing and (iii) services. The percentage shares are reported for the years 1998-99, 2003-04, 2007-08 (years for which official IOTs are available) and for 2012-13 (the latest year for which SUT is available). It is clear that the share of 'Agriculture, mining & allied activities' (henceforth, agriculture) declined consistently over the years from about 11% in 1998-99 and 2003-04 to less than 4% in 2012-13. The share of manufacturing declined from 68.7% in 1998-99 to 42.7% in 2007-08 and then rebounded to 63.6% in 2012-13. The share of services exports shot up from about 20% in 1998-99 to nearly 49% in 2007-08 and then showed a decline to about 32.5% in 2012-13. Manufacturing accounted for the largest share of exports for all years, except for 2007-08 when services recorded higher share (48.7%) than manufacturing (42.7%).

With this background on the changes in the sectoral composition of gross exports, Table 4 reports the dollar values of DVA for the three sectors. Agriculture DVA increased steadily from 4.6 billion dollars in 1999-2000 to about 21 billion dollars in 2007-08 and then declined gradually to 16 billion dollars in 2012-13. Until 2007-08, the ratio of DVA to gross exports in this sector remained very high and unchanged in the range of 0.95 – 0.96. Since then, however, this ratio recorded a small decline with the value being 0.91 in 2012-13. Gross exports and DVA grew fast at the rate of about 22% per annum during the period 1999-00 to 2005-06 while both series recorded a negative growth rate during 2006-07 to 2012-13 (see Table 5).

For the manufacturing sector, the value of DVA increased steadily from about 24 billion dollars in 1999-2000 to 165 billion dollars in 2011-12, before declining to 154 billion dollars in the following year. The ratio of DVA to gross exports declined from 0.81 in 1999-2000 to 0.53 in 2012-13, at the rate of -3% per annum. This ratio declined slowly during the initial years and at a much faster rate during the later years. The decline in this ratio reflects the fact that the global production sharing activities by Indian manufacturing industries have improved over the years. It is clear that

manufacturing sector is the major contributor to the observed decline, as reported in Table 1, in the ratio of aggregate DVA to aggregate exports. It may also be noted that the significant decline in the ratio of DVA to gross exports in the manufacturing sector since the mid-2000s coincided with a major increase in the share of manufacturing in gross exports. Table 5 suggests that dollar value of gross exports in manufacturing tend to record higher growth rates than that of DVA. Both the series grew at a faster rate during the second half of the 2000s as compared to the first half.

Turning to the service sector, we find consistent increase in the dollar value of DVA from 17.5 billion dollars in 1999-00 to about 116 billion dollars in 2008-09. The DVA value declined to about 99 billion dollar in 2009-10 and then gradually rebounded, crossing 125 billion dollars in 2012-13. However, DVA to export ratio declined rather slowly, at the rate of -0.6 % per annum, and remain quite high at 0.86 in 2012-13, down from 0.92 in 1999-2000. Both DVA and gross exports of services recorded faster growth rate during the first half of the 2000s as compared to the second half.

The composition of total DVA across sectors underwent significant changes during the period (see Figure 2). In 1999-2000, manufacturing accounted for the largest share of DVA (51.9%) followed by services (38%) and agriculture (10.1%). By 2007-08, the share of services increased considerably (54%) at the cost of manufacturing (35.9) while the share of agriculture remained constant (10.1%). Since then, however, the trend got reversed as the share of manufacturing increased consistently, reaching 52.1% in 2012-13 at the cost of services (42.5%) and agriculture (5.4%). Indeed, the DVA value of the manufacturing sector recorded an impressive growth since the mid-2000s while agriculture and services DVA witnessed a significant slowdown.

The observed changes in the composition of DVA are broadly consistent with the changes in the composition of gross exports as reported in Table 3. An interesting contrast, however, is that the manufacturing share in gross exports always exceed its share in DVA which is mainly driven two sectors - 'Petroleum Products' (IO Code 63) and 'Gems & Jewelry' (IO Code 103). Owing to their high import dependence, both these sectors generally account for a very high share in gross exports as compared to DVA: for example, in 2012-13, these two sectors together accounted for about 24% of gross exports but only about 7% in total DVA (see Table 7). In general, manufactured products are more tradable and hence more amenable to global production sharing, resulting in relatively lower DVA to gross export ratios, as compared to services and agriculture. Indeed, as can be seen

in Table 4, throughout the period, DVA to export ratio remained lower for manufacturing as compared other sectors. Further, while DVA to export ratio declined in all the sectors over the years, the rate of decline has been the fastest in the manufacturing sector. Therefore, as compared to agriculture and services sectors, India's manufacturing sector is more integrated with the GPNs/GVCs through production sharing.

Note that the DVA values reported in Table 4 is obtained by aggregating the elements of the vector dva_1 corresponding to each broad sector. The values for each sector is the sum of direct DVA $\left(dva_1^d\right)$ and indirect DVA (dva_1^{id}), the latter being attributed to backward linkages. Figure 3 depicts the share of indirect DVA in total DVA generated by each sector. It can be seen that, as expected, backward linkages are significantly more important for manufacturing industries as compared to services and agriculture. In general, indirect DVA accounted for more than 60% of total DVA generated in the manufacturing sector while it is less than 30% for services. The share of indirect DVA in total DVA is the lowest for agriculture, varying in the range of 15% - 25%, despite some increase in recent years. These values imply that, in general, export from a given manufacturing industry generates significant DVA through backward linkages with agriculture, services and other upstream manufacturing industries. In contrast, much of the DVA generated in agriculture and services are in the nature of direct DVA, with backward linkages being relatively weak.

As mentioned earlier, total DVA for each sector can be computed applying two different concepts of linkages – backward and forward. The values reported in Table 4 make use of the former concept. Table 6 reports the values based on the concept of forward linkages. Note that, as the importance of backward and forward linkages for a given industry is not identical, total DVA measured using these two concepts can differ significantly for a given sector (or for a given industry) though the two measures give identical values for the economy as a whole.

Comparing the DVA values in Table 4 with those in Table 6, it is immediately evident that these values are significantly different for each sector. For agriculture and services, the values in Table 6 are higher than those in Table 4 for all years while opposite is the case with manufacturing. Therefore, it is clear that forward linkages are more important than backward linkages for agriculture and services while it is the opposite for manufacturing. This can be seen clearly by comparing Figure 3 with Figure 4: these figures depict the share of indirect DVA attributed to backward and forward

linkages, respectively, in each sector's total DVA. Figure 4 shows that the share of indirect DVA in total sectoral DVA increased significantly since 2007-08 for agriculture and services while this proportion recorded some decline for manufacturing. Indirect DVA attributed to forward linkages accounted for over 70% of total DVA generated in agriculture in 2012-13, up from about 45% in 2007-08. For manufacturing, by contrast, only about 29% of total DVA in 2012-13 (down from 36% in 2007-08) can be attributed to indirect exports.

Throughout the period, the DVA to export ratio in Table 6 is above 1 for agriculture and services while it is less than 0.5 for manufacturing. These ratios reflect the fact that exports from downstream industries (mainly manufacturing) generates significant DVA in upstream agriculture and services through linkages even though a number of upstream industries do not directly engage in export activities. Exports of manufactured products offer the greatest potential to generate value addition and employment directly as well as indirectly through strong backward linkages with agriculture and services. Even the industries which are not export-oriented sometimes have heavy export dependence due to the linkages with other export-oriented industries. An implication is that industries which are less export-oriented are not necessarily protected from negative external shocks. While negative external shocks directly affects export oriented industries, relatively less export oriented industries are also adversely affected through backward linkages.

4.3. Disaggregated Level Estimates

Appendix tables A3 through A8 provide detailed time series estimates for 112 sectors. The various sector level indicators reported in these tables include dollar value of gross exports, dollar value of dva_1, ratio of dva_1 in gross exports, share of dva_1^{id} in dva_1, dollar value of dva_2 and the share of dva_2^{id} in dva_2. The main results from these estimates are summarized below with the help of Tables 7 through 11, where the estimates for selected sectors and years are reproduced.

Table 7 shows the percentage distribution of dva_1, the ratio of dva_1 to gross exports, and the share of dva_1^{id} in dva_1 for the top exporting sectors – that is, all sectors with share in total gross exports greater than or equal to 1% in 2012-13. These estimates are reported for three years: 1999-2000, 2003-04, 2007-08 and 2012-13[24]. Within agriculture, there is only one sector - 'Forestry & Logging'

[24] The years 2003-04 and 2007-08 are included as the estimates for these years are based on official IO tables while 1999-00 and 2012-13 are included as these are respectively the beginning and terminal years of our study period.

(IO 25) - with share in exports greater than 1%. The value of DVA in this sector increased from 0.3 billion dollars in 2007-08 to 4.3 billion dollars in 2012-13, with its share in total DVA being increased from just 0.2% to 1.5%. The increase in the value of DVA has been accompanied by a moderate decline in DVA to export ratio from 0.99 in 1999-2000 to 0.96 in 2007-08 and to 0.92 in 2012-13. Direct DVA accounts for the bulk of DVA generated in this sector though the share of indirect DVA is on the rise.

Within the manufacturing group, there are 13 sectors with share in gross exports greater than or equal 1%, with each accounting for greater than or equal to 1% share in total DVA as well. 'Petroleum Products' (IO Code 63) and 'Gems & Jewelry' (IO Code 103), each with share in gross exports greater than 10%, recorded a substantial decline in DVA to export ratio, even as the absolute value of DVA increased significantly in both the sectors. The DVA value in Petroleum Products increased from 0.2 billion dollars in 1999-2000 to 6.3 billion dollars in 2007-08 to 14.7 billion dollars in 2012-13. During this period, DVA to export ratio in this sector declined consistently from 0.55 in 1999-2000 to 0.24 in 2012-13. DVA to export ratio for 'Gems & Jewelry' declined drastically from nearly 0.61 in 1999-2000 to around 0.14 in 2012-13 while the absolute value of DVA in this sector increased from 2.5 billion dollars to 6.3 billion dollars. These two sectors record one of the lowest DVA to export ratios, which is expected given their high import dependence. It may be noted that these two sectors accounts for a much smaller share in total DVA as compared to their corresponding shares in gross exports, again underscoring their high import dependence.

The share of DVA in gross exports has dropped considerably over the years in other manufacturing sectors as well, with the exception of 'Miscellaneous Food Products' (IO Code 43). The value of DVA in IO-43 increased from 2.4 billion dollars in 2007-08 to nearly 18 billion dollars in 2012-13, with a corresponding increase in its share in total DVA from 1.2% to 6.1%. We note that the DVA shares are significantly higher than gross export shares for four manufacturing sectors – 'Miscellaneous Food Products' (IO-43), 'Readymade garments and miscellaneous textile products' (IO – 53+54), 'Drugs and medicines' (IO-70) and 'Khadi, cotton textiles in handlooms and cotton textiles' (IO - 46+47). All these sectors also record relatively higher DVA to export ratios, despite some decline over the years. Conversely, other traditional sectors like motor vehicles (IO Code 97) and 'Art Silk, Synthetic Fibre Textiles' (IO code 50) have experienced a significant decline in DVA to export ratio over time. The importance of backward linkages vary across manufacturing sectors,

with the share of indirect DVA ranging from only 36% for IO-70 to as high as 82% for IO-47 for the year 2012-13.

Within the services sector, 'Computer Related Services' (IO Code 124) and 'Business Services' (IO Code 123) record the largest values of DVA and gross exports. Both these sectors record significantly higher DVA shares relative to gross export shares. The DVA to export ratio remain very high for most of the services sectors, despite some decline over the years. It is evident that backward linkages are not as strong for services sectors as they are for manufacturing.

Table 8 reports the percentage distribution of dva_1 and ratio of dva_1 to gross exports for the fast growing sectors in the export basket. The fast growing sectors are identified as those whose shares in gross exports increased by at least 0.5 percentage points in 2012-13 as compared to 2003-04[25]. It can be seen that each of these sector's share in total DVA too increase by at least 0.5 percentage points, with the exception of 'Gems & Jewelry' (IO Code 103) and 'Inorganic and organic heavy chemicals' (IO-65+66). For IO-103, the share in DVA declined by 4.4 percentage points. As can be seen in Figure 5, barring few exceptions, there exist a high positive correlation between the percentage point changes in gross export shares and dva_1 shares. The two outliers, below the trend line, are IO-103 and 'Petroleum products including L.P.G.' (IO-63). We also note a very high positive correlation between the absolute dollar values of gross exports and dva_1 (see Figure 6 for the correlation between the two for the year 2012-13). It can be seen that all the fast growing sectors experienced a decline in the ratio of dva_1 to gross exports over the years, with the exception of 'Miscellaneous Food Products' (IO Code 43) and 'Ships and Boats' (IO Code 95).

4.4. Does Greater Participation in GPNs/GVCs Lead to Higher Absolute Values of Gross Exports and DVA?

We have seen in the previous section that the ratio of DVA in India's gross exports has declined consistently between 1999-2000 and 2012-13. This may imply that India's participation in GPNs/GVCs has increased over the years. As mentioned earlier, what really matters for employment generation within a country is the absolute value of DVA rather than DVA per unit of the good exported (i.e., DVA to gross export ratio). In this section, we analyze whether the decline

[25] In order to compute the percentage share in gross exports, we use official export data available in IOTS/SUTS, rather than the estimates based on interpolated shares. For the period under consideration, 2003-04 is the earliest year for which official export data are available as per IO classification while 2012-13 is the latest year.

in DVA to export ratio (implying greater participation in GPNs/GVCs) leads to an increase in the absolute dollar value of gross exports and DVA.

We hypothesize that with greater participation in GPNs/GVCs, the absolute value of India's exports will increase, which in turn will lead to an increase in the absolute value of DVA, even as the ratio of DVA to exports falls. While DVA per unit of export falls, total DVA generated from exports would increase as a result of the scale effect of producing for the world market. The following simultaneous equation model is estimated.

$$ln(x_t^j) = \alpha_0 + \alpha_1 ln\left(\frac{dva_1^j}{x^j}\right)_{t-1} + \alpha_2 ln(WD_t^j) + \alpha_3 ln(Y_t^j) + \alpha_4 ln(RPO_t^j) + \alpha_5 D(t) + \alpha_6 J + u1_t^j \quad (17)$$

$$ln(dva_{1t}^j) = \beta_0 + \beta_1 ln(x_t^j) + \beta_2 ln(WD_t^j) + \beta_3 ln(GVA_t^j) + \beta_4 ln(RPV_t^j) + \beta_5 D(t) + \beta_6 J + u2_t^j \quad (18)$$

The notations *j, t* and *ln* in the above equations stand respectively for sector, year and natural logarithm. Variable *x* is the dollar value of India's exports to the world, $dva_1$is the dollar value of DVA generated from India's exports; *WD* is world demand, *Y* is value of output, *RPO* is exchange rate adjusted relative prices measured using sector specific output deflators, *RPV* is exchange rate adjusted relative prices measured using sector specific value added deflators, *GVA* is gross value added; *D(t)* is the vector of year dummies and *J* is the vector of sector dummies. The variables *x* and dva_1 are endogenous while other variables are assumed as exogenous to the system. Note that we use one year lagged value of DVA to export ratio, rather than its contemporaneous value, assuming that the effect of GPN/GVC participation on gross exports will be observed with one year lag[26]. Our regressions exclude the observations where the values of *x* and dva_1 are zero as in such cases the ratios between the two (zero divided by zero) are undefined[27].

The variable WD is measured as the weighted average of total imports (in US dollars) in given sector by rest of the world from all countries other than India. The share of a given country in India's total exports in a given sector is taken as the weight. This variable is measured using trade data from WITS at the 6-digit HS level, matched with our IO sector codes, for 96 countries that have consistently reported import data for each year from 1999 to 2012. This variable could be constructed only for merchandise as detailed trade data required for measuring WD is not available

[26] Use of lagged ratio also enables us to treat this variable as exogenous.

[27] For the merchandise group, the observations with zero export values account for less than 5% of total observations.

for services sectors. Thus, the observations corresponding to services sectors are dropped in the specifications that include WD as one of the regressors.

The variable RPO (RPV) is measured by taking the ratio of output (value added) deflator for India to that of United States for each IO sector[28]. These ratios were adjusted by the dollar per rupee nominal exchange rate for the given year. An increase in these ratios implies a deterioration of India's price competiveness in the world market for the given sector, and vice versa. Further details pertaining to variable definition, variable construction, and data sources are given in Appendix Table A2.

Before proceeding with the estimation, we perform the Hausman specification test for simultaneity. Results show that simultaneity problem is present in the system and hence OLS estimators will not be consistent[29]. Therefore, we estimate the regression equations (17) and (18) using three-stage least squares (3SLS) estimation procedure. The 3SLS, a combination of seemingly unrelated regressions (SUR) and 2SLS, obtains instrumental variable estimates, taking into account the covariances across equation disturbances.

The regression results are reported in Table 9. While 3 SLS is our preferred specification, the table also reports the results of fixed effect regressions. As expected, DVA to export ratio show statistically significant negative coefficient values in all specifications of equation (17). The elasticity of gross exports with respect to the ratio ranges from -1.6 to -4.6 in 3 SLS specifications. This implies that a 10% decline in the ratio of DVA to exports leads to an increase in the dollar value of gross exports in the range of 16% to 46%. Thus, greater integration of a sector in GPNs/GVCs, as captured by a decline in DVA to export ratio, causes the absolute value of exports to increase. The results corresponding to equation (18) confirm that higher value of gross exports, in turn, leads to higher absolute value of DVA. The elasticity of DVA values with respect to gross export ranges from 0.42 to 0.85 in 3 SLS specifications, which means that a 10% increase in gross exports causes an increase in DVA in the range of 4.2% to 8.5%. Overall, the results confirm the benevolent effect of GPN/GVC participation for domestic value addition.

[28] Output (value added) deflator for the United States is taken as a proxy for world prices.

[29] The test is carried out as follows. First, using the OLS method, we regress $\ln(x_t^j)$ on all the exogenous variables and obtain the residuals. Second, we run the OLS regression of $\ln(dva_{1t}^j)$ (equation 18) with the residuals obtained in the first regression as an additional regressor. We find that the coefficient of the residual is statistically significant at 1% level which implies that endogeneity problem exists.

The variable WD yields statistically significant positive coefficients in both the equations, implying that Indian exports as well as DVA respond positively to increase in world demand. The point estimates suggest that a 10% increase in world demand raises India's gross exports by about 1% to 3.5%. Our results suggests that world demand exerts an independent positive effect on DVA, though quantitatively small, even after controlling for the effect of gross exports on the latter. The variables *Y* (gross output) and GVA (gross value added) are included to capture the effect of domestic supply capacity on exports and DVA, respectively. It is evident that both these variables show positive coefficient, with GVA being statistically significant in all specifications of equation (18) while *Y* loses significance when year dummy is included. Finally, the variables representing exchange rate adjusted relative prices (RPO and RPV) show expected negative signs in all 3SLS specifications but do not always attain statistical significance.

5. Conclusion and Policy Implications

Using Input-Output (IO) analysis, this study provides the time series estimates of domestic value added (DVA) content of India's merchandise and services exports for the period 1999-2000 to 2012-13 and for 112 sectors. The major advantage of the IO framework is that, in addition to the direct effect within a given industry, DVA generated in other industries as a result of indirect linkages (backward and forward) can be taken into consideration. The study makes use of the official input-output tables (IOTs) for the benchmark years 1998-99, 2003-04, 2007-08 as well as the recently published Supply Use Tables (SUTs) for the years 2011-12 and 2012-13. The IOTs and SUTs, compiled by the CSO, do not distinguish imported inputs from domestic inputs. Using a "proportionality" assumption we separate domestic and imported inputs. Further, for the intervening years (i.e., the years for which IOTs and SUTs are not available), we construct the domestic use tables by making use of detailed production and trade data from various official sources. This enables us to make use of year-specific domestic use tables in our estimation.

The estimates show that the DVA content of India's exports increased from US $46 billion in 1999-00 to US $295 billion in 2012-13, with a growth rate of 17.7% per annum. Consistent with this result, a companion study using the same database, showed that the total number of jobs supported by aggregate Indian exports increased from about 34 million in 1999-00 to 62.6 million in 2012-13, with a growth rate of 3.4% per annum (Veeramani, 2016). Further, export related jobs grew significantly faster than that of country's total employment: the share of export-supported jobs in

total employment in the country increased from little over 9% in 1999-00 to 14.5% in 2012- 13. At the sometime, as shown in this study, the ratio of DVA to gross exports steadily declined from 0.86 in 1999-00 to 0.65 in 2012-13.

The decline in the ratio of DVA to gross exports has been particularly sharp for manufacturing sectors, suggesting that Indian industries have become more integrated with the GPNs/GVCs, especially since the second half of the 2000s. Using an econometric analysis, we show that greater participation in GPNs/GVCs, as captured by the share of DVA in gross exports of a sector, leads to higher absolute values of gross exports and DVA. The increased integration of manufacturing sector with GPNs/GVCs is also associated with significant growth of export supported jobs in this sector (Veeramani, 2016). Export supported jobs accounted for 39.5% of total employment in the manufacturing sector in 2012-13, up from 19.6% in 1999-00. Backward linkages, particularly from manufacturing to agriculture and services, have become an important source of export related DVA and job creation in the country. An implication is that the industries which are less export oriented are not necessarily protected from negative external shocks.

Based on imported parts and components, India has a huge potential to emerge as a major hub for final assembly in several industries, particularly in electronics and electrical machinery. Since this strategy involves processing or assembly of imported parts and components, the net domestic value added *per unit* of exported good would not be very high. However, since the scale of operations is usually very large, the total domestic value addition from these activities could be considerably high contributing to large scale employment generation.

What needs to be done at the policy level to strengthen India's participation in GPN? A number of studies suggest that a low level of service link cost - cost related to transportation, communication, and other related tasks involved in coordinating the activity in a given country with what is done in other countries within the production network - is critical for countries to participate in GPN. Supply disruption in a given location due to shipping delays, power failure, political disturbances, labor disputes etc could disrupt the entire production chain. Clearly, the policy should focus on reducing India's high service link costs with other countries within the production network.

Assembly processes within production networks requires not only trainable low-cost unskilled labor but also a lot of middle-level supervisory manpower. For example, when Apple employed about 7,00,000 factory workers in China, it also employed 30,000 engineers on-site to supervise those workers (Isaacson, 2011). This implies that skill development policy should be actively followed by both the central and state governments.

Greater integration of domestic industries with GPNs/GVCs must form an essential part of the "Make in India" initiative. What is important is the creation of an environment that allows entrepreneurs to freely search and identify opportunities in the vertically integrated global supply chains of various industries. While India has a potential to emerge as a major hub for final assembly in several industries, it is important to resist the temptation of extending tariff protection for final goods assembly as it will have the detrimental effect of breeding inefficiencies. A level playing field should be created for different types of business entities – domestic, foreign and joint ventures. The domestic market for goods should be as contestable as is the export market for competing suppliers from around the world.

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Tables

Table 1: Domestic Value Added Content of India's Merchandise plus Services Exports ($ Billion).

Year	Domestic Value Added			Gross Exports	Ratio of Total DVA to Gross Exports	Share of Direct DVA in Total DVA	Gross exports ($ billion) required to generate $1 billion worth of DVA
	Total	Direct	Indirect				
	(1)			(2)	(3)	(4)	(5)
1999-00	46.0	24.6	21.3	53.3	0.86	53.5	1.16
2000-01	53.0	29.2	23.8	61.8	0.86	55.1	1.17
2001-02	53.3	29.4	23.9	61.9	0.86	55.2	1.16
2002-03	63.7	35.5	28.2	74.5	0.85	55.7	1.17
2003-04	79.0	44.9	34.1	92.9	0.85	56.8	1.18
2004-05	105.7	61.5	44.3	128.1	0.83	58.2	1.21
2005-06	132.5	79.1	53.4	162.9	0.81	59.7	1.23
2006-07	163.7	100.4	63.3	202.6	0.81	61.3	1.24
2007-08	207.2	130.0	77.3	256.1	0.81	62.7	1.24
2008-09	229.4	137.4	92.0	296.0	0.77	59.9	1.29
2009-10	213.2	120.2	93.0	278.4	0.77	56.4	1.31
2010-11	278.1	150.1	128.0	380.8	0.73	54.0	1.37
2011-12	304.2	159.6	144.6	452.0	0.67	52.5	1.49
2012-13	295.4	160.1	135.3	452.1	0.65	54.2	1.53

Table 2: Growth Rates of DVA and Gross Exports (%)

Period	Growth Rate: DVA			Growth Rate: Gross Exports (Merchandise Plus Services)	Growth Rate: Ratio of Total DVA to Gross Exports
	Total	Direct	Indirect		
1999-2000 to 2012-13	17.7	17.7	17.7	20.1	-2.0
1999-2000 to 2005-06	19.3	21.3	16.8	20.5	-0.9
2006-07 to 2012-13	10.2	7	14.8	14.5	-3.8

Table 3: Composition of Exports across Broad Sectors

Broad Sectors	Percentage share (%)			
	1998-99	2003-04	2007-08	2012-13
Agriculture, mining & allied activities	11.1	10.9	8.6	3.8
Manufacturing	68.7	53.7	42.7	63.6
Services	20.2	35.4	48.7	32.5
Total	100	100	100	100

Source: CSO (IOTs and Supply-Use Table for 2012-13).

Table 4: Domestic Value Added in Exports for Broad Sectors, Direct Effects plus Backward Linkages - dva_1 for each sector ($ Billion)

Year	Agriculture, mining & allied activities		Manufacturing		Services	
	DVA	Ratio of Total DVA to Gross Export	DVA	Ratio of Total DVA to Gross Export	DVA	Ratio of Total DVA to Gross Export
1999-00	4.64	0.96	23.87	0.81	17.48	0.92
2000-01	5.63	0.96	27.12	0.80	20.26	0.92
2001-02	5.93	0.96	27.02	0.80	20.38	0.93
2002-03	7.47	0.96	31.72	0.79	24.49	0.93
2003-04	9.73	0.96	38.78	0.78	30.48	0.93
2004-05	12.59	0.95	48.08	0.74	45.08	0.91
2005-06	15.07	0.95	55.88	0.71	61.56	0.90
2006-07	17.63	0.95	63.83	0.69	82.27	0.89
2007-08	20.95	0.95	74.34	0.68	111.95	0.90
2008-09	20.46	0.92	93.05	0.65	115.86	0.88
2009-10	16.17	0.91	98.19	0.66	98.81	0.89
2010-11	18.06	0.91	140.40	0.62	119.66	0.88
2011-12	16.47	0.89	164.89	0.57	122.87	0.87
2012-13	15.99	0.91	153.83	0.53	125.63	0.86

Table 5: Average Annual Growth Rates of Gross Exports and DVA for Broad Sectors (%)

Period	Agriculture			Manufacturing			Services		
	Exports	DVA	Ratio of Total DVA to Gross Export	Exports	DVA	Ratio of Total DVA to Gross Export	Exports	DVA	Ratio of Total DVA to Gross Export
1999-2000 to 2012-13	11.9	11.3	-0.6	20.9	17.3	-3.0	20.2	19.4	-0.6
1999-2000 to 2005-06	22.4	22.3	-0.2	18.0	15.6	-2.0	23.5	22.9	-0.3
2006-07 to 2012-13	-2.2	-3.2	-1.0	23.2	18.0	-4.2	6.2	5.5	-0.6

Table 6: Domestic Value Added in Exports for Broad Sectors, Direct Effects plus Foreword Linkages - dva_2 for each sector ($ Billion)

Year	Agriculture, mining & allied activities		Manufacturing		Services	
	DVA	Ratio of Total DVA to Gross Export	DVA	Ratio of Total DVA to Gross Export	DVA	Ratio of Total DVA to Gross Export
1999-00	8.06	1.66	13.05	0.44	24.89	1.32
2000-01	9.38	1.59	15.20	0.45	28.42	1.30
2001-02	9.64	1.56	14.73	0.44	28.93	1.32
2002-03	11.93	1.54	17.06	0.42	34.71	1.31
2003-04	14.94	1.48	21.13	0.42	42.93	1.30
2004-05	19.48	1.48	26.13	0.40	60.09	1.21
2005-06	23.16	1.46	30.16	0.38	79.18	1.16
2006-07	26.90	1.45	34.83	0.38	101.97	1.11
2007-08	32.26	1.46	40.55	0.37	134.39	1.08
2008-09	33.42	1.51	50.25	0.35	145.73	1.11
2009-10	30.00	1.69	52.68	0.35	130.52	1.17
2010-11	39.79	1.99	73.86	0.33	164.45	1.21
2011-12	42.78	2.30	86.72	0.30	174.69	1.23
2012-13	42.85	2.44	81.60	0.28	170.95	1.16

Table 7: DVA in Top Exporting Sectors (Sectors with Share in Gross Exports ≥ 1%)

IO Code	Share in Gross Exports, 2012-13 (%)	Share in *dva1* (%)				Ratio of *dva1* to Gross Exports				Share of Indirect DVA (dva_1^{id}) in dva_1 (%)			
		1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
Agriculture, Mining & Allied Activities													
25	1.0	0.6	0.3	0.2	1.5	0.99	0.99	0.96	0.92	4.7	3.1	10.3	29.4
Manufacturing													
63	13.6	0.5	1.8	3.0	5.0	0.6	0.5	0.3	0.2	68.3	56.1	54.5	51.0
103	10.2	5.3	6.5	1.7	2.1	0.6	0.7	0.7	0.1	51.4	39.8	55.7	53.9
43	4.2	1.7	2.7	1.2	6.1	0.9	0.9	0.9	0.9	90.3	88.5	87.2	81.8
53+54	3.9	8.8	8.3	4.9	5.0	0.9	0.9	0.9	0.8	72.6	68.4	66.4	66.3
65+66	3.6	3.2	2.9	2.5	3.1	0.8	0.8	0.7	0.6	53.7	58.2	68.9	63.7
77+78+79	3.5	1.6	3.2	3.3	3.6	0.9	0.8	0.7	0.7	61.5	63.7	62.6	76.1
85+87	2.4	1.5	2.3	1.6	2.3	0.8	0.8	0.7	0.6	65.7	66.0	65.5	53.5
70	2.2	1.6	1.7	1.5	2.7	0.9	0.9	0.8	0.8	56.0	44.0	55.3	36.0
97	2.2	1.0	1.3	1.2	2.1	0.8	0.8	0.7	0.6	70.5	70.8	77.5	68.0
46+47	2.1	3.1	2.0	1.6	2.8	0.9	0.9	0.9	0.9	69.6	68.4	68.4	70.1
105	1.3	0.5	0.6	1.1	1.2	0.8	0.8	0.8	0.6	82.1	72.6	69.2	65.2
62+72	1.1	0.9	1.3	1.0	1.0	0.8	0.8	0.7	0.6	53.2	54.9	61.5	67.7
50	1.0	1.0	1.0	0.6	1.0	0.8	0.8	0.8	0.7	78.2	79.5	74.1	76.6
Services													
124	14.9	13.8	16.2	19.4	20.7	0.9	1.0	0.9	0.9	30.1	22.0	19.2	23.9
123	12.5	1.3	1.5	8.2	15.9	0.9	0.9	0.8	0.8	43.2	40.3	33.7	31.5
111	1.5	0.1	0.2	2.1	1.4	0.9	0.9	0.8	0.6	42.9	37.7	25.7	41.8
118	1.4	0.1	0.4	0.0	2.0	1.0	1.0	0.0	0.9	12.3	9.4	0.0	18.8

Table 8: DVA in Fast Growing Export Sectors

IO Code	Share in Gross Exports (%)			Share in dva_1 (%)			Ratio of dva_1 to gross exports	
	2003-04	2012-13	Percentage Point Change	2003-04	2012-13	Percentage Point Change	2003-04	2012-13
123	1.40	12.5	11.1	1.5	15.9	14.4	0.91	0.83
63	3.40	13.6	10.3	1.8	5	3.2	0.45	0.24
103	8.50	10.2	1.7	6.5	2.1	-4.4	0.65	0.14
43	2.50	4.2	1.7	2.7	6.1	3.4	0.91	0.93
111	0.10	1.5	1.3	0.2	1.4	1.2	0.86	0.62
118	0.30	1.4	1.1	0.4	2	1.6	0.98	0.92
97	1.30	2.2	0.8	1.3	2.1	0.8	0.83	0.64
25	0.30	1	0.8	0.3	1.5	1.2	0.99	0.92
95	0.10	0.8	0.7	0.1	1.1	1	0.57	0.84
105	0.70	1.3	0.6	0.6	1.2	0.6	0.78	0.60
124	14.30	14.9	0.6	16.2	20.7	4.5	0.96	0.91
112	0.30	0.8	0.6	0.2	0.9	0.7	0.80	0.70
70	1.70	2.2	0.6	1.7	2.7	1	0.85	0.79
65+66	3.10	3.6	0.5	2.9	3.1	0.2	0.79	0.56

Table 9: Regression Results, 3SLS and Fixed Effects

	3 SLS				Fixed Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
Equation (1) Dep. Variable: $ln(x_t^j)$						
$ln\left(\frac{dva_1^j}{x^j}\right)_{t-1}$	-4.643***	-3.455***	-1.672***	-1.637***	-1.121***	-1.164***
	(0.124)	(0.144)	(0.191)	(0.194)	(0.302)	(0.308)
$ln(WD_t^j)$	0.348***	0.291***	0.0978**		0.0964**	
	(0.024)	(0.041)	(0.042)		(0.0441)	
$ln(Y_t^j)$	0.373***	0.450***	0.0528	0.0057	0.196*	0.262***
	(0.031)	(0.045)	(0.041)	(0.041)	(0.102)	(0.0988)
$ln(RPO_t^j)$	-13.29	-15.09**	-6.152	-3.957	-18.64**	-11.36
	(8.454)	(6.580)	(4.093)	(4.100)	(8.125)	(7.160)
Constant	3.238***	4.268***	16.73***	19.54***	12.59***	13.11***
	(0.643)	(1.085)	(1.205)	(1.077)	(2.311)	(2.137)
Year Dummy (*D(t)*)	No	No	Yes	Yes	Yes	Yes
Industry Dummy (*J*)	No	Yes	Yes	Yes	-	-
Observations	1,073	1,073	1,073	1247	1,073	1,247
R^2	0.457	0.857	0.879	0.876	0.404	0.409
Equation (2) Dependent Variable: $ln(dva_{1t}^j)$						
$ln(x_t^j)$	0.847***	0.810***	0.473***	0.416***	0.983***	0.984***
	(0.0105)	(0.0227)	(0.108)	(0.086)	(0.00344)	(0.00288)
$ln(WD_t^j)$	0.0512***	0.0646***	0.0487*		-0.00453	
	(0.00783)	(0.0134)	(0.0282)		(0.00473)	
$ln(GVA_t^j)$	0.0544***	0.0315**	0.0538***	0.0471***	0.0618***	0.0618***
	(0.00503)	(0.0152)	(0.0109)	(0.0078)	(0.0117)	(0.0104)
$ln(RPV_t^j)$	-2.978*	-3.458**	-2.001	-2.818	1.708**	0.888
	(1.543)	(1.639)	(1.346)	(2.927)	(0.793)	(0.650)
Constant	0.605***	1.940***	8.250***	10.41***	-1.042***	-1.152***
	(0.146)	(0.288)	(2.156)	(1.799)	(0.247)	(0.219)
Year Dummy (*D(t)*)	No	No	Yes	Yes	Yes	Yes
Industry Dummy (*J*)	No	Yes	Yes	Yes	-	-
Observations	1,073	1,073	1,073	1247	1,164	1,355
R^2	0.984	0.993	0.964	0.956	0.992	0.994

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figures

Figure 1: Measures of Openness: Exports to GDP Ratio versus DVA to GDP Ratio

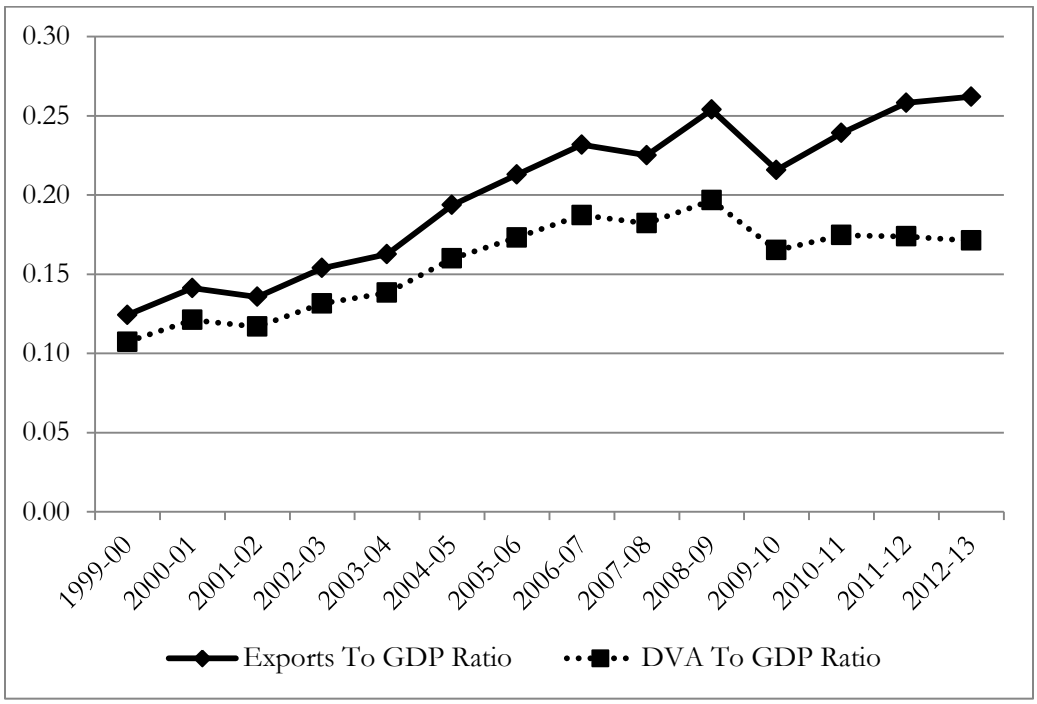


Figure 2: Distribution of DVA across Sectors: Agriculture, Manufacturing and Services

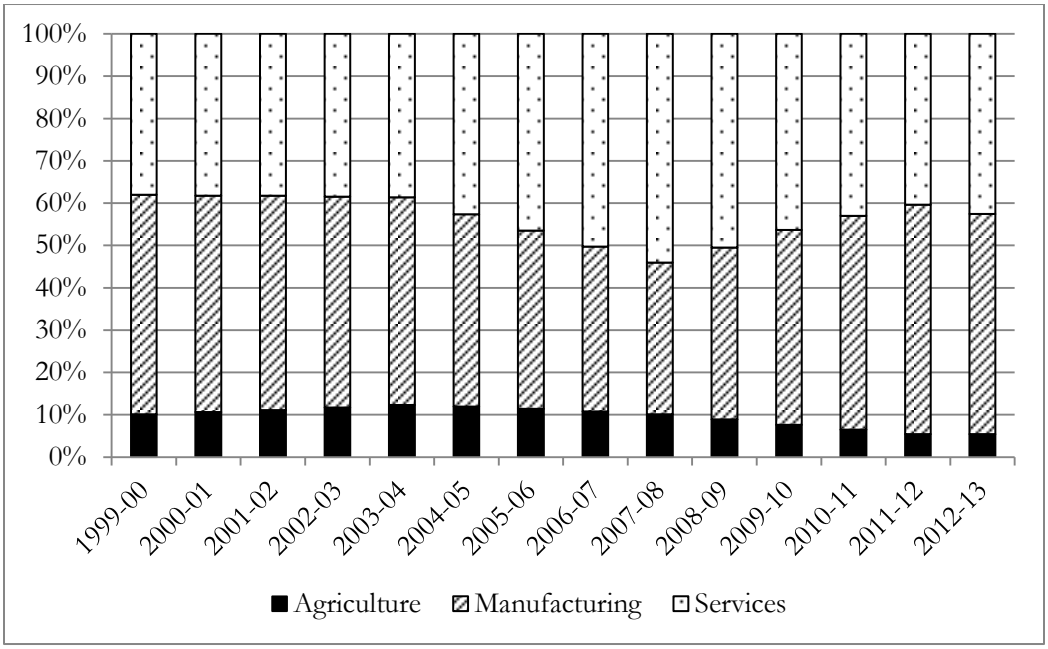


Figure 3: Share of Indirect DVA (Backward Linkages) in Total DVA for Each Sector (%)

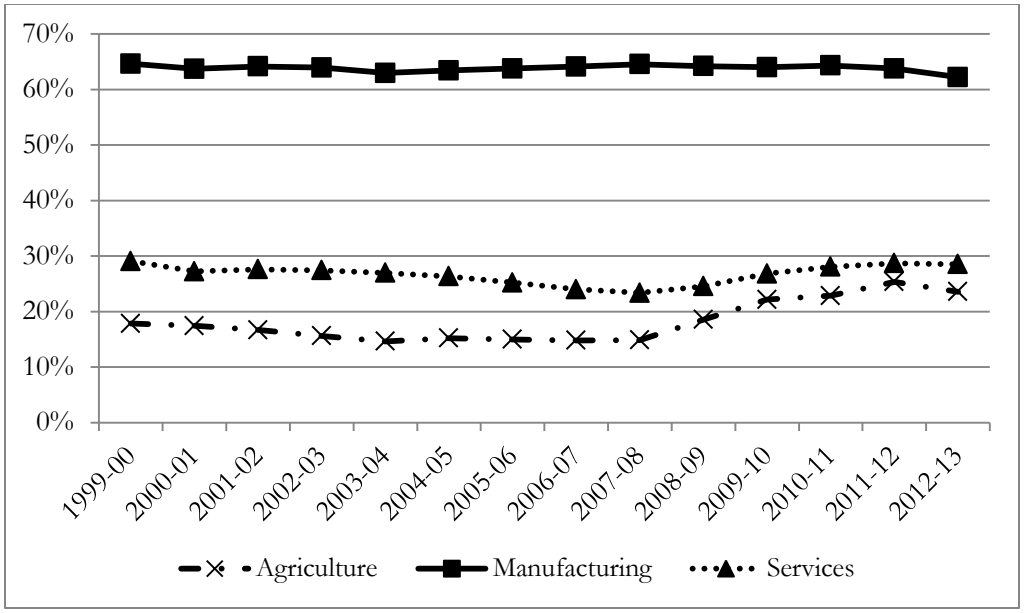


Figure 4: Share of Indirect DVA (Forward Linkages) in Total DVA for each Sector (%)

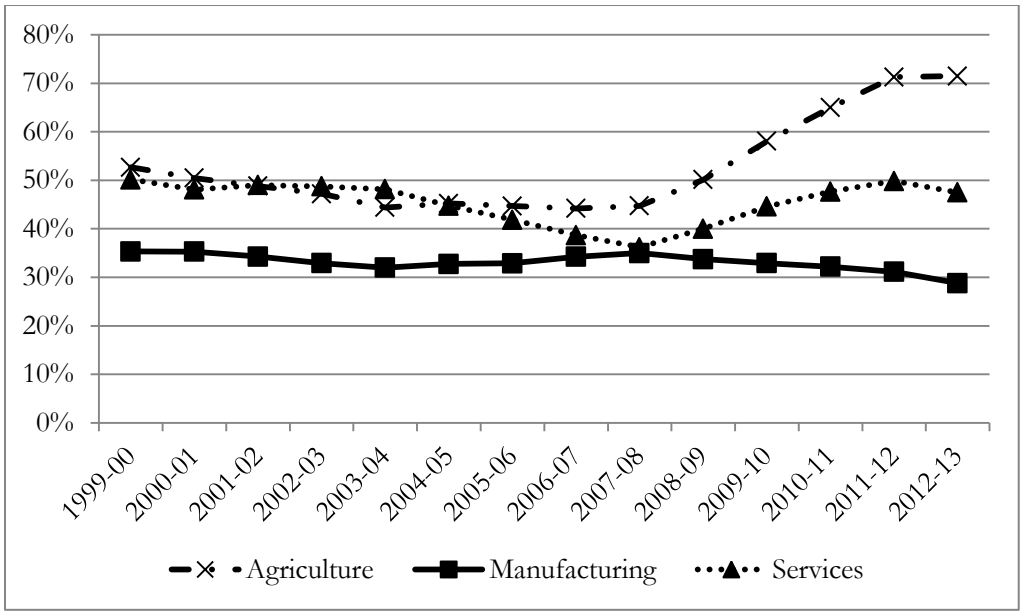


Figure 5: Correlation between percentage point changes in export and dva1 shares, between 2003-14 and 2012-13

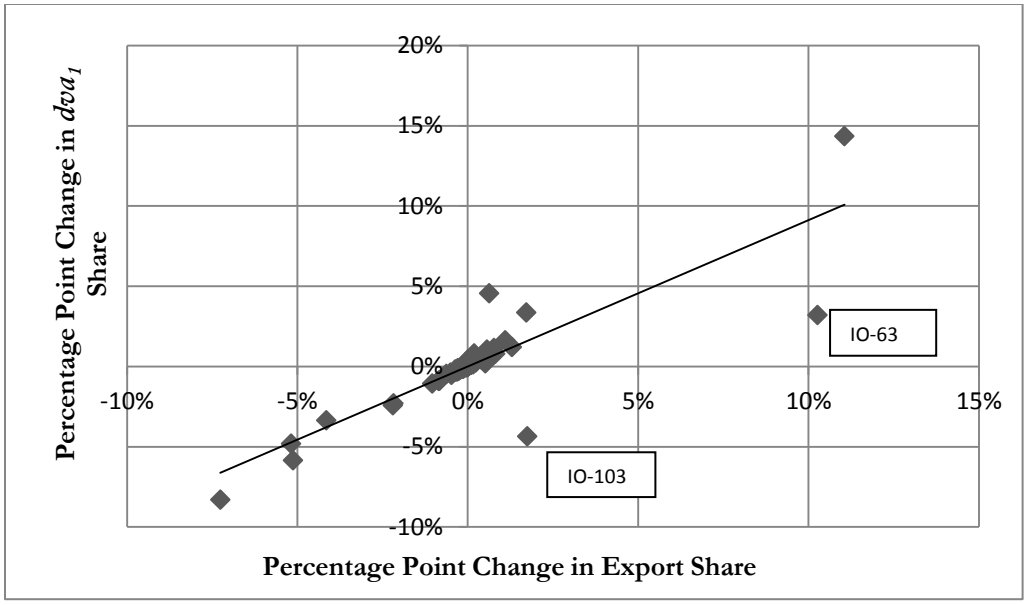
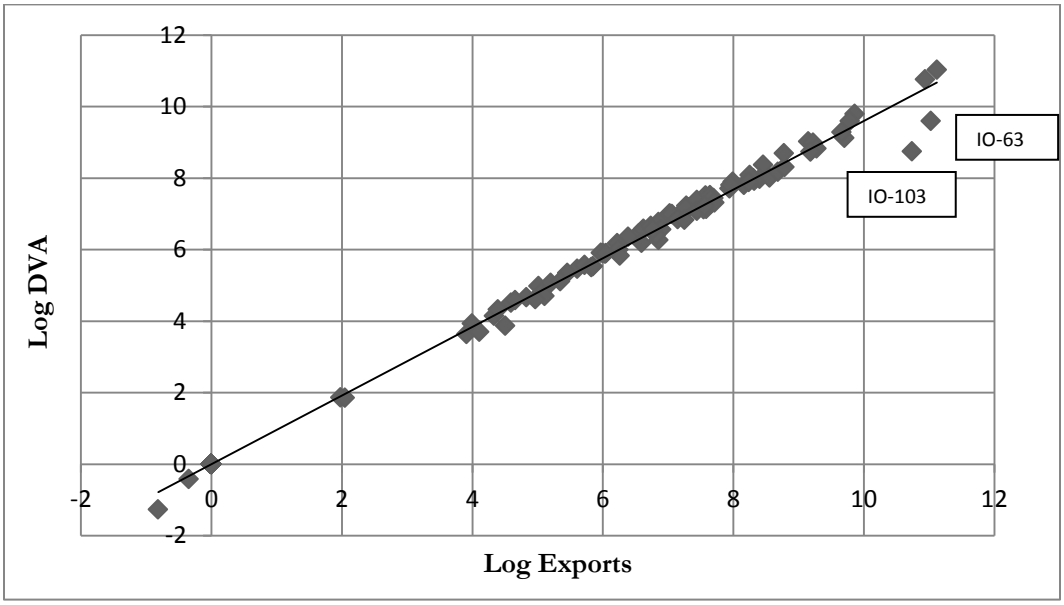


Figure 6: Correlation between dollar values of gross exports and dva_1, 2012-13



Appendix

Table A 1: IO Sector Codes and Description

IO Code	Description
1	Paddy
2	Wheat
3	Jowar
5	Maize
6+7	Gram and Other Pulses
8	Sugarcane
9	Groundnut
10	Coconut
11	Other oilseeds
12	Jute
13	Cotton
14	Tea
15	Coffee
16	Rubber
17	Tobacco
18+19	Fruits and Vegetables
20	Other crops (including Bajra)
21	Milk and milk products
23	Poultry & Eggs
22+24	Animal services(agricultural) and Other livestock products
25	Forestry and logging
26	Fishing
27	Coal and lignite
28+29	Natural gas and Crude petroleum
30	Iron ore
31	Manganese ore
32	Bauxite
33	Copper ore
34	Other metallic minerals
35	Lime stone
36	Mica
37	Other nonmetallic minerals
38+39	Sugar and Khandsari,boora
40+41	Hydrogenated oil and Edible oils other than vanaspati
42	Tea and coffee processing
43	Miscellaneous food products
44	Beverages

45	Tobacco products
46+47	Khadi,cotton textiles in handlooms and Cotton textiles
48	Woolen textiles
49	Silk textiles
50	Art silk, synthetic fiber textiles
51	Jute, hemp, mesta textiles
52	Carpet weaving
53+54	Readymade garments and Miscellaneous textile products
55	Furniture and fixtures-wooden
56	Wood and wood products
57	Paper, paper prods. & newsprint
58	Printing and publishing
59	Leather footwear
60	Leather and leather products
61	Rubber products
63	Petroleum products
64	Coal tar products
65+66	Inorganic and organic heavy chemicals
67	Fertilizers
68	Pesticides
69	Paints, varnishes and lacquers
70	Drugs and medicines
71	Soaps, cosmetics & glycerin
62+72	Plastic products and Synthetic fibres
73	Other chemicals
74	Structural clay products
75	Cement
76	Other non-metallic mineral prods.
77+78+79	Iron and steel ferro alloys, Iron and steel casting and forging and Iron and steel foundries
80	Non-ferrous basic metals
81	Hand tools, hardware
82	Miscellaneous metal products
83	Tractors and agri. implements
84	Industrial machinery(F & T)
86	Machine tools
85+87	Industrial machinery and Other non electrical machinery
88	Electrical industrial Machinery
89	Electrical wires & cables
90	Batteries
91+93	Electrical appliances and Other electrical machinery
92+94	Communication equipments and Electronic equipments

95	Ships and boats
96	Rail equipments
97	Motor vehicles
98	Motor cycles and scooters
99+100	Bicycles, cycle-rickshaw and Other transport equipments
101	Watches and clocks
102	Medical, precision &optical instruments
103	Gems & jewelry
104	Aircraft & spacecraft
105	Miscellaneous manufacturing
106	Construction
107	Electricity
108	Water supply
109	Railway transport services
110	Land tpt including via pipeline
111	Water transport
112	Air transport
113	Supporting and aux. tpt activities
114	Storage and warehousing
115	Communication
116	Trade
117	Hotels and restaurants
118	Banking
119	Insurance
120	Ownership of dwellings
121	Education and research
122	Medical and health
123	Business services
124	Computer & related activities
125	Legal services
126	Real estate activities
127	Renting of machinery & equipment
128+129	O.com, social & personal services and Other services
130	Public administration

Table A 2: Description of Variables

Variable Name	Variable Description	Variable Computation	Formula	Data Source	Remarks
World Demand (WD^j)	This variable captures the world demand for each IO product category	WD is the weighted average of total imports (in US dollars) in a given sector by rest of the world from all countries other than India. Weights used are the shares of each country j in India's total exports of given IO product category. Rest of the world includes 96 countries that have consistently reported import data for each year from 1999 to 2012	$WD^j = \sum_{r=1}^{96} w_r^j m_r^j$ where m_r^j stands for imports of sector *j* by each of the 96 countries from world (excluding India); w_r^j is the weight given as the share of *r* in India's total exports of sector *j*.	UN-COMTRADE WITS database according to 6-digit HS 1996 classification. A concordance table is used to identify the HS codes corresponding to each IO category.	This variable could not be constructed for sectors corresponding to services as trade data for services sector are not available at the required level of disaggregation.
Relative Prices RPO^j (RPV^j)	RPO (RPV) is exchange rate adjusted relative price measured using sector specific output (value added) deflators.	It is computed as the ratio of India's price deflator to the price deflator of United States for each IO category. This ratio is then adjusted by the dollar per rupee nominal exchange rate prevailing in that particular year	$RPO^j = \frac{India's\ output\ deflator_j}{US\ output\ deflator_j} \times e_{\$\ to\ Rupee}$ $e_{\$\ to\ Rupee}$ stands for nominal exchange rate between US dollar and Indian rupee in year t. *RPV* is computed in analogous manner using value added deflator.	Data for US Price Deflator is taken from U.S. Bureau of Economic Analysis, https://www.bea.gov/industry/gdpbyind_data.htm Data for India's Price deflator is collected from National Account Statistics; Data for exchange rate is taken from World Bank, World Development Indicators	
Gross Value of Output and Gross Value added GVO^j (GVA^j)	India's Output and value added for each IO category in US $			National Accounts Statistics, Annual Survey of Industries and unorganized sector surveys of NSSO	Refer Section 3.3.1. for more details

Table A 3: Gross Exports of Each Sector ($ Million)

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	1379.2	1332.5	1067.8	965.2	803.2	1208.6	1667.1	2234.2	3027.7	2631.2	1657.1	1148.0	35.4	98.6
2	60.4	137.7	205.6	329.3	512.4	531.4	453.9	288.1	14.8	32.9	45.7	82.8	122.3	1950.2
3	0.2	0.2	0.1	0.1	0.0	0.7	1.8	3.4	5.7	7.2	7.4	10.9	13.8	7.2
5	7.8	17.6	26.2	41.8	65.0	136.2	232.6	363.0	552.0	697.8	712.3	1050.6	1337.9	701.3
6+7	28.9	25.4	17.4	11.2	1.9	16.3	38.3	69.3	115.1	99.8	62.6	42.8	0.0	0.0
8	1.8	1.6	1.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	41.3	54.2	60.5	80.5	109.8	113.5	96.3	59.8	0.0	179.7	338.1	693.5	1097.5	753.5
10	295.1	256.6	171.3	103.2	0.1	0.1	0.1	0.1	0.0	6.0	11.3	23.2	36.7	54.3
11	84.0	100.1	103.1	127.6	163.3	183.9	181.8	161.1	121.6	206.3	255.9	434.4	616.0	1453.5
12	2.1	2.0	1.5	1.3	0.9	1.0	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0
13	22.3	19.4	12.9	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	596.2
16	5.1	11.3	16.6	26.4	41.0	53.7	64.9	76.3	91.0	78.9	49.5	33.8	0.0	0.0
17	109.6	115.6	104.4	112.0	122.5	152.9	174.2	191.3	209.9	182.0	114.1	78.1	0.0	0.0
18+19	325.6	388.4	399.8	494.8	633.3	773.8	858.7	911.3	954.2	1007.3	857.2	1048.9	1098.5	1125.5
20	86.2	102.9	105.9	131.0	167.7	256.2	358.0	484.9	663.2	838.2	855.7	1262.2	1607.3	842.5
21	0.0	0.0	0.1	0.1	0.1	1.0	2.3	4.1	6.8	5.9	3.7	2.5	0.0	0.0
23	28.3	33.8	34.8	43.0	55.1	66.4	72.5	75.1	76.0	79.2	66.3	79.5	81.1	150.9
22+24	178.0	212.3	218.6	270.5	346.2	392.4	391.5	352.9	276.9	266.1	199.5	203.4	159.0	404.6
25	275.3	280.8	242.7	246.1	249.1	301.1	329.5	343.0	349.3	1108.1	1704.7	3237.1	4917.6	4701.9
26	893.2	925.6	816.9	851.5	896.6	1054.8	1112.1	1097.0	1025.2	936.8	647.3	565.4	291.6	503.8
27	20.3	23.5	23.6	28.4	35.5	42.7	46.4	47.8	48.0	105.4	146.2	264.2	389.8	272.3
28+29	10.1	15.8	19.9	28.8	42.1	195.5	423.7	744.5	1216.2	1054.6	661.3	452.2	0.0	0.0
30	195.4	273.3	320.4	442.4	621.9	1037.7	1550.2	2213.7	3159.7	3526.4	3197.6	4209.8	4803.3	1819.5
31	2.5	3.0	3.1	3.8	4.9	6.4	7.9	9.3	11.2	11.7	9.8	11.7	11.9	7.8
32	5.9	10.5	14.2	21.5	32.3	59.7	95.2	142.4	210.2	185.5	120.3	90.4	19.3	125.2

33	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	13.1	24.3	49.5	78.0	0.4
34	56.5	66.1	66.7	81.0	101.8	172.4	260.4	374.8	538.1	560.9	470.0	563.9	575.8	417.7
35	0.7	0.9	1.0	1.4	1.9	3.1	4.5	6.3	8.9	16.4	21.2	36.8	53.1	50.0
36	2.6	5.3	7.6	12.0	18.4	20.5	19.8	16.8	11.4	9.9	6.2	4.2	0.0	0.0
37	725.0	1473.7	2110.0	3305.5	5073.8	6418.8	7437.2	8341.5	9398.1	8349.7	5486.9	4267.2	1223.6	1508.1
38+39	23.7	50.9	74.5	118.1	182.6	302.9	450.6	641.3	913.2	1098.9	1074.1	1524.3	1875.0	1705.7
40+41	478.3	547.4	541.2	643.4	791.8	1078.9	1357.2	1668.5	2084.8	1981.1	1459.6	1443.8	1058.3	105.3
42	587.3	575.2	470.5	439.5	389.4	480.8	540.7	584.0	626.6	841.2	900.9	1382.1	1818.7	1164.0
43	863.4	1141.1	1283.3	1715.0	2349.5	2757.7	2897.9	2844.4	2635.8	4830.0	6219.6	10798.4	15538.7	19192.3
44	19.3	20.4	18.4	19.7	21.6	28.9	35.6	42.9	52.5	104.0	138.6	245.2	357.1	393.0
45	132.9	124.8	95.7	80.0	55.7	72.8	87.6	102.6	121.7	245.8	330.0	586.4	856.4	948.4
46+47	1563.3	1652.0	1494.0	1606.5	1762.4	2301.5	2766.3	3238.8	3839.8	4145.8	3623.2	4577.2	4984.6	9421.0
48	76.0	80.8	73.5	79.7	88.3	123.3	159.0	200.4	256.7	968.3	1542.5	2973.2	4554.3	181.3
49	132.5	157.8	162.3	200.6	256.6	298.9	310.8	299.9	269.8	265.9	206.8	223.5	195.0	157.3
50	566.4	655.7	655.8	789.0	982.6	1208.0	1351.2	1449.2	1539.8	2161.2	2391.0	3759.8	5044.2	4473.9
51	130.4	127.9	104.8	98.1	87.4	110.1	126.9	141.4	158.1	177.3	161.6	214.0	245.7	233.9
52	297.2	356.3	368.7	458.4	589.5	736.5	840.4	925.1	1017.6	1085.4	935.2	1161.7	1239.8	1437.1
53+54	4566.0	5218.7	5152.1	6117.0	7516.1	9272.3	10416.4	11236.4	12033.7	13497.8	12305.1	16293.7	18705.9	17807.2
55	14.7	21.9	26.8	38.1	54.8	90.2	133.5	189.2	268.5	313.9	298.4	412.5	494.9	513.8
56	40.7	42.5	37.8	39.9	42.6	56.6	69.3	82.7	100.3	125.3	126.6	185.2	234.1	304.9
57	535.7	505.6	391.0	331.9	240.6	299.3	339.6	371.1	404.5	499.7	500.0	724.9	909.3	990.8
58	93.8	93.8	79.1	77.3	74.0	98.3	120.3	143.7	174.2	206.3	198.6	277.9	337.3	338.6
59	367.0	341.1	257.3	208.4	133.2	160.7	175.3	181.8	184.0	499.2	739.0	1379.2	2074.4	2084.3
60	796.0	890.7	860.0	997.5	1195.7	1449.8	1592.8	1667.5	1712.1	1907.7	1726.9	2269.3	2584.1	2960.4
61	396.6	497.4	535.8	690.9	918.1	1170.8	1369.6	1553.9	1775.7	1975.8	1785.7	2342.7	2662.8	2812.3
63	433.3	894.3	1288.2	2024.5	3113.7	5551.6	8667.1	12772.3	18666.3	21805.4	20720.1	28623.5	34316.7	61555.7
64	5.8	13.0	19.2	30.7	47.7	60.3	69.8	78.1	87.9	77.8	50.8	38.8	9.7	949.1
65+66	1791.2	2038.6	2003.8	2368.2	2896.3	3884.7	4806.8	5808.8	7129.8	12521.4	15801.2	27111.4	38711.4	16418.6
67	8.5	8.3	6.7	6.2	5.4	9.6	15.1	22.3	32.6	41.9	43.4	64.7	83.1	90.3
68	203.8	230.3	224.7	263.4	319.5	396.8	449.5	490.1	532.5	461.8	289.6	198.0	0.0	0.0

69	336.3	372.8	356.3	408.8	484.2	606.5	694.3	767.3	848.5	1066.7	1084.0	1592.6	2021.3	2174.1
70	872.6	1016.9	1023.9	1239.9	1554.2	2091.6	2597.1	3150.2	3881.7	4764.1	4740.6	6838.2	8538.1	10115.6
71	632.9	604.1	475.3	416.4	324.6	398.7	445.5	477.1	506.0	715.3	795.4	1255.3	1689.0	1969.1
62+72	537.5	692.9	763.8	1004.2	1357.1	1758.4	2095.0	2428.6	2846.6	3336.9	3181.8	4410.1	5304.6	5193.3
73	303.7	326.3	301.0	331.5	374.7	530.5	693.0	884.3	1146.3	1065.8	758.3	703.1	438.3	1272.5
74	45.6	89.4	126.1	196.0	299.3	314.0	274.4	185.6	37.9	43.4	40.4	54.6	64.1	76.3
75	33.9	51.0	62.9	89.8	129.6	149.1	152.0	142.2	120.6	145.6	142.7	203.1	250.4	210.8
76	2754.8	2443.5	1696.2	1139.1	293.1	440.0	605.7	810.4	1096.6	1254.5	1167.5	1579.5	1854.6	2206.8
77+78+79	879.8	1297.2	1576.9	2234.1	3202.8	4494.5	5821.1	7366.7	9473.8	10741.3	9903.5	13270.7	15428.0	15664.4
80	270.5	389.3	465.6	652.2	927.0	1492.3	2171.9	3040.6	4273.0	4392.2	3615.6	4239.5	4195.2	4045.5
81	199.2	223.5	216.5	251.9	303.0	381.0	438.1	486.9	542.3	599.6	538.1	700.7	789.8	730.2
82	551.2	629.5	621.0	736.7	904.5	1120.7	1265.9	1375.4	1487.2	1616.1	1422.8	1812.7	1993.7	2111.6
83	23.0	35.2	43.9	63.2	91.6	138.7	192.2	258.7	351.9	459.1	481.0	725.1	940.5	909.3
84	123.9	152.4	161.5	205.1	269.0	341.7	397.8	448.8	509.4	569.2	516.9	681.6	779.0	522.6
86	133.4	160.9	167.4	209.3	270.3	347.5	410.2	470.5	544.6	716.1	754.8	1143.5	1489.2	347.4
85+87	841.5	1113.3	1253.0	1675.5	2296.5	2974.0	3541.3	4102.2	4804.3	6542.1	7082.2	10955.3	14511.1	10710.2
88	209.2	238.4	234.6	277.6	340.0	559.9	828.6	1175.0	1668.1	1800.2	1572.6	1985.5	2160.8	1896.7
89	55.0	59.6	55.4	61.7	70.6	121.7	186.0	270.0	390.3	559.8	628.6	999.3	1351.8	1407.3
90	37.8	41.6	39.5	44.9	52.7	63.6	69.6	72.3	73.6	108.0	123.2	198.1	270.2	165.7
91+93	486.6	523.2	483.1	532.7	602.9	834.2	1065.7	1330.7	1689.0	2028.0	1978.3	2802.3	3441.1	3512.6
92+94	752.2	838.7	806.7	931.7	1111.8	1339.4	1458.9	1509.4	1522.6	2056.8	2213.3	3408.0	4497.6	4117.1
95	68.6	79.1	78.7	94.3	116.8	380.8	764.2	1298.0	2080.4	2110.6	1708.0	1956.7	1872.6	3826.8
96	10.7	11.6	10.8	12.0	13.8	23.9	36.7	53.5	77.4	84.8	75.3	96.9	107.8	143.4
97	549.4	685.2	734.7	943.5	1249.3	1713.9	2170.9	2687.6	3382.1	4303.9	4418.2	6548.3	8373.3	9742.5
98	84.0	119.2	141.2	196.4	277.7	338.2	373.7	394.4	409.6	613.4	708.4	1148.6	1576.8	1705.5
99+ 100	101.5	99.5	81.5	76.3	67.9	81.6	88.7	91.3	91.6	118.0	122.5	183.1	235.9	60.9
101	23.6	29.7	32.1	41.6	55.4	61.3	58.8	49.3	32.2	40.2	40.6	59.3	75.0	80.7
102	94.1	112.3	115.6	143.0	183.0	222.3	244.8	257.2	265.3	549.7	745.6	1332.2	1952.3	2115.4
103	4049.9	4829.9	4972.5	6153.1	7876.0	8729.4	8403.9	7090.2	4715.0	12419.0	18234.5	33898.3	50873.2	46200.0
104	40.3	48.1	49.5	61.3	78.5	171.3	298.4	471.0	721.7	992.3	1081.9	1682.6	2238.2	2239.8

105	317.9	379.2	390.4	483.1	618.3	1016.8	1503.1	2129.6	3021.3	4802.1	5747.9	9544.1	13326.7	5892.0
106	0.0	0.0	0.0	0.0	0.0	188.0	478.4	892.3	1503.9	1441.5	1076.3	1089.6	839.6	869.8
107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	15.0	28.1	57.5	91.0	0.0
108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109	311.9	432.5	504.2	692.9	970.7	1181.5	1304.4	1375.0	1425.7	1236.3	775.2	530.1	0.0	0.0
110	2477.7	2954.9	3042.1	3764.4	4818.4	6282.3	7537.8	8807.6	10418.3	9034.0	5664.7	3873.3	0.0	0.0
111	71.4	85.1	87.6	108.4	138.8	810.5	1819.1	3241.8	5336.3	5663.5	4850.8	5982.6	6328.3	6556.1
112	120.9	144.2	148.4	183.7	235.1	704.9	1381.5	2320.6	3695.2	3802.2	3134.0	3681.1	3651.5	3783.0
113	228.7	272.8	280.8	347.5	444.8	833.8	1342.0	2018.3	2993.1	2595.4	1627.4	1112.8	0.0	0.0
114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115	44.2	42.0	32.8	28.3	21.4	375.1	917.0	1687.1	2823.8	2752.5	2107.1	2222.7	1856.2	1923.0
116	5666.1	6046.8	5533.7	6037.5	6744.7	9545.7	12464.3	15897.1	20597.6	17860.7	11199.4	7657.8	0.0	0.0
117	1128.3	1320.5	1335.0	1623.3	2043.1	2111.6	1791.0	1113.6	0.0	0.0	0.0	0.0	0.0	0.0
118	35.6	82.5	123.9	199.0	310.1	320.5	271.9	169.0	0.0	1022.4	1923.3	3945.2	6243.7	6468.6
119	228.8	271.3	277.8	342.0	435.6	652.6	896.9	1198.2	1619.3	1856.3	1731.0	2346.7	2761.1	2860.5
120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123	690.1	823.0	847.3	1048.5	1342.1	3944.1	7682.8	12867.5	20454.2	26667.2	27921.5	42066.1	54538.9	56502.8
124	6832.6	8148.5	8389.0	10380.9	13287.5	19055.9	25192.2	32506.1	42580.3	47589.7	43218.5	56992.6	65143.2	67488.8
125	0.0	0.0	0.0	0.0	0.0	83.9	213.5	398.3	671.2	582.1	365.0	249.6	0.0	0.0
126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 + 129	1084.8	1293.7	1331.9	1648.1	2109.6	3506.7	5224.3	7445.1	10610.2	9267.3	5894.9	4202.9	408.6	423.4
130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A 4: Domestic Value Added (DVA1) for Each Sector ($. Million)

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	1300.0	1240.8	992.6	887.0	731.7	1086.2	1499.4	2016.2	2771.7	2397.9	1529.4	1066.7	32.9	90.7
2	56.0	126.1	188.6	299.4	464.2	476.1	408.3	261.0	13.7	30.3	42.7	77.9	115.1	1823.7
3	0.2	0.2	0.1	0.1	0.0	0.6	1.6	3.0	5.1	6.4	6.6	9.8	12.4	6.4
5	7.3	16.4	24.6	39.2	60.9	125.4	212.2	328.3	499.8	627.5	649.0	963.2	1223.2	636.3
6+7	27.3	23.9	16.4	10.5	1.8	15.2	35.6	64.6	108.2	93.9	59.6	40.9	0.0	0.0
8	1.8	1.5	1.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	39.5	51.7	58.0	77.1	105.4	108.0	91.5	56.9	0.0	171.1	323.9	666.5	1053.4	719.3
10	280.1	242.4	162.6	97.7	0.1	0.1	0.1	0.1	0.0	5.6	10.7	22.0	34.7	51.1
11	80.1	95.0	98.1	120.8	154.4	172.0	169.6	150.0	113.7	192.4	241.1	411.5	583.1	1369.9
12	2.0	1.9	1.5	1.2	0.9	0.9	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0
13	21.1	18.2	12.2	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	574.9
16	5.0	10.7	15.8	24.8	38.2	49.9	60.6	71.7	86.4	74.9	47.4	32.6	0.0	0.0
17	106.6	112.0	101.2	108.3	118.3	145.1	163.1	176.2	191.0	165.3	105.3	72.6	0.0	0.0
18+19	321.9	383.5	395.3	488.9	626.1	762.3	844.4	894.2	936.0	986.8	842.0	1031.5	1079.7	1101.7
20	82.1	97.5	100.8	124.4	159.5	240.4	334.1	450.6	618.8	779.2	802.8	1189.0	1510.5	782.8
21	0.0	0.0	0.1	0.1	0.1	1.0	2.2	4.0	6.6	5.7	3.6	2.5	0.0	0.0
23	28.0	33.3	34.4	42.5	54.5	65.2	70.7	73.0	73.7	76.6	64.3	77.1	78.2	145.5
22+24	169.4	201.4	208.5	257.3	329.7	369.5	367.8	331.6	261.9	248.8	186.5	189.0	145.4	364.0
25	272.6	278.0	240.5	243.9	246.9	296.0	321.5	332.9	335.9	1041.8	1591.0	2994.9	4519.6	4322.8
26	855.1	881.1	777.4	808.4	847.1	984.8	1040.7	1029.1	971.8	887.9	619.1	541.1	278.6	480.3
27	18.5	21.5	21.9	26.6	33.4	39.8	43.0	43.8	44.1	95.0	131.7	235.3	341.4	235.0
28+29	9.6	14.9	18.6	27.3	39.2	182.8	392.4	685.3	1118.6	917.3	568.4	382.3	0.0	0.0
30	181.5	252.0	297.3	412.2	586.1	978.2	1460.2	2074.5	2996.8	3140.0	2737.8	3564.7	3784.2	1461.9
31	2.5	2.9	3.0	3.7	4.8	6.3	7.6	8.9	10.9	11.2	8.9	10.4	10.0	6.4
32	5.6	10.1	13.7	20.9	31.4	57.5	91.3	136.5	203.2	170.0	107.8	78.7	16.4	106.0

33	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	10.6	18.0	34.3	49.1	0.3
34	53.9	62.8	63.4	77.6	97.4	164.2	247.0	354.4	509.5	511.9	413.0	498.5	494.2	358.7
35	0.7	0.9	1.0	1.3	1.8	2.9	4.1	5.8	8.1	14.1	17.7	29.7	40.8	37.8
36	2.4	4.8	7.1	10.9	16.2	17.7	17.1	14.4	10.7	7.5	4.7	3.2	0.0	0.0
37	709.8	1443.0	2068.4	3248.8	4980.3	6233.3	7185.0	8055.8	9051.0	7793.5	5035.1	3832.6	1063.6	1306.6
38+39	22.6	48.2	70.3	110.2	169.3	277.6	413.8	592.5	856.2	1020.0	1002.4	1426.4	1749.1	1606.3
40+41	438.6	497.7	496.9	587.9	727.3	972.4	1219.5	1500.4	1901.3	1788.7	1335.2	1333.6	981.5	98.2
42	543.2	523.9	427.0	393.5	344.1	417.0	468.1	509.0	557.5	745.2	813.6	1265.4	1674.7	1085.7
43	792.4	1039.4	1175.9	1564.4	2143.8	2474.8	2595.8	2556.6	2403.0	4378.0	5721.4	10020.1	14453.3	17943.6
44	16.9	17.9	16.4	17.5	19.3	25.3	31.2	37.9	47.4	93.6	127.3	228.5	336.6	368.5
45	121.5	114.0	88.7	74.5	52.9	68.2	81.8	95.7	114.1	228.0	307.2	545.0	789.0	864.7
46+47	1426.4	1495.7	1353.6	1444.4	1570.8	2014.5	2403.7	2808.4	3353.4	3597.6	3209.6	4091.3	4456.2	8271.5
48	67.1	70.5	64.0	68.3	74.8	102.5	132.5	169.9	224.1	854.7	1390.2	2686.4	4059.6	158.7
49	118.1	138.0	140.7	170.1	213.4	237.6	240.8	229.9	207.8	199.7	159.8	173.3	149.2	119.8
50	467.8	534.2	535.9	634.1	782.8	920.8	1010.3	1079.4	1160.0	1537.8	1711.9	2609.8	3298.6	2896.3
51	118.9	116.2	95.8	89.7	80.2	99.7	114.5	127.5	142.8	159.0	146.9	195.1	223.5	210.1
52	269.1	317.2	325.8	398.0	505.6	621.7	712.0	795.1	895.6	948.2	832.9	1039.4	1106.6	1270.0
53+54	4068.3	4618.7	4570.9	5375.7	6572.7	7898.7	8771.1	9434.8	10181.5	11224.4	10408.6	13726.6	15475.6	14652.2
55	13.2	19.6	24.3	34.4	50.0	80.1	117.2	165.5	235.2	265.9	251.1	336.4	384.0	401.9
56	38.3	39.9	35.7	37.6	40.3	52.6	63.9	76.2	92.1	112.3	113.1	162.8	200.4	262.4
57	439.7	415.7	329.0	278.8	204.0	246.4	276.8	302.9	331.8	391.9	392.8	554.3	666.2	707.3
58	77.0	77.1	66.1	64.5	62.4	80.0	96.3	114.7	140.0	160.3	156.6	215.9	253.9	245.9
59	332.1	308.1	234.0	189.1	121.0	143.3	155.5	161.6	165.4	445.9	668.9	1249.5	1857.7	1845.2
60	697.2	783.3	768.8	895.8	1084.0	1296.6	1424.1	1501.0	1562.3	1733.0	1588.6	2090.7	2361.2	2678.4
61	333.3	413.1	446.5	565.7	747.9	933.4	1096.6	1260.9	1473.0	1611.1	1487.6	1947.3	2179.8	2211.9
63	236.9	458.6	632.6	993.3	1410.9	2284.7	3212.5	4455.1	6281.5	6280.7	6340.8	8417.4	8785.9	14729.8
64	5.1	11.3	16.7	26.0	39.5	48.5	55.5	62.0	70.8	54.2	33.4	23.1	5.1	525.1
65+66	1461.3	1642.9	1622.7	1889.1	2289.0	2911.7	3495.6	4153.5	5090.8	8354.0	10585.3	17358.7	22895.6	9139.3
67	6.3	5.9	4.8	4.2	3.5	5.9	8.9	12.7	18.0	22.4	25.0	37.8	47.6	48.0
68	169.4	190.1	186.9	217.2	263.2	315.0	350.4	379.6	414.2	344.7	218.1	144.6	0.0	0.0

69	265.2	292.0	282.2	319.6	376.8	460.4	529.1	597.2	682.6	826.0	846.5	1211.4	1464.0	1505.3
70	741.0	860.7	874.0	1050.2	1314.4	1706.0	2071.5	2480.8	3048.2	3711.8	3813.5	5481.9	6698.2	7996.0
71	518.0	492.5	391.4	338.8	263.0	310.8	340.1	361.7	385.6	522.4	588.3	901.6	1142.8	1257.8
62+72	430.2	546.8	605.0	782.0	1047.3	1284.5	1482.4	1692.6	1983.6	2213.5	2162.1	2922.3	3312.0	3018.9
73	261.4	274.9	251.5	268.9	295.2	406.6	530.9	688.7	921.5	830.3	601.1	550.3	333.2	939.3
74	36.6	71.3	101.4	156.5	237.2	247.2	218.3	150.4	31.5	35.2	33.5	45.9	54.8	63.1
75	29.0	43.3	53.5	75.8	108.5	120.3	120.0	110.9	93.9	110.3	111.7	161.4	203.8	166.2
76	2196.2	1948.9	1376.7	927.3	240.5	347.9	467.5	616.3	833.4	920.8	884.7	1217.0	1470.9	1694.0
77+78+79	749.1	1075.7	1298.4	1789.3	2509.1	3344.3	4225.2	5242.6	6777.4	7619.2	7369.5	9919.5	11209.9	10690.8
80	198.0	281.5	341.3	470.2	664.2	992.0	1382.0	1877.0	2633.8	2633.5	2352.5	2898.1	3051.2	2968.8
81	168.8	186.2	179.9	204.9	243.1	291.6	327.8	358.7	399.8	423.6	386.0	489.0	526.6	486.5
82	449.3	501.5	493.6	569.1	685.9	809.6	896.0	962.9	1047.2	1098.1	999.7	1255.8	1338.0	1431.4
83	18.9	28.4	35.4	50.0	71.7	102.7	138.6	184.4	252.4	320.0	347.1	514.8	641.1	604.5
84	93.9	114.8	123.6	155.0	203.1	241.0	268.7	294.3	330.0	359.7	346.5	460.5	519.3	340.0
86	110.5	131.3	137.4	169.2	217.4	267.6	308.3	348.1	402.2	517.7	567.9	861.0	1107.7	252.0
85+87	672.5	882.3	1004.1	1324.5	1804.4	2193.4	2506.7	2818.8	3260.2	4288.5	4844.0	7425.3	9525.6	6774.8
88	162.3	182.4	181.7	211.7	257.8	399.5	573.1	800.8	1145.6	1186.9	1075.0	1340.2	1420.7	1239.9
89	38.0	40.1	37.4	40.6	45.8	73.6	108.8	159.1	237.3	323.9	391.2	648.2	919.9	927.0
90	27.4	29.6	28.4	31.6	36.8	41.8	44.9	47.0	49.4	69.1	82.7	133.0	181.6	109.5
91+93	371.9	398.6	373.9	407.4	459.5	605.1	758.7	945.8	1225.5	1428.4	1442.8	2025.3	2433.2	2442.7
92+94	557.4	617.6	607.6	693.3	831.4	934.4	973.6	979.9	981.0	1306.3	1501.3	2313.5	3016.7	2763.0
95	55.7	60.5	57.0	60.7	66.4	176.2	298.2	440.8	621.4	824.8	977.0	1406.2	1521.5	3227.8
96	9.1	9.7	9.1	10.0	11.4	19.0	28.6	41.3	60.2	62.0	55.2	68.7	72.9	100.4
97	459.5	568.8	616.5	786.7	1040.5	1345.0	1632.4	1954.1	2416.3	2868.5	2959.6	4223.8	5096.5	6209.8
98	70.5	99.9	120.1	166.4	235.3	275.4	297.6	309.0	319.7	444.9	511.0	799.5	1049.4	1184.8
99+ 100	84.3	82.2	68.1	63.3	56.4	65.4	70.1	71.7	72.5	84.7	85.3	120.4	144.2	40.5
101	19.2	24.4	27.1	35.5	48.6	52.8	50.8	43.2	28.9	35.6	36.4	53.5	70.0	75.6
102	69.3	84.1	90.7	115.9	157.0	183.6	197.6	205.1	212.0	420.8	577.8	1021.7	1540.7	1653.3
103	2459.3	2961.6	3165.6	3909.3	5129.3	5334.8	5194.7	4684.2	3460.7	7193.8	8506.5	10416.8	7027.3	6283.1
104	33.0	39.8	42.2	53.0	69.1	125.0	156.0	158.8	148.4	288.8	491.9	952.8	1332.5	1497.7

105	237.5	282.0	297.8	369.5	484.4	769.0	1127.2	1611.3	2342.5	3540.7	4232.8	6672.5	8058.9	3523.6
106	0.0	0.0	0.0	0.0	0.0	158.8	402.0	749.3	1275.7	1197.1	904.1	909.1	692.4	706.8
107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	11.6	21.9	42.8	64.3	0.0
108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109	284.8	388.5	451.2	613.5	848.2	1023.9	1135.6	1220.3	1299.1	1094.7	686.9	458.1	0.0	0.0
110	2045.1	2394.9	2457.5	3030.5	3811.7	4833.7	5706.0	6616.2	7907.2	6751.1	4380.8	3069.2	0.0	0.0
111	64.1	75.7	77.1	92.7	119.6	686.3	1514.2	2650.4	4346.4	4175.0	3574.1	4399.6	4621.2	4032.2
112	102.6	119.3	121.8	146.9	188.7	549.2	1069.1	1851.3	2997.4	2910.4	2392.1	2754.5	2586.4	2662.9
113	212.2	251.9	261.0	322.6	412.0	759.7	1213.0	1812.9	2696.4	2209.9	1357.0	893.3	0.0	0.0
114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115	41.1	38.9	30.6	26.2	19.8	341.2	822.6	1491.4	2489.4	2289.4	1717.5	1686.6	1323.6	1360.1
116	5500.4	5862.1	5378.1	5869.6	6557.9	9228.7	12023.1	15312.1	19863.0	17047.5	10661.6	7262.2	0.0	0.0
117	1061.7	1236.9	1254.6	1520.8	1910.2	1952.3	1652.8	1028.0	0.0	0.0	0.0	0.0	0.0	0.0
118	34.7	80.3	121.0	194.3	302.8	311.2	263.5	163.8	0.0	979.9	1827.0	3709.5	5771.4	5946.2
119	215.9	254.8	263.3	325.3	412.6	613.1	839.6	1129.0	1539.2	1724.3	1589.2	2113.5	2407.5	2456.1
120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123	609.6	725.2	762.9	950.6	1215.8	3357.4	6287.3	10519.4	16958.5	22054.0	23727.0	35834.8	45795.8	46912.5
124	6359.0	7689.6	7994.8	9917.3	12762.0	18034.1	23753.6	30630.9	40183.9	44578.0	40358.0	52585.2	59243.8	61165.6
125	0.0	0.0	0.0	0.0	0.0	82.7	208.3	383.8	640.8	539.7	334.8	224.2	0.0	0.0
126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 + 129	954.5	1142.9	1199.6	1490.4	1924.5	3130.6	4663.3	6697.3	9730.0	8313.0	5290.5	3707.4	351.0	365.5
130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A 5: Ratio of Domestic Value Added (DVA1) to Gross Exports in Each Sector

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	0.943	0.931	0.930	0.919	0.911	0.899	0.899	0.902	0.915	0.911	0.923	0.929	0.929	0.920
2	0.927	0.916	0.917	0.909	0.906	0.896	0.900	0.906	0.922	0.921	0.934	0.941	0.941	0.935
3	0.940	0.927	0.925	0.912	0.000	0.886	0.886	0.889	0.902	0.892	0.901	0.904	0.898	0.888
5	0.938	0.933	0.939	0.936	0.937	0.920	0.912	0.905	0.905	0.899	0.911	0.917	0.914	0.907
6+7	0.947	0.941	0.944	0.940	0.938	0.929	0.930	0.932	0.940	0.941	0.951	0.957	0.000	0.000
8	0.965	0.958	0.957	0.949	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.957	0.954	0.959	0.958	0.960	0.952	0.951	0.950	0.000	0.952	0.958	0.961	0.960	0.955
10	0.949	0.945	0.949	0.946	0.947	0.936	0.933	0.932	0.000	0.935	0.944	0.948	0.947	0.940
11	0.954	0.949	0.952	0.947	0.945	0.935	0.933	0.931	0.935	0.933	0.942	0.947	0.947	0.942
12	0.967	0.961	0.961	0.955	0.952	0.940	0.936	0.932	0.000	0.000	0.000	0.000	0.000	0.000
13	0.945	0.940	0.944	0.940	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.929
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.964
16	0.964	0.951	0.948	0.939	0.934	0.929	0.934	0.939	0.950	0.949	0.958	0.963	0.000	0.000
17	0.973	0.969	0.970	0.967	0.965	0.949	0.937	0.921	0.910	0.908	0.923	0.931	0.000	0.000
18+19	0.988	0.988	0.989	0.988	0.989	0.985	0.983	0.981	0.981	0.980	0.982	0.983	0.983	0.979
20	0.952	0.948	0.952	0.950	0.951	0.938	0.933	0.929	0.933	0.930	0.938	0.942	0.940	0.929
21	0.985	0.984	0.986	0.985	0.985	0.981	0.981	0.981	0.984	0.980	0.979	0.977	0.000	0.000
23	0.988	0.987	0.988	0.988	0.989	0.981	0.976	0.971	0.970	0.967	0.969	0.969	0.965	0.965
22+24	0.952	0.949	0.954	0.951	0.952	0.942	0.940	0.940	0.946	0.935	0.935	0.929	0.915	0.900
25	0.990	0.990	0.991	0.991	0.991	0.983	0.976	0.970	0.962	0.940	0.933	0.925	0.919	0.919
26	0.957	0.952	0.952	0.949	0.945	0.934	0.936	0.938	0.948	0.948	0.957	0.957	0.955	0.953
27	0.916	0.916	0.930	0.936	0.941	0.933	0.926	0.916	0.919	0.901	0.901	0.891	0.876	0.863
28+29	0.951	0.946	0.938	0.948	0.933	0.935	0.926	0.921	0.920	0.870	0.860	0.846	0.809	0.000
30	0.929	0.922	0.928	0.932	0.942	0.943	0.942	0.937	0.948	0.890	0.856	0.847	0.788	0.803
31	0.968	0.967	0.971	0.975	0.977	0.980	0.968	0.959	0.973	0.955	0.908	0.891	0.839	0.823
32	0.957	0.964	0.968	0.971	0.971	0.963	0.958	0.959	0.967	0.917	0.896	0.871	0.848	0.847

33	0.929	0.932	0.936	0.941	0.957	0.943	0.935	0.931	0.946	0.809	0.742	0.693	0.629	0.633
34	0.954	0.950	0.950	0.958	0.957	0.952	0.948	0.946	0.947	0.913	0.879	0.884	0.858	0.859
35	0.946	0.944	0.946	0.950	0.946	0.935	0.925	0.925	0.919	0.862	0.837	0.806	0.768	0.757
36	0.930	0.900	0.936	0.911	0.880	0.863	0.868	0.861	0.939	0.760	0.765	0.764	0.000	0.000
37	0.979	0.979	0.980	0.983	0.982	0.971	0.966	0.966	0.963	0.933	0.918	0.898	0.869	0.866
38+39	0.956	0.946	0.943	0.933	0.927	0.916	0.918	0.924	0.938	0.928	0.933	0.936	0.933	0.942
40+41	0.917	0.909	0.918	0.914	0.919	0.901	0.899	0.899	0.912	0.903	0.915	0.924	0.927	0.933
42	0.925	0.911	0.908	0.895	0.884	0.867	0.866	0.871	0.890	0.886	0.903	0.916	0.921	0.933
43	0.918	0.911	0.916	0.912	0.912	0.897	0.896	0.899	0.912	0.906	0.920	0.928	0.930	0.935
44	0.876	0.877	0.892	0.889	0.892	0.875	0.876	0.884	0.902	0.900	0.918	0.932	0.943	0.938
45	0.914	0.913	0.927	0.932	0.949	0.937	0.934	0.933	0.938	0.927	0.931	0.929	0.921	0.912
46+47	0.912	0.905	0.906	0.899	0.891	0.875	0.869	0.867	0.873	0.868	0.886	0.894	0.894	0.878
48	0.882	0.872	0.871	0.858	0.848	0.831	0.834	0.848	0.873	0.883	0.901	0.904	0.891	0.876
49	0.892	0.874	0.867	0.848	0.832	0.795	0.775	0.766	0.770	0.751	0.773	0.775	0.765	0.762
50	0.826	0.815	0.817	0.804	0.797	0.762	0.748	0.745	0.753	0.712	0.716	0.694	0.654	0.647
51	0.912	0.908	0.914	0.914	0.918	0.906	0.902	0.901	0.903	0.897	0.909	0.912	0.910	0.898
52	0.905	0.890	0.884	0.868	0.858	0.844	0.847	0.860	0.880	0.874	0.891	0.895	0.893	0.884
53+54	0.891	0.885	0.887	0.879	0.874	0.852	0.842	0.840	0.846	0.832	0.846	0.842	0.827	0.823
55	0.896	0.896	0.906	0.904	0.911	0.888	0.878	0.875	0.876	0.847	0.841	0.815	0.776	0.782
56	0.940	0.939	0.944	0.942	0.946	0.930	0.923	0.921	0.919	0.896	0.893	0.879	0.856	0.861
57	0.821	0.822	0.842	0.840	0.848	0.823	0.815	0.816	0.820	0.784	0.785	0.765	0.733	0.714
58	0.821	0.822	0.836	0.835	0.842	0.814	0.801	0.798	0.804	0.777	0.789	0.777	0.753	0.726
59	0.905	0.903	0.909	0.908	0.908	0.892	0.887	0.889	0.899	0.893	0.905	0.906	0.896	0.885
60	0.876	0.879	0.894	0.898	0.907	0.894	0.894	0.900	0.913	0.908	0.920	0.921	0.914	0.905
61	0.840	0.830	0.833	0.819	0.815	0.797	0.801	0.811	0.830	0.815	0.833	0.831	0.819	0.787
63	0.547	0.513	0.491	0.491	0.453	0.412	0.371	0.349	0.337	0.288	0.306	0.294	0.256	0.239
64	0.887	0.870	0.867	0.848	0.828	0.804	0.795	0.794	0.806	0.697	0.658	0.595	0.524	0.553
65+66	0.816	0.806	0.810	0.798	0.790	0.750	0.727	0.715	0.714	0.667	0.670	0.640	0.591	0.557
67	0.740	0.716	0.707	0.685	0.660	0.617	0.588	0.568	0.552	0.534	0.576	0.585	0.573	0.532
68	0.831	0.825	0.832	0.825	0.824	0.794	0.780	0.775	0.778	0.747	0.753	0.730	0.000	0.000

69	0.789	0.783	0.792	0.782	0.778	0.759	0.762	0.778	0.805	0.774	0.781	0.761	0.724	0.692
70	0.849	0.846	0.854	0.847	0.846	0.816	0.798	0.788	0.785	0.779	0.804	0.802	0.785	0.790
71	0.818	0.815	0.823	0.814	0.810	0.779	0.763	0.758	0.762	0.730	0.740	0.718	0.677	0.639
62+72	0.800	0.789	0.792	0.779	0.772	0.730	0.708	0.697	0.697	0.663	0.680	0.663	0.624	0.581
73	0.861	0.843	0.836	0.811	0.788	0.766	0.766	0.779	0.804	0.779	0.793	0.783	0.760	0.738
74	0.802	0.797	0.804	0.798	0.792	0.787	0.796	0.810	0.831	0.812	0.830	0.840	0.855	0.827
75	0.856	0.848	0.852	0.844	0.837	0.807	0.790	0.780	0.778	0.757	0.782	0.795	0.814	0.788
76	0.797	0.798	0.812	0.814	0.821	0.791	0.772	0.760	0.760	0.734	0.758	0.771	0.793	0.768
77+78+79	0.851	0.829	0.823	0.801	0.783	0.744	0.726	0.712	0.715	0.709	0.744	0.747	0.727	0.682
80	0.732	0.723	0.733	0.721	0.717	0.665	0.636	0.617	0.616	0.600	0.651	0.684	0.727	0.734
81	0.848	0.833	0.831	0.814	0.802	0.766	0.748	0.737	0.737	0.706	0.717	0.698	0.667	0.666
82	0.815	0.797	0.795	0.772	0.758	0.722	0.708	0.700	0.704	0.679	0.703	0.693	0.671	0.678
83	0.821	0.805	0.807	0.791	0.782	0.740	0.721	0.713	0.717	0.697	0.722	0.710	0.682	0.665
84	0.758	0.753	0.766	0.756	0.755	0.705	0.676	0.656	0.648	0.632	0.670	0.676	0.667	0.651
86	0.828	0.816	0.820	0.808	0.804	0.770	0.752	0.740	0.739	0.723	0.752	0.753	0.744	0.726
85+87	0.799	0.792	0.801	0.790	0.786	0.738	0.708	0.687	0.679	0.656	0.684	0.678	0.656	0.633
88	0.776	0.765	0.775	0.762	0.758	0.713	0.692	0.682	0.687	0.659	0.684	0.675	0.657	0.654
89	0.690	0.672	0.675	0.657	0.649	0.605	0.585	0.589	0.608	0.579	0.622	0.649	0.680	0.659
90	0.725	0.712	0.719	0.703	0.698	0.658	0.645	0.649	0.672	0.640	0.671	0.671	0.672	0.661
91+93	0.764	0.762	0.774	0.765	0.762	0.725	0.712	0.711	0.726	0.704	0.729	0.723	0.707	0.695
92+94	0.741	0.736	0.753	0.744	0.748	0.698	0.667	0.649	0.644	0.635	0.678	0.679	0.671	0.671
95	0.812	0.766	0.724	0.644	0.568	0.463	0.390	0.340	0.299	0.391	0.572	0.719	0.812	0.843
96	0.850	0.839	0.842	0.830	0.825	0.794	0.779	0.772	0.777	0.731	0.732	0.709	0.676	0.700
97	0.836	0.830	0.839	0.834	0.833	0.785	0.752	0.727	0.714	0.666	0.670	0.645	0.609	0.637
98	0.839	0.838	0.850	0.847	0.847	0.814	0.796	0.783	0.781	0.725	0.721	0.696	0.666	0.695
99+ 100	0.831	0.826	0.835	0.830	0.830	0.802	0.790	0.785	0.791	0.718	0.697	0.658	0.611	0.665
101	0.814	0.820	0.842	0.854	0.877	0.861	0.864	0.877	0.900	0.886	0.897	0.902	0.934	0.936
102	0.736	0.749	0.785	0.810	0.858	0.826	0.807	0.798	0.799	0.765	0.775	0.767	0.789	0.782
103	0.607	0.613	0.637	0.635	0.651	0.611	0.618	0.661	0.734	0.579	0.467	0.307	0.138	0.136
104	0.817	0.828	0.852	0.864	0.881	0.730	0.523	0.337	0.206	0.291	0.455	0.566	0.595	0.669

105	0.747	0.744	0.763	0.765	0.783	0.756	0.750	0.757	0.775	0.737	0.736	0.699	0.605	0.598
106	0.000	0.000	0.000	0.000	0.000	0.844	0.840	0.840	0.848	0.830	0.840	0.834	0.825	0.813
107	0.000	0.000	0.000	0.000	0.000	0.815	0.808	0.808	0.822	0.776	0.779	0.744	0.706	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.913	0.898	0.895	0.885	0.874	0.867	0.871	0.888	0.911	0.886	0.886	0.864	0.000	0.000
110	0.825	0.810	0.808	0.805	0.791	0.769	0.757	0.751	0.759	0.747	0.773	0.792	0.000	0.000
111	0.899	0.890	0.880	0.855	0.861	0.847	0.832	0.818	0.814	0.737	0.737	0.735	0.730	0.615
112	0.848	0.828	0.820	0.800	0.803	0.779	0.774	0.798	0.811	0.765	0.763	0.748	0.708	0.704
113	0.928	0.924	0.930	0.928	0.926	0.911	0.904	0.898	0.901	0.851	0.834	0.803	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.930	0.927	0.935	0.924	0.925	0.910	0.897	0.884	0.882	0.832	0.815	0.759	0.713	0.707
116	0.971	0.969	0.972	0.972	0.972	0.967	0.965	0.963	0.964	0.954	0.952	0.948	0.000	0.000
117	0.941	0.937	0.940	0.937	0.935	0.925	0.923	0.923	0.000	0.000	0.000	0.000	0.000	0.000
118	0.976	0.974	0.977	0.977	0.976	0.971	0.969	0.969	0.000	0.958	0.950	0.940	0.924	0.919
119	0.944	0.939	0.948	0.951	0.947	0.939	0.936	0.942	0.951	0.929	0.918	0.901	0.872	0.859
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.883	0.881	0.900	0.907	0.906	0.851	0.818	0.818	0.829	0.827	0.850	0.852	0.840	0.830
124	0.931	0.944	0.953	0.955	0.960	0.946	0.943	0.942	0.944	0.937	0.934	0.923	0.909	0.906
125	0.000	0.000	0.000	0.000	0.000	0.986	0.975	0.964	0.955	0.927	0.917	0.898	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128 + 129	0.880	0.883	0.901	0.904	0.912	0.893	0.893	0.900	0.917	0.897	0.897	0.882	0.859	0.863
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table A 6: Ratio of Indirect DVA1 to Total DVA1

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	0.245	0.273	0.289	0.325	0.338	0.339	0.323	0.312	0.292	0.267	0.247	0.220	0.199	0.216
2	0.276	0.297	0.304	0.331	0.334	0.310	0.270	0.238	0.199	0.183	0.172	0.155	0.144	0.159
3	0.319	0.344	0.363	0.403	0.000	0.446	0.449	0.463	0.471	0.428	0.386	0.340	0.291	0.315
5	0.290	0.274	0.249	0.238	0.210	0.241	0.259	0.286	0.307	0.272	0.242	0.206	0.173	0.193
6+7	0.273	0.277	0.272	0.284	0.277	0.281	0.270	0.264	0.250	0.232	0.216	0.202	0.000	0.000
8	0.146	0.155	0.157	0.169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.234	0.222	0.202	0.192	0.165	0.171	0.167	0.169	0.000	0.146	0.130	0.113	0.098	0.112
10	0.213	0.223	0.218	0.227	0.220	0.242	0.253	0.278	0.000	0.279	0.254	0.229	0.204	0.230
11	0.256	0.250	0.235	0.237	0.221	0.224	0.216	0.213	0.203	0.182	0.165	0.146	0.131	0.141
12	0.206	0.205	0.196	0.199	0.186	0.206	0.216	0.236	0.000	0.000	0.000	0.000	0.000	0.000
13	0.243	0.245	0.236	0.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.149
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.202
16	0.146	0.182	0.198	0.222	0.229	0.208	0.181	0.165	0.147	0.130	0.114	0.095	0.000	0.000
17	0.105	0.106	0.102	0.103	0.094	0.110	0.118	0.131	0.137	0.120	0.109	0.089	0.000	0.000
18+19	0.064	0.060	0.053	0.051	0.044	0.046	0.047	0.051	0.053	0.049	0.046	0.041	0.038	0.046
20	0.214	0.204	0.183	0.173	0.148	0.165	0.175	0.194	0.211	0.187	0.167	0.146	0.128	0.148
21	0.169	0.167	0.162	0.170	0.164	0.173	0.173	0.175	0.172	0.185	0.197	0.210	0.000	0.000
23	0.182	0.168	0.152	0.145	0.128	0.180	0.224	0.271	0.313	0.313	0.320	0.327	0.347	0.328
22+24	0.561	0.564	0.563	0.585	0.581	0.598	0.599	0.602	0.597	0.623	0.644	0.666	0.685	0.681
25	0.047	0.041	0.037	0.034	0.031	0.047	0.061	0.074	0.103	0.159	0.208	0.256	0.304	0.294
26	0.110	0.104	0.098	0.092	0.095	0.098	0.087	0.083	0.072	0.092	0.111	0.131	0.143	0.096
27	0.235	0.233	0.217	0.199	0.191	0.176	0.179	0.201	0.202	0.259	0.311	0.352	0.387	0.428
28+29	0.137	0.156	0.204	0.163	0.215	0.171	0.178	0.183	0.190	0.247	0.291	0.318	0.384	0.000
30	0.271	0.273	0.259	0.237	0.185	0.147	0.131	0.131	0.104	0.195	0.281	0.274	0.349	0.342
31	0.131	0.134	0.133	0.118	0.114	0.083	0.120	0.148	0.100	0.147	0.339	0.382	0.519	0.574
32	0.203	0.166	0.165	0.150	0.157	0.152	0.150	0.136	0.108	0.284	0.414	0.503	0.546	0.570

33	0.298	0.274	0.285	0.304	0.291	0.280	0.261	0.239	0.178	0.434	0.628	0.696	0.758	0.737
34	0.208	0.223	0.254	0.226	0.242	0.191	0.164	0.144	0.129	0.206	0.333	0.294	0.322	0.323
35	0.187	0.187	0.197	0.182	0.198	0.189	0.197	0.184	0.198	0.277	0.366	0.425	0.485	0.495
36	0.179	0.243	0.151	0.205	0.277	0.361	0.385	0.455	0.214	0.774	0.888	0.928	0.000	0.000
37	0.090	0.088	0.093	0.082	0.089	0.101	0.103	0.097	0.107	0.155	0.204	0.236	0.276	0.270
38+39	0.879	0.866	0.851	0.848	0.832	0.844	0.848	0.854	0.857	0.843	0.832	0.823	0.816	0.781
40+41	0.803	0.789	0.790	0.798	0.812	0.825	0.835	0.843	0.861	0.831	0.803	0.783	0.763	0.734
42	0.758	0.776	0.789	0.819	0.831	0.843	0.843	0.848	0.850	0.822	0.796	0.771	0.749	0.695
43	0.903	0.899	0.893	0.895	0.885	0.888	0.883	0.879	0.872	0.869	0.864	0.858	0.851	0.818
44	0.653	0.653	0.645	0.657	0.649	0.674	0.686	0.707	0.723	0.668	0.615	0.554	0.490	0.507
45	0.579	0.578	0.566	0.556	0.513	0.495	0.462	0.439	0.402	0.408	0.412	0.410	0.413	0.381
46+47	0.696	0.679	0.688	0.688	0.684	0.674	0.675	0.676	0.684	0.696	0.711	0.733	0.744	0.701
48	0.769	0.737	0.718	0.687	0.653	0.615	0.584	0.547	0.508	0.644	0.722	0.783	0.816	0.855
49	0.583	0.588	0.619	0.638	0.658	0.662	0.679	0.699	0.724	0.743	0.757	0.773	0.777	0.791
50	0.782	0.771	0.783	0.799	0.795	0.778	0.761	0.750	0.741	0.759	0.776	0.794	0.803	0.766
51	0.647	0.628	0.634	0.628	0.618	0.575	0.545	0.512	0.481	0.484	0.486	0.489	0.484	0.469
52	0.505	0.510	0.534	0.541	0.551	0.526	0.508	0.489	0.466	0.462	0.456	0.458	0.452	0.426
53+54	0.726	0.709	0.708	0.694	0.684	0.675	0.671	0.668	0.664	0.668	0.668	0.672	0.666	0.663
55	0.561	0.550	0.582	0.585	0.608	0.581	0.568	0.561	0.548	0.576	0.595	0.610	0.614	0.612
56	0.551	0.548	0.593	0.598	0.631	0.609	0.606	0.603	0.574	0.582	0.587	0.595	0.596	0.621
57	0.692	0.689	0.713	0.712	0.719	0.700	0.688	0.672	0.643	0.660	0.677	0.691	0.701	0.727
58	0.524	0.528	0.549	0.552	0.563	0.576	0.594	0.616	0.638	0.620	0.597	0.574	0.536	0.555
59	0.625	0.613	0.620	0.611	0.605	0.641	0.684	0.725	0.765	0.775	0.783	0.801	0.807	0.823
60	0.684	0.655	0.649	0.626	0.601	0.570	0.554	0.537	0.526	0.554	0.576	0.609	0.621	0.652
61	0.775	0.756	0.757	0.763	0.742	0.674	0.608	0.555	0.512	0.518	0.531	0.552	0.560	0.553
63	0.683	0.640	0.594	0.623	0.561	0.593	0.577	0.561	0.545	0.569	0.613	0.658	0.676	0.510
64	0.854	0.844	0.848	0.841	0.831	0.712	0.612	0.513	0.438	0.622	0.733	0.798	0.843	0.693
65+66	0.537	0.538	0.563	0.577	0.582	0.594	0.620	0.650	0.689	0.669	0.649	0.625	0.591	0.637
67	0.595	0.596	0.618	0.641	0.658	0.654	0.657	0.666	0.682	0.693	0.708	0.723	0.727	0.732
68	0.558	0.532	0.524	0.499	0.473	0.471	0.480	0.494	0.513	0.537	0.560	0.587	0.000	0.000

69	0.636	0.635	0.652	0.659	0.661	0.603	0.544	0.489	0.431	0.446	0.461	0.476	0.479	0.469
70	0.560	0.522	0.506	0.474	0.440	0.454	0.477	0.509	0.553	0.480	0.432	0.400	0.367	0.360
71	0.617	0.608	0.615	0.607	0.598	0.605	0.617	0.640	0.671	0.674	0.675	0.676	0.666	0.657
62+72	0.532	0.529	0.545	0.545	0.549	0.556	0.574	0.593	0.615	0.639	0.661	0.683	0.693	0.677
73	0.674	0.654	0.658	0.652	0.643	0.609	0.576	0.543	0.509	0.509	0.515	0.519	0.517	0.551
74	0.547	0.538	0.551	0.554	0.551	0.510	0.481	0.456	0.436	0.422	0.411	0.399	0.379	0.414
75	0.672	0.657	0.665	0.670	0.660	0.639	0.621	0.604	0.591	0.564	0.537	0.506	0.466	0.485
76	0.516	0.510	0.531	0.533	0.533	0.559	0.581	0.602	0.625	0.619	0.610	0.600	0.583	0.611
77+78+79	0.615	0.608	0.620	0.629	0.637	0.634	0.626	0.621	0.626	0.629	0.637	0.657	0.661	0.761
80	0.642	0.635	0.650	0.655	0.655	0.671	0.691	0.699	0.716	0.721	0.724	0.724	0.718	0.631
81	0.501	0.501	0.513	0.515	0.524	0.553	0.573	0.602	0.624	0.613	0.600	0.601	0.595	0.563
82	0.638	0.626	0.624	0.615	0.611	0.609	0.601	0.608	0.610	0.582	0.553	0.541	0.519	0.470
83	0.702	0.699	0.711	0.715	0.724	0.681	0.644	0.619	0.595	0.584	0.578	0.573	0.561	0.586
84	0.657	0.672	0.697	0.710	0.729	0.735	0.740	0.753	0.763	0.741	0.719	0.702	0.675	0.669
86	0.618	0.607	0.618	0.610	0.613	0.605	0.595	0.591	0.584	0.556	0.525	0.498	0.461	0.468
85+87	0.657	0.650	0.659	0.657	0.660	0.653	0.648	0.653	0.655	0.624	0.594	0.570	0.536	0.535
88	0.759	0.771	0.794	0.807	0.821	0.811	0.801	0.793	0.779	0.756	0.736	0.719	0.701	0.711
89	0.724	0.732	0.743	0.770	0.784	0.776	0.750	0.748	0.738	0.720	0.709	0.730	0.741	0.751
90	0.695	0.706	0.726	0.749	0.769	0.750	0.717	0.695	0.663	0.642	0.629	0.626	0.621	0.632
91+93	0.661	0.674	0.693	0.701	0.710	0.693	0.675	0.660	0.638	0.609	0.586	0.570	0.550	0.570
92+94	0.709	0.723	0.757	0.775	0.796	0.774	0.751	0.722	0.685	0.657	0.629	0.579	0.533	0.542
95	0.653	0.631	0.619	0.584	0.545	0.474	0.405	0.328	0.233	0.202	0.180	0.161	0.139	0.158
96	0.643	0.636	0.645	0.642	0.639	0.609	0.579	0.555	0.527	0.499	0.480	0.468	0.450	0.495
97	0.705	0.698	0.709	0.708	0.708	0.715	0.732	0.753	0.775	0.735	0.702	0.676	0.649	0.680
98	0.663	0.650	0.659	0.659	0.656	0.652	0.656	0.666	0.678	0.641	0.614	0.597	0.579	0.587
99+ 100	0.655	0.648	0.660	0.659	0.661	0.653	0.651	0.650	0.647	0.614	0.590	0.581	0.566	0.576
101	0.557	0.521	0.498	0.460	0.414	0.366	0.330	0.300	0.275	0.281	0.288	0.314	0.376	0.368
102	0.661	0.624	0.590	0.552	0.499	0.526	0.554	0.579	0.603	0.599	0.595	0.580	0.527	0.505
103	0.514	0.489	0.461	0.437	0.398	0.441	0.486	0.525	0.557	0.557	0.553	0.556	0.558	0.539
104	0.637	0.646	0.671	0.681	0.686	0.627	0.567	0.480	0.357	0.379	0.409	0.434	0.448	0.374

105	0.821	0.799	0.782	0.762	0.726	0.713	0.700	0.695	0.692	0.688	0.683	0.680	0.664	0.652
106	0.000	0.000	0.000	0.000	0.000	0.499	0.501	0.513	0.513	0.514	0.532	0.552	0.550	0.543
107	0.000	0.000	0.000	0.000	0.000	0.491	0.462	0.428	0.396	0.443	0.452	0.517	0.551	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.498	0.497	0.491	0.464	0.447	0.435	0.425	0.382	0.332	0.324	0.310	0.316	0.000	0.000
110	0.495	0.490	0.496	0.484	0.474	0.456	0.451	0.457	0.463	0.426	0.403	0.368	0.000	0.000
111	0.429	0.395	0.419	0.448	0.377	0.323	0.300	0.286	0.257	0.302	0.364	0.407	0.459	0.418
112	0.461	0.465	0.484	0.507	0.449	0.465	0.472	0.429	0.440	0.530	0.593	0.596	0.633	0.640
113	0.481	0.459	0.437	0.422	0.413	0.409	0.400	0.405	0.408	0.453	0.495	0.524	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.154	0.153	0.143	0.156	0.148	0.134	0.129	0.131	0.123	0.244	0.342	0.474	0.541	0.538
116	0.132	0.128	0.129	0.130	0.129	0.122	0.115	0.114	0.115	0.127	0.140	0.145	0.000	0.000
117	0.613	0.605	0.610	0.607	0.612	0.606	0.599	0.605	0.000	0.000	0.000	0.000	0.000	0.000
118	0.123	0.126	0.118	0.105	0.094	0.103	0.104	0.104	0.000	0.120	0.152	0.168	0.190	0.188
119	0.264	0.277	0.263	0.238	0.258	0.253	0.253	0.219	0.190	0.216	0.248	0.267	0.300	0.310
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.432	0.442	0.419	0.384	0.403	0.385	0.384	0.351	0.337	0.339	0.340	0.326	0.315	0.315
124	0.301	0.244	0.243	0.236	0.220	0.223	0.209	0.196	0.192	0.187	0.210	0.230	0.237	0.239
125	0.000	0.000	0.000	0.000	0.000	0.087	0.097	0.109	0.120	0.226	0.301	0.366	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128 + 129	0.142	0.142	0.144	0.145	0.149	0.152	0.149	0.152	0.150	0.200	0.235	0.270	0.300	0.270
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table A 7: Domestic Value Added (DVA2) for Each Sector ($ Million)

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	1127.9	1050.5	839.3	732.6	619.7	872.6	1188.5	1577.5	2187.4	2295.6	1968.1	2381.7	2261.3	2920.8
2	192.0	244.3	274.2	345.8	461.6	515.0	518.4	450.2	306.5	412.8	463.6	747.8	974.1	2487.8
3	4.9	4.9	4.3	4.3	4.2	6.7	9.3	12.7	17.4	23.1	25.7	40.8	52.8	59.5
5	13.0	22.3	30.7	46.2	71.1	121.4	185.2	263.5	377.3	500.4	542.6	848.0	1121.7	664.1
6+7	81.3	84.0	77.5	82.1	89.6	130.7	180.6	241.0	332.3	406.6	420.7	608.3	678.6	781.9
8	59.3	79.2	89.6	112.8	142.5	227.4	342.9	502.9	763.1	922.1	944.4	1426.6	1792.6	1701.2
9	123.3	146.1	145.9	175.9	207.5	250.5	277.2	304.3	317.6	457.2	533.1	872.0	1200.5	710.5
10	255.4	222.5	157.5	107.4	31.4	37.6	41.5	45.7	47.9	59.4	60.3	84.2	94.5	59.3
11	177.4	184.8	204.0	246.9	384.5	467.2	561.6	621.8	816.4	834.5	734.6	1005.7	1128.0	1563.0
12	74.0	68.7	57.6	51.9	50.0	44.1	33.1	18.4	0.0	0.0	0.0	0.0	0.0	0.0
13	497.6	511.0	478.8	488.8	553.1	647.2	740.8	824.5	949.7	1335.0	1492.7	2412.8	3083.4	4015.5
14	149.7	139.3	111.9	100.6	86.4	100.4	110.8	119.0	130.0	182.6	211.5	357.1	500.6	419.6
15	21.3	17.7	12.5	9.4	6.5	14.2	25.5	40.7	62.8	103.9	137.9	262.1	407.0	694.8
16	65.4	90.4	112.3	151.3	221.9	270.2	321.4	367.8	440.5	572.3	626.1	1011.6	1280.8	899.4
17	105.1	109.3	98.3	104.1	112.6	134.9	149.4	158.5	170.3	159.7	118.2	120.9	95.2	85.3
18+19	556.2	661.8	694.6	867.9	1137.8	1363.2	1519.6	1639.7	1788.0	2183.2	2223.3	3324.2	4227.0	4591.6
20	471.8	498.3	477.4	526.5	602.2	764.0	918.1	1079.9	1321.5	1688.4	1861.6	3045.7	4126.8	2955.5
21	113.1	154.5	175.5	227.8	310.4	423.6	513.2	582.5	705.0	804.4	795.7	1091.1	1339.1	1748.1
23	80.5	98.1	103.5	123.0	149.4	168.1	165.0	163.2	158.8	172.2	166.4	234.0	263.8	334.7
22+24	280.7	309.7	308.4	341.0	404.9	488.3	569.7	647.3	770.9	985.7	1106.2	1797.2	2347.3	1606.3
25	574.1	617.9	619.0	608.3	689.9	866.3	939.3	1057.6	1069.3	1769.7	2097.7	3222.9	4107.5	4066.8
26	811.8	849.0	760.6	804.2	847.5	993.1	1096.5	1123.5	1126.8	1101.7	859.1	872.8	713.5	1042.0
27	672.6	743.8	781.2	922.5	1123.4	1457.0	1664.8	1681.8	2016.4	2148.9	2014.5	2455.0	2675.9	2296.5
28+29	513.7	688.6	660.5	1117.6	1195.5	2045.2	2507.7	3152.1	4020.0	3541.9	3281.9	4105.1	3292.9	3729.7
30	153.3	208.5	249.6	352.3	547.6	961.7	1474.9	2076.2	3177.4	2992.8	2349.5	3248.4	3006.0	1371.6
31	9.3	11.0	11.1	12.2	12.5	25.4	25.7	28.6	61.9	96.7	40.8	57.6	40.0	27.6
32	9.8	17.0	19.2	27.2	36.6	58.8	86.2	126.9	190.7	127.5	67.3	44.2	14.1	51.1

33	16.7	19.4	13.1	10.6	10.9	12.2	13.1	17.4	30.8	17.5	11.3	15.0	14.7	3.7
34	87.1	93.7	78.8	100.9	115.9	193.8	275.5	388.4	541.0	484.9	319.3	442.6	430.9	338.7
35	33.7	33.4	28.5	30.1	30.5	35.7	37.1	43.8	42.4	52.1	45.8	53.6	50.2	49.1
36	2.0	3.6	6.1	8.7	11.7	11.3	10.6	7.9	8.7	1.7	0.5	0.2	0.0	0.0
37	722.5	1400.1	1959.3	3091.9	4673.3	5769.0	6660.0	7539.0	8315.3	6981.7	4482.4	3603.0	1463.6	1573.1
38+39	11.6	19.1	26.5	38.0	59.9	78.2	102.7	130.3	174.3	227.4	243.1	373.2	480.5	538.5
40+41	105.2	128.4	129.3	149.1	173.9	212.3	248.2	286.7	319.9	381.7	360.3	453.0	452.1	211.2
42	138.1	123.6	95.5	76.0	62.9	71.2	79.7	84.3	91.4	141.3	173.9	301.4	432.3	346.6
43	87.0	118.4	141.9	182.0	275.7	323.2	378.4	421.2	486.6	771.5	956.4	1622.8	2294.5	3433.5
44	20.6	20.6	22.2	26.7	34.9	36.4	43.9	53.0	69.6	109.6	127.4	211.2	296.5	286.6
45	51.2	48.2	38.5	33.1	25.9	34.6	44.2	53.9	68.4	135.0	180.6	321.8	462.9	534.8
46+47	851.8	972.5	866.9	919.4	1049.3	1300.8	1452.1	1602.2	1740.5	1795.0	1510.4	1754.9	1793.0	3369.4
48	29.2	33.9	31.3	34.3	39.4	61.0	86.7	123.0	175.4	375.3	455.2	678.3	867.8	100.0
49	59.2	68.0	63.5	71.9	84.7	98.0	100.0	96.1	87.6	104.0	107.5	156.3	204.4	188.3
50	174.3	211.6	201.2	215.9	275.1	358.0	433.3	504.7	577.7	666.7	652.4	872.4	1016.7	1132.5
51	119.3	121.6	96.4	88.8	85.7	121.0	150.4	187.4	226.2	258.5	234.5	293.5	310.2	255.7
52	135.0	158.1	154.9	186.7	232.0	301.0	358.1	415.5	489.6	519.8	460.7	572.8	616.5	733.9
53+54	1149.6	1382.1	1373.7	1685.4	2134.1	2664.0	3038.3	3358.0	3740.6	4088.7	3785.0	4908.2	5589.1	5392.3
55	20.2	24.1	22.0	25.1	29.5	60.9	110.5	192.8	337.4	297.1	222.3	235.9	215.4	233.2
56	149.9	158.0	133.9	121.5	135.7	233.7	230.6	269.5	377.2	464.4	465.7	558.1	538.5	471.6
57	254.9	266.2	215.0	208.5	208.1	272.2	327.5	403.1	506.0	610.4	582.7	728.4	704.1	579.1
58	131.1	138.4	121.8	127.8	143.1	175.5	198.1	225.7	256.1	303.4	298.9	393.4	427.5	339.2
59	127.2	124.5	96.3	84.3	64.4	69.5	66.8	62.1	55.8	120.9	161.3	261.9	360.6	330.7
60	242.8	296.6	294.0	360.5	461.9	604.0	701.8	790.6	869.8	988.9	915.5	1162.1	1310.4	1204.6
61	137.9	174.5	174.7	199.8	272.9	431.0	609.7	802.7	1028.5	1137.3	1067.3	1412.2	1671.9	1414.8
63	370.2	596.9	769.6	979.6	1517.7	1921.2	2465.3	3249.8	4355.6	4352.7	4134.4	4985.4	4971.9	10129.6
64	16.8	19.0	16.4	16.3	18.3	42.7	73.5	119.9	177.3	116.3	71.6	62.9	45.5	350.5
65+66	925.1	1052.0	989.8	1119.0	1357.7	1629.4	1778.8	1920.3	2045.6	3654.7	4988.1	8860.0	12855.6	5591.9
67	131.8	141.4	114.8	112.3	112.4	139.2	150.7	168.2	178.7	169.2	146.4	168.3	166.3	184.0
68	119.6	145.7	143.4	170.0	209.3	279.3	336.6	404.1	476.7	554.2	486.3	462.4	131.6	92.1

69	168.3	182.5	162.9	170.4	193.5	290.0	396.8	524.6	679.4	742.4	708.4	961.1	1134.2	1124.9
70	339.9	433.1	456.7	585.2	779.5	994.8	1161.7	1312.8	1471.3	2075.8	2346.9	3624.9	4782.6	5625.2
71	212.8	209.7	165.9	149.8	125.3	149.1	163.0	169.9	172.7	219.5	235.3	346.0	432.9	465.2
62+72	778.0	836.4	818.6	1101.0	1256.5	1456.2	1462.4	1530.7	1642.5	1823.7	1789.8	2435.8	2704.5	2423.6
73	337.7	402.1	374.3	401.7	458.2	626.3	787.4	1003.4	1276.5	1443.0	1396.8	1851.6	1978.2	1152.4
74	29.7	49.7	65.5	91.9	135.1	166.4	175.0	163.5	123.1	165.8	182.7	277.4	362.9	287.4
75	55.2	62.8	61.0	62.4	73.6	101.7	125.8	151.2	176.6	242.4	278.0	443.7	619.1	632.4
76	1152.8	1049.0	728.5	512.9	202.4	258.1	308.9	366.7	437.1	532.8	570.7	882.1	1214.5	1097.2
77+78+79	769.4	991.6	1044.6	1242.3	1598.5	2103.9	2672.7	3312.0	4099.2	4631.0	4464.1	5699.6	6380.9	4281.4
80	434.5	533.2	444.5	520.4	622.0	807.3	843.7	1067.5	1266.9	1220.4	1094.9	1692.2	2236.2	2553.6
81	174.3	190.0	173.3	186.1	213.7	261.4	306.2	349.3	406.4	445.3	412.8	483.1	492.7	554.5
82	317.2	366.4	354.6	393.0	468.5	583.2	699.2	802.9	928.3	1132.0	1209.6	1679.8	1956.9	2409.1
83	7.2	10.8	12.6	17.3	23.7	40.1	61.0	88.4	129.7	168.4	185.4	277.5	348.9	297.1
84	55.0	70.3	73.5	90.0	116.0	129.0	134.3	134.4	136.3	153.4	147.7	187.9	205.7	138.7
86	71.5	93.3	99.3	126.0	169.2	223.8	281.7	344.0	423.0	593.3	673.9	985.1	1191.7	499.6
85+87	323.7	423.3	457.0	586.3	786.1	995.0	1182.2	1351.5	1579.7	2196.6	2614.7	4125.3	5546.5	3954.1
88	68.2	74.9	68.1	74.4	86.4	119.8	161.2	215.0	303.9	363.5	381.5	544.6	658.7	479.9
89	43.3	44.6	39.5	35.7	37.0	47.9	64.2	80.3	106.9	139.7	163.6	237.4	307.3	274.8
90	19.3	21.6	20.2	20.9	23.7	29.8	36.7	42.9	50.5	66.9	77.1	118.7	159.3	136.0
91+93	172.1	190.7	179.0	198.9	236.7	330.0	432.8	551.2	717.8	900.7	961.9	1376.0	1635.5	1372.9
92+94	249.3	262.7	229.3	241.7	272.5	357.2	436.4	534.3	657.4	790.0	848.7	1299.8	1659.1	1647.9
95	27.0	29.6	27.2	30.1	35.0	104.7	202.1	344.5	565.7	799.2	980.5	1438.0	1571.3	3106.3
96	66.1	82.2	82.1	92.4	112.9	143.8	177.2	203.1	230.3	262.6	214.1	218.3	140.9	105.8
97	177.8	227.2	236.9	300.9	400.0	502.8	567.7	621.0	691.2	978.4	1144.7	1765.3	2292.3	2431.3
98	25.4	37.6	44.3	61.4	88.1	107.8	119.0	125.8	132.9	206.5	250.9	396.0	518.1	592.4
99+ 100	43.8	50.4	46.2	49.5	53.2	67.9	76.9	88.9	105.9	104.9	90.7	103.3	92.2	65.5
101	8.5	11.7	13.6	19.2	28.5	37.4	51.5	80.6	136.0	194.2	161.7	131.8	48.7	104.7
102	34.5	43.5	48.5	64.5	97.9	115.6	125.8	134.3	140.1	260.3	344.7	597.5	908.5	1000.3
103	1225.8	1544.0	1729.7	2220.4	3105.0	3002.4	2693.0	2255.9	1565.7	3230.2	3840.1	4683.4	3160.1	2925.3
104	12.0	14.2	14.0	17.0	21.8	46.9	67.8	82.8	95.7	179.7	291.5	540.3	735.6	938.4

105	93.8	118.5	128.8	165.0	245.5	411.9	615.8	867.6	1185.5	1647.0	1830.7	2641.6	3029.6	1481.7
106	538.3	575.1	642.6	689.7	812.0	1396.1	1822.7	2192.3	2784.5	3836.2	4044.7	5633.7	7083.4	6620.7
107	1249.1	1284.8	1164.7	1454.7	1542.4	1814.6	2263.3	2742.7	3437.5	3615.6	4053.3	4105.0	3994.8	3828.1
108	53.6	64.6	69.1	81.9	96.3	121.4	140.2	140.8	160.6	140.2	123.1	127.4	100.4	113.7
109	449.4	532.4	583.5	768.9	1011.6	1272.4	1503.1	1791.7	2128.6	2571.0	2412.5	2581.3	1989.8	2161.2
110	2135.9	2496.9	2480.4	3108.0	3948.3	5384.3	6536.2	7558.8	8979.2	9547.2	7967.3	8633.3	6451.2	6373.1
111	64.7	85.0	79.8	84.7	136.5	550.0	1148.1	1974.2	3303.9	2993.1	2341.6	2679.5	2541.9	2386.5
112	113.6	122.9	114.8	125.4	191.5	397.9	680.4	1233.4	1869.2	1648.4	1273.3	1560.7	1315.9	1193.7
113	251.4	300.9	325.4	397.2	489.3	741.9	1064.3	1428.7	1981.7	1586.9	1006.1	765.6	268.8	247.5
114	47.6	52.5	46.3	46.5	50.7	74.0	88.8	110.9	130.2	98.1	81.4	70.4	68.4	79.4
115	713.9	827.0	949.8	989.3	1325.9	1967.5	2633.8	3373.9	4725.2	4484.9	3634.6	2849.2	2142.7	2165.4
116	8737.2	9555.1	9150.7	10252.5	11889.4	16391.6	21195.4	26234.5	32879.9	33827.9	28792.6	36478.7	38600.6	32804.0
117	591.2	712.2	727.0	899.8	1116.5	1440.9	1755.2	1972.6	2236.7	2052.9	1649.2	2189.6	2369.2	2131.6
118	2934.8	2900.0	3071.2	3677.4	4635.3	5057.8	5593.8	6297.9	7631.1	11068.0	11629.1	17424.5	19845.9	20439.0
119	493.2	558.2	644.0	882.4	1041.9	1343.5	1584.5	2071.0	2678.7	3171.0	3042.8	4030.3	4125.1	4095.7
120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121	27.8	49.9	65.6	97.6	134.9	393.6	697.1	1006.4	1522.7	1361.3	1097.5	1173.0	924.3	923.1
122	44.5	69.9	84.4	113.3	138.9	235.1	332.2	421.2	610.0	459.2	318.9	234.8	72.6	133.1
123	603.2	690.5	797.3	1111.7	1338.3	2799.4	4617.7	7718.6	12241.5	15911.3	17198.2	26492.5	33919.8	34824.0
124	4482.0	5878.3	6138.2	7684.6	10125.0	14242.9	19132.1	25068.9	32988.8	36876.9	32340.2	40893.3	45431.3	46780.5
125	76.9	126.9	168.9	244.5	362.8	564.0	776.9	991.5	1316.5	1108.9	803.3	710.3	511.5	498.0
126	40.4	45.4	44.0	51.2	61.0	113.2	217.0	361.3	641.7	509.1	406.5	380.0	177.2	240.6
127	20.2	23.7	24.9	30.1	37.4	68.7	101.1	126.9	165.0	149.4	138.4	193.2	266.4	248.5
128 + 129	1221.0	1463.5	1553.0	1915.0	2441.0	3722.0	5296.8	7151.6	9976.5	8713.1	6160.3	5245.1	2493.1	2659.1
130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A 8: Ratio of Indirect Domestic Value Added (DVA2) in Total DVA2

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	0.130	0.141	0.160	0.183	0.219	0.177	0.146	0.121	0.103	0.234	0.415	0.651	0.988	0.976
2	0.789	0.637	0.521	0.420	0.330	0.362	0.425	0.558	0.964	0.940	0.924	0.912	0.899	0.384
3	0.973	0.978	0.983	0.991	1.000	0.947	0.905	0.873	0.843	0.840	0.842	0.841	0.833	0.926
5	0.602	0.466	0.398	0.353	0.323	0.216	0.151	0.111	0.082	0.087	0.093	0.098	0.098	0.227
6+7	0.756	0.794	0.846	0.908	0.986	0.917	0.856	0.803	0.756	0.822	0.889	0.946	1.000	1.000
8	0.975	0.984	0.991	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
9	0.754	0.725	0.682	0.646	0.576	0.643	0.725	0.845	1.000	0.681	0.471	0.322	0.209	0.101
10	0.137	0.153	0.193	0.297	0.997	0.997	0.998	0.999	1.000	0.932	0.868	0.799	0.708	0.337
11	0.664	0.615	0.632	0.627	0.687	0.714	0.763	0.810	0.889	0.811	0.726	0.651	0.551	0.247
12	0.979	0.978	0.980	0.981	0.986	0.984	0.982	0.980	1.000	1.000	1.000	1.000	1.000	1.000
13	0.968	0.973	0.981	0.989	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.340
16	0.935	0.903	0.887	0.872	0.867	0.854	0.846	0.837	0.833	0.886	0.933	0.971	1.000	1.000
17	0.092	0.084	0.075	0.067	0.048	0.043	0.038	0.034	0.032	0.089	0.206	0.453	1.000	1.000
18+19	0.458	0.455	0.461	0.465	0.474	0.467	0.471	0.482	0.504	0.570	0.639	0.702	0.754	0.771
20	0.863	0.844	0.828	0.805	0.774	0.737	0.700	0.664	0.630	0.625	0.641	0.666	0.681	0.774
21	1.000	1.000	1.000	1.000	1.000	0.998	0.996	0.994	0.992	0.994	0.996	0.998	1.000	1.000
23	0.716	0.717	0.718	0.704	0.682	0.682	0.667	0.674	0.681	0.694	0.737	0.778	0.806	0.708
22+24	0.735	0.717	0.705	0.687	0.659	0.696	0.741	0.796	0.863	0.905	0.940	0.965	0.981	0.928
25	0.547	0.569	0.626	0.613	0.653	0.674	0.678	0.709	0.718	0.505	0.400	0.309	0.234	0.250
26	0.062	0.070	0.079	0.087	0.095	0.105	0.133	0.160	0.200	0.268	0.359	0.461	0.665	0.583
27	0.979	0.978	0.978	0.977	0.976	0.977	0.979	0.979	0.983	0.967	0.955	0.938	0.922	0.941
28+29	0.984	0.982	0.978	0.980	0.974	0.926	0.871	0.822	0.774	0.805	0.877	0.936	1.000	1.000
30	0.137	0.121	0.118	0.107	0.128	0.133	0.140	0.132	0.155	0.155	0.162	0.203	0.181	0.298
31	0.770	0.769	0.765	0.731	0.663	0.772	0.740	0.733	0.841	0.902	0.856	0.888	0.880	0.901
32	0.542	0.504	0.404	0.348	0.277	0.171	0.100	0.071	0.050	0.045	0.062	0.116	0.472	0.106

33	1.000	1.000	1.000	0.999	0.999	0.997	0.993	0.990	0.990	0.656	0.409	0.306	0.193	0.980
34	0.510	0.480	0.400	0.405	0.363	0.314	0.251	0.219	0.180	0.162	0.137	0.205	0.223	0.283
35	0.984	0.978	0.972	0.964	0.953	0.935	0.911	0.892	0.846	0.804	0.755	0.682	0.582	0.610
36	0.023	0.006	0.005	0.001	0.000	0.001	0.003	0.005	0.037	0.012	0.017	0.035	1.000	1.000
37	0.106	0.061	0.043	0.035	0.029	0.029	0.032	0.035	0.028	0.057	0.106	0.187	0.474	0.394
38+39	0.765	0.662	0.604	0.559	0.524	0.446	0.386	0.337	0.299	0.297	0.306	0.325	0.330	0.346
40+41	0.179	0.183	0.193	0.203	0.213	0.199	0.189	0.181	0.177	0.209	0.269	0.362	0.485	0.876
42	0.048	0.050	0.054	0.062	0.077	0.078	0.080	0.083	0.087	0.061	0.046	0.037	0.027	0.045
43	0.114	0.116	0.115	0.098	0.106	0.140	0.195	0.266	0.369	0.256	0.189	0.124	0.064	0.050
44	0.715	0.699	0.738	0.774	0.806	0.774	0.777	0.790	0.811	0.717	0.615	0.518	0.421	0.366
45	0.000	0.001	0.001	0.002	0.005	0.004	0.004	0.003	0.003	0.001	0.000	0.000	0.000	0.000
46+47	0.492	0.506	0.513	0.510	0.527	0.495	0.462	0.432	0.391	0.390	0.385	0.378	0.365	0.266
48	0.470	0.453	0.423	0.376	0.341	0.354	0.364	0.375	0.372	0.190	0.152	0.142	0.138	0.769
49	0.168	0.164	0.155	0.142	0.138	0.182	0.227	0.281	0.344	0.507	0.639	0.748	0.837	0.867
50	0.414	0.422	0.422	0.411	0.416	0.429	0.443	0.466	0.481	0.444	0.411	0.385	0.361	0.402
51	0.648	0.645	0.636	0.624	0.642	0.649	0.654	0.668	0.672	0.683	0.678	0.660	0.628	0.564
52	0.014	0.017	0.019	0.020	0.022	0.022	0.021	0.022	0.022	0.018	0.017	0.016	0.016	0.006
53+54	0.029	0.029	0.028	0.025	0.025	0.037	0.050	0.067	0.086	0.088	0.087	0.083	0.075	0.083
55	0.714	0.634	0.538	0.429	0.337	0.449	0.542	0.623	0.685	0.620	0.543	0.444	0.311	0.331
56	0.885	0.886	0.891	0.876	0.890	0.912	0.891	0.888	0.896	0.899	0.900	0.882	0.850	0.789
57	0.469	0.514	0.561	0.615	0.725	0.729	0.736	0.754	0.766	0.782	0.783	0.765	0.717	0.666
58	0.721	0.737	0.755	0.774	0.810	0.807	0.803	0.805	0.802	0.799	0.789	0.766	0.725	0.678
59	0.020	0.043	0.077	0.128	0.258	0.259	0.265	0.285	0.302	0.169	0.102	0.051	0.008	0.010
60	0.092	0.089	0.082	0.070	0.063	0.077	0.095	0.120	0.149	0.218	0.265	0.296	0.317	0.225
61	0.456	0.422	0.378	0.328	0.293	0.294	0.294	0.301	0.301	0.318	0.346	0.382	0.427	0.301
63	0.797	0.723	0.667	0.618	0.591	0.516	0.449	0.398	0.344	0.378	0.406	0.422	0.427	0.287
64	0.955	0.907	0.846	0.746	0.636	0.674	0.707	0.748	0.776	0.824	0.875	0.926	0.982	0.540
65+66	0.269	0.279	0.284	0.285	0.294	0.275	0.253	0.243	0.225	0.243	0.256	0.265	0.272	0.406
67	0.981	0.983	0.984	0.986	0.989	0.985	0.980	0.975	0.968	0.959	0.950	0.938	0.922	0.930
68	0.374	0.390	0.380	0.360	0.338	0.404	0.459	0.524	0.577	0.712	0.803	0.871	1.000	1.000

69	0.427	0.416	0.397	0.361	0.340	0.369	0.392	0.418	0.428	0.383	0.355	0.339	0.328	0.290
70	0.040	0.050	0.055	0.056	0.056	0.064	0.068	0.072	0.073	0.070	0.078	0.093	0.113	0.091
71	0.066	0.079	0.093	0.110	0.156	0.177	0.201	0.233	0.265	0.223	0.187	0.155	0.117	0.074
62+72	0.741	0.692	0.664	0.677	0.624	0.608	0.568	0.550	0.535	0.562	0.591	0.620	0.624	0.597
73	0.748	0.764	0.770	0.767	0.770	0.746	0.714	0.686	0.646	0.718	0.791	0.857	0.919	0.634
74	0.442	0.338	0.306	0.241	0.212	0.272	0.353	0.499	0.856	0.877	0.892	0.901	0.906	0.871
75	0.827	0.764	0.706	0.599	0.498	0.572	0.638	0.709	0.782	0.802	0.814	0.820	0.824	0.865
76	0.077	0.090	0.113	0.156	0.446	0.405	0.366	0.330	0.285	0.341	0.395	0.448	0.495	0.399
77+78+79	0.625	0.574	0.528	0.466	0.429	0.418	0.409	0.401	0.381	0.390	0.400	0.403	0.404	0.402
80	0.837	0.807	0.731	0.688	0.632	0.596	0.494	0.471	0.409	0.398	0.407	0.527	0.615	0.571
81	0.517	0.511	0.495	0.466	0.459	0.501	0.543	0.592	0.630	0.631	0.626	0.596	0.567	0.617
82	0.488	0.489	0.477	0.443	0.430	0.457	0.489	0.530	0.560	0.595	0.630	0.657	0.671	0.685
83	0.214	0.208	0.191	0.177	0.166	0.182	0.191	0.205	0.211	0.209	0.210	0.207	0.194	0.159
84	0.415	0.464	0.491	0.501	0.526	0.504	0.481	0.460	0.426	0.393	0.342	0.269	0.180	0.188
86	0.410	0.448	0.471	0.477	0.502	0.528	0.556	0.586	0.605	0.612	0.600	0.561	0.499	0.732
85+87	0.287	0.271	0.252	0.226	0.219	0.236	0.254	0.277	0.289	0.266	0.249	0.225	0.203	0.204
88	0.427	0.443	0.451	0.450	0.466	0.370	0.292	0.228	0.167	0.204	0.257	0.309	0.355	0.252
89	0.758	0.759	0.757	0.738	0.733	0.655	0.576	0.500	0.417	0.351	0.304	0.264	0.225	0.159
90	0.567	0.597	0.614	0.620	0.641	0.648	0.654	0.666	0.670	0.630	0.602	0.582	0.568	0.704
91+93	0.268	0.318	0.359	0.388	0.437	0.437	0.430	0.417	0.382	0.380	0.380	0.367	0.331	0.235
92+94	0.348	0.349	0.355	0.356	0.376	0.410	0.444	0.490	0.530	0.433	0.343	0.251	0.150	0.231
95	0.286	0.246	0.202	0.161	0.137	0.116	0.121	0.140	0.158	0.176	0.183	0.179	0.166	0.125
96	0.951	0.957	0.961	0.961	0.964	0.948	0.932	0.910	0.876	0.882	0.866	0.832	0.715	0.520
97	0.238	0.245	0.243	0.236	0.242	0.237	0.229	0.224	0.214	0.224	0.228	0.226	0.219	0.184
98	0.066	0.071	0.075	0.076	0.081	0.110	0.140	0.181	0.226	0.228	0.214	0.187	0.146	0.174
99+ 100	0.335	0.426	0.498	0.563	0.642	0.665	0.682	0.717	0.758	0.688	0.614	0.511	0.320	0.738
101	0.001	0.001	0.002	0.002	0.003	0.107	0.339	0.625	0.846	0.868	0.840	0.721	0.103	0.544
102	0.319	0.274	0.233	0.195	0.196	0.246	0.300	0.357	0.400	0.352	0.321	0.283	0.197	0.182
103	0.025	0.020	0.014	0.009	0.005	0.007	0.009	0.013	0.022	0.012	0.011	0.012	0.017	0.011
104	0.006	0.006	0.006	0.006	0.006	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.000

105	0.547	0.521	0.497	0.466	0.459	0.463	0.451	0.433	0.392	0.329	0.267	0.192	0.106	0.172
106	1.000	1.000	1.000	1.000	1.000	0.943	0.890	0.833	0.777	0.848	0.895	0.928	0.956	0.951
107	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.997	0.995	0.993	1.000
108	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
109	0.682	0.633	0.607	0.573	0.536	0.545	0.565	0.579	0.592	0.712	0.804	0.879	1.000	1.000
110	0.516	0.511	0.501	0.497	0.492	0.512	0.520	0.525	0.527	0.594	0.672	0.775	1.000	1.000
111	0.434	0.461	0.438	0.395	0.455	0.156	0.077	0.041	0.023	0.027	0.029	0.027	0.016	0.016
112	0.513	0.480	0.453	0.423	0.457	0.261	0.170	0.143	0.102	0.170	0.235	0.288	0.278	0.198
113	0.562	0.547	0.548	0.530	0.506	0.395	0.316	0.245	0.194	0.238	0.318	0.445	1.000	1.000
114	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
115	0.951	0.960	0.972	0.978	0.987	0.850	0.728	0.616	0.538	0.614	0.689	0.688	0.716	0.710
116	0.453	0.465	0.488	0.502	0.520	0.506	0.498	0.483	0.466	0.560	0.682	0.830	1.000	1.000
117	0.305	0.314	0.326	0.335	0.336	0.466	0.623	0.794	1.000	1.000	1.000	1.000	1.000	1.000
118	0.990	0.976	0.965	0.953	0.941	0.945	0.958	0.977	1.000	0.922	0.867	0.823	0.764	0.764
119	0.678	0.670	0.699	0.719	0.706	0.659	0.604	0.574	0.534	0.574	0.607	0.616	0.591	0.587
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
122	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
123	0.426	0.414	0.445	0.473	0.458	0.263	0.162	0.116	0.082	0.084	0.089	0.088	0.075	0.077
124	0.008	0.011	0.013	0.015	0.017	0.017	0.018	0.018	0.016	0.017	0.015	0.010	0.004	0.004
125	1.000	1.000	1.000	1.000	1.000	0.866	0.758	0.655	0.572	0.623	0.709	0.800	1.000	1.000
126	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
127	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
128 + 129	0.329	0.330	0.338	0.334	0.329	0.287	0.250	0.206	0.171	0.237	0.343	0.484	0.901	0.900
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000