Towards a Green New Deal: Scenarios for the US Transition to Renewable Energy and Green Infrastructure

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HIGHLIGHTS

1) US carbon gas emissions have declined by 740 million metric tons since 2008, but the year-to-year fluctuations are still large. The largest contributor to carbon emissions are the transportation (28.4%), electricity generation (27.1%) and industrial sector (22.2%).

2) Though investment in renewable energy fluctuates over the years, the last year saw a 25% increase from USD 47.1 billion to USD 59 billion.

3) The current number of jobs in the renewable energy sector stands at 755,600 including the manufacturing sector and 18,290 if only looking at specialized jobs within the sector. The median wages in this sector are approximately $70,360, well above the median US wage.

4) In 2018, the largest sectors in renewable energies to produce electricity were hydropower accounting for 39.8% [317,004 GWh], wind energy accounting for 37.1% [275,834 GWh] and solar energy accounting for 10.9% [85,184 GWh].

5) Biomass energy is most consumed in industrial, transportation and commercial sectors, whereas solar energy is most consumed in residential sectors. Hydropower electricity is used most used in the agricultural sectors.

6) At a total 0.5% of GDP investment (107.15 billion), uniformly distributed across all sectors of the economy, a total of 388,089 sustainable jobs will be created across the economy, with an overall 204 billion increase in output.

7) At a total 1% of GDP (214.3 billion) investment, uniformly distributed across all sectors of the economy, a total of 776,178 sustainable jobs will be created across the economy with an overall 408 billion increase in output.

8) At a total 2% of GDP (428.6 billion) investment, uniformly distributed across all sectors of the economy, a total of 1,552,355 sustainable jobs will be created across the economy with an overall 816.2 billion increase in output.

9) Majority of the jobs created with these investments will be in the administrative and support services, wholesale trade, real estate, primary metals and professional scientific and technical services.

10) The largest increase in output can be seen in the following industries: professional, scientific and technical services, real estate, administrative and support services, wholesale trade and chemical products.

ABSTRACT

With the election of Biden as the next US President and Harris as his Vice President, hopes regarding mitigating global climate change through renewable energy transitions have received a new impetus. Using data from the 2019 input-output table, a set of multipliers are computed for the US. Three different scenarios for transition to renewable energy are computed and analyzed using two different methodologies. It turns out that even modest changes in the direction of renewable energy transitions will help both mitigation of global warming and create new decent jobs in many sectors. Under the first methodology, the study found that with a 0.5% of GDP investment (107.15 billion), uniformly distributed across all sectors of the economy, a total of 388,089 jobs will be created in the renewable energy sector, the number doubles and quadruples to of 776,178 and 1,552,355 accordingly for 1% and 2% of GDP investments. Even under the second methodology, which only focuses on job-growth in the energy-intensive sectors, 1,406,466 would be created in the low assessment, 2,812,933 in the medium, and 5,625,866 jobs will be generated in the high assessment scenarios. Similar trends are seen output growth as well. Thus, there can be a double dividend from a set of renewable energy production and investment policies.

1. Introduction

The main purpose of this paper is to analyze the existing condition of green energy technology investment for the US in a multisectoral context. This can be done by using a multisectoral economy wide model. Such a model can enable the analyst to perform rigorous counterfactual experiments presenting a number of scenarios. In light of these rigorous thought experiments it becomes possible to make appropriate policy recommendations addressing existing gaps and thus find economically efficient and equitable means of green economic growth. In this way of approaching the problem by considering both efficiency and equity, we are following the theoretical lead of Stiglitz and Sen. [1]

The first section focuses, primarily, on historical trends in carbon emissions, investment patterns and consumptions in green technology, with special attention to industry patterns whenever the data is available. The latter section defends the investment into green technology based on two reasons: First, historically, any investment into infrastructure and technology has been one of the most effective means of jobs creation, and second, in addition to the immediate benefits of job creation, it would also, in the long term, create far greater benefits to the entire American public in terms of overall societal productivity, human development and a move towards a cleaner and more efficient economy. Climate change is an impending global crisis that requires immediate attention from governing bodies across the world. It is thus essential to envision economic and job growth in a manner that is not only sustainable for the policymakers but also for the environment.

In this paper, we examine the macroeconomic aspects from a multi-sectoral perspective---- in particular employment impacts--- of an expanded green technology investment program, and what it would take to create many new well-paying jobs for all needy Americans. We develop specific policy scenarios based on different investment levels, with each addressing solutions to the climate change crisis progressively more than the previous– while estimating the employment that would be created if these policies were implemented, with a specific focus on jobs created from the renewable energy sector. We also examine what the long-run impacts of such a program would be

[1] See Stiglitz, Joseph. "How to Restore Equitable and Sustainable Economic Growth in the United States." *American Economic Review* 106, no. 5 (2016) 43-47. In development economics the debate goes back several decades. For a good summary see Khan(2017a,b;2006;1997;1998) and Weiss and Khan(2006).For a recent discussion in the system wide context for the US, see Khan(2020).

in terms of productivity, output and overall economic growth. Finally, we offer some brief observations on both U.S. competitiveness and environmental sustainability that emerge directly from the main findings. This paper also hopes to highlight some of these observations in light of the new US administration, who have identified climate change to be of some degree of import, if not the first priority. While the Biden-Harris's promise to invest up to 1.3 trillion into green technology (Montgomery, 2020) will be contingent on many political factors, there is certainly much value in looking to the many benefits that such investments could bring to the American economy.

2. Some Methodological Issues:

Ideally, one could carry out economy wide modeling in a multisectoral context so that a disaggregated analysis of macroeconomic expenditure policies can be done. However, the data limitations with regards to the construction of a Social Accounting Matrix for a recent enough year preclude such detailed modeling. Nevertheless, with the input-output(I-O) data available from BEA one can arrive at least at a first approximation for a reasonably recent year.[2] These can then be examined in light of longer run econometric issues such as nonstationarity of many macro time-series. Basically, this strategy is followed in this paper. On the one hand, we use the most recent available I-O table from BEA for the year 2019 to derive multipliers and estimate the output and employment effects of increased required government expenditures with a low, medium and high scenario. We then point out some technical issues in the appendix particularly with regards to the relations in the long run between public and private investments.

To elaborate a bit further, any expansion in aggregate demand, including the increase of the investment, will generate some increase in output and employment majorly in two ways. First, the direct output expansion and job creation is generated. For raising the production in the renewable energy sector itself, more employees are needed. Second, the indirect job creation is associated with the increased demand for raw materials, commodities and other services used in the production process. The input- output multiplier could help get the effects directly. The induced effects of the job creation will not be discussed her since the input-output model that we have used does not contain the household indicator.

The input-output model we have used to estimate the impacts of investment into renewable energy in the sectors was retrieved from BEA and contains 71 industries for which the data was last updated in 2019. The input-output model applied to this table could help estimate the employment effects caused by the increase of final demand in a specific industry. For instance, the direct employments increased in construction sector could be estimated for any specific amount of increased spending on construction industry, and the indirect output and employment expansions

[2] For a formal discussion of I-O multipliers and contrasts with SAM-based fixed price multipliers, see appendix 4 of this paper.

caused by the increased production could also be estimated if we look at the effects of increased outputs in other sectors.

More specifically, in order to better understand the benefits of increasing investment, we will construct three policy scenarios and estimate the output and employment effects of these three policies. Though, the investments are distributed uniformly across all the sectors, the employment effects within the renewable energy sector are measured in two different ways: one that estimates a percentage of jobs from each sector coming from the renewable energy sector, whereas the other looks at the overall growth of green jobs as a result of the industrial shift in sectors that have the most amount of energy use currently.

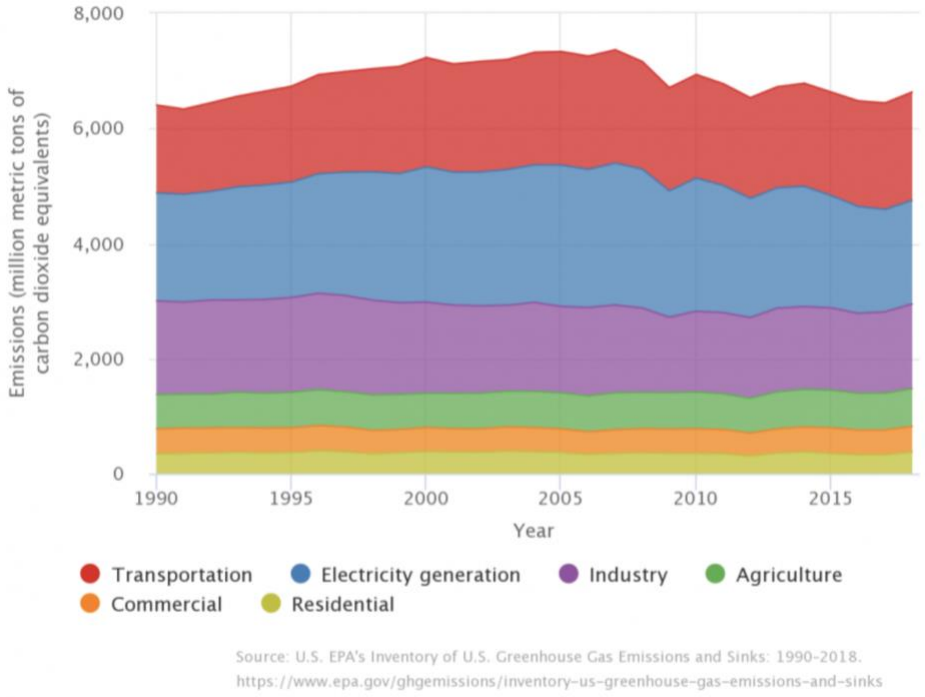
The input-output modeling results given in the remainder of the paper are “macro-aggregates”. Hence it is particularly important to keep these less aggregated sector details in mind as an exemplar of the need for fine-grained intra sectoral details in actual planning for increasing investment in infrastructure. Needless to say, the allocation to specific subsectors and economic activities is always an openly debated and politically determined public policy issue in a democracy.

3. Historical Trends and Current Data on Renewable Energy and Carbon Emissions

3.1. Carbon Emission Trends

Carbon emissions refer to the greenhouse gases released into the air as a result of various human activities, often identified as one of the prime causes for global warming and the deterioration of the climate. Fossil fuels and its many industrial uses remain to this day a large contributor to this, and it is important to look at the US trends in carbon emissions over the last two decades as the United States remains the second largest contributor to carbon emissions to this day (Boden, Marland, and Andres, 2017). Though there has been a steady rise up till 2008, there has been a fluctuating but downwards trend since then attributed to more environmentally conscious choices made both in the policy-making and industrial sectors. This can also be seen in the investments in renewable technology generally rising since this period.

Figure 3. 1. (a) U.S. Greenhouse Gas Emissions by Economics Sector, 1990-2018.

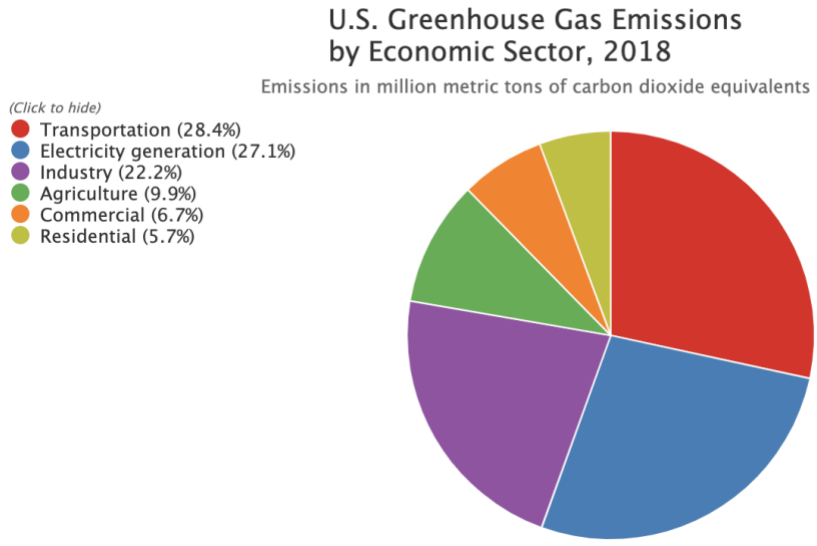


Source: Environmental Protection Agency (2020). "US Greenhouse Gas Emissions by Economic Sector, 1990-2018." US EPA'S Inventory of US Greenhouse Emissions Data. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks

The following figure outlines the greenhouse gas emissions by economic sector for 2018, where it can be seen that the transportation sector, electricity generation and industrial sectors account for the largest contribution to greenhouse gas emissions. It is thus important, in further analysis to

keep in mind that these are sectors that need the most immediate attention for sustainability approaches and the largest investments into green technology.

Figure 3. 1. (b) US Greenhouse Gas Emissions by Economic Sector, 2018.

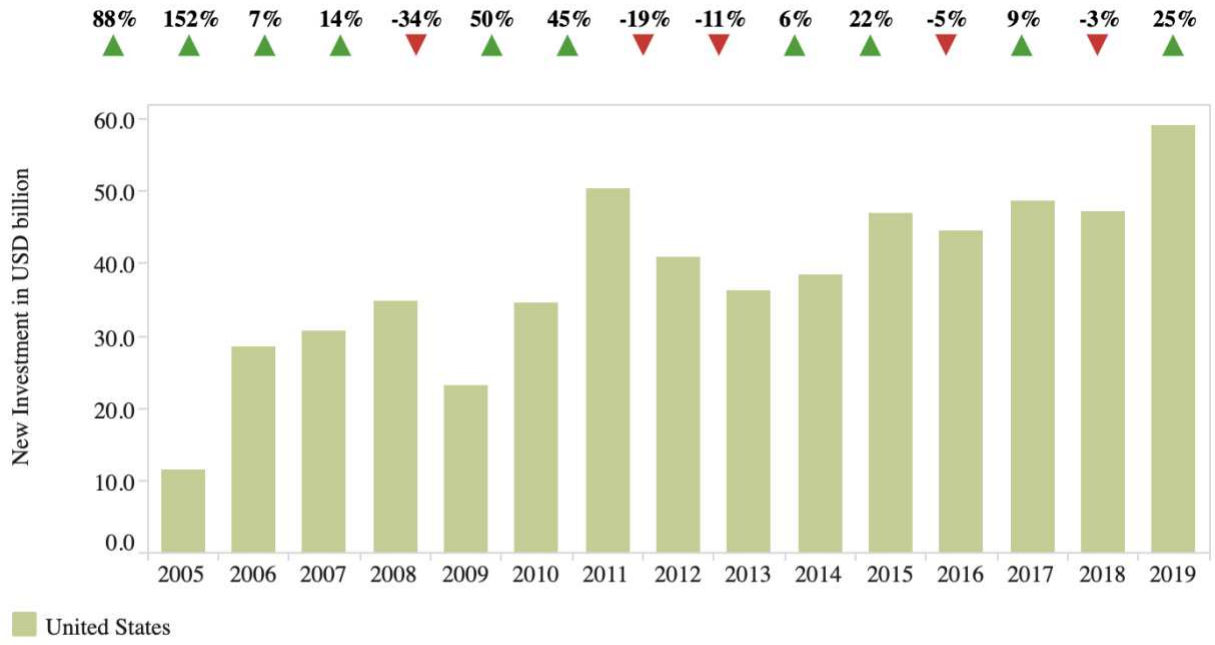


Source: Environmental Protection Agency (2020). "US Greenhouse Gas Emissions by Economic Sector, 2018." US EPA'S Inventory of US Greenhouse Emissions Data. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks

3.2. Investment in Renewable Energy

According to data from IRENA (2020), the total US investment into renewable energy in 2019 was approximately USD 59 billion whereas it was USD 47.1 billion in 2018. There was a 25% increase in investments in the span of the year. A longer trend present in the figure below shows a fluctuating but overall increase in the investments over the last 15 years.

Figure 3.2. Trends in Renewable Energy Investment, 2015-2019



Source Frankfurt School-UNEP Centre/BNEF. 2020.Global Trends in Renewable Energy Investment 2020, http://www.fs-unep-centre.org. Note: Investment volume adjusts for re-invested equity. Buy-outs are not included as new investment. Total values include estimates for undisclosed deals. The regional classification is consistent with BNEF.

Source: IRENA. 2020. "Global Trends in Renewable Energy Investment" International Renewable Energy Agency – Renewable Energy and Jobs 2020 Annual Review. https://www.irena.org/Statistics/View-Data-by-Topic/Finance-and-Investment/Investment-Trends

3.3. Renewable Energy Electricity Production Data

In 2018, the total amount of renewable energy produced were divided in the following manner: hydropower accounted for 39.8% of the total renewable energy production, wind energy accounted for 37.1%; solar energy, 10.9%; solid biofuels: 6.2%; geothermal energy: 2.5%; biogas: 1.8%; renewable municipal waste energy: 1.1% and solar thermal energy accounted for 0.5%.

After collecting the data regarding the amount of electricity produced and cost per GWh for generating electricity in each individual renewable energy sector from IRENA (2020) data. An estimate of the total cost for the production of electricity in each sector for 2018 was calculated. This data is presented in the table below.

Table 3.3. (a) Renewable Energy Production and Costs for 2018

Technology Sector	Amount of Electricity Production	Cost per GWh (Average LCOE)	Total Costs
Bioenergy	67,885 GWh	0.06565/kWh	4,456,650,250
Wind Energy	275,834 GWh	0.084 USD/kWh (avg of onshore and off-shore)	23,170,056,000
Solar Energy	85,184 GWh	0.0684/kWh	5,826,585,600
Geothermal Energy	18,773 GWh	0.0732/kWh	1,374,183,600
Hydropower (including pumped storage)	317,004 GWh	0.0473/kWh	14,994,289,200

Source: IRENA. 2020. "Country Rankings." International Renewable Energy Agency – Renewable Energy and Jobs 2020 Annual Review. https://www.irena.org/Statistics/View-Data-by-Topic/Capacity-and-Generation/Country-Rankings
IRENA. 2020. "Renewable Power Generation Costs in 2019." International Renewable Energy Agency – Abu Dhabi. https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019

The US Energy Information Administration has reports regarding renewable energy consumption by industry (Table 3.3. (b)). Though it is not comprehensive, *and* it does not include agriculture, which would be a notable consumer of renewable energy, it provides enough details to get a general and broad idea of the amount of renewable energy costs overall per sector (Table 3.3. (c)). The costs were estimated using the prices noted from the previous table.

Table 3.3. (b) Renewable Energy Consumption by Sector, in trillion BTU

(in trillion BTU)	Industry	Commercial	Residential	Transport
Hydroelectric Power	10.461	2.069	39.6	
Geothermal Power	4.2	20.004		
Solar Energy	24.429	93.985	221.244	
Wind Energy	0.882	1.585		
Biomass Energy	3270.756	156.474		1657.644
Total Renewable Energy (Other)	2486.434	274.119	778.183	1677.061

Source: Calculated from EIA Data. US Energy Information Agency. 2020. "Energy Consumption by Sector, Annual Data." Renewable and Alternative Fuel Statistics. https://www.eia.gov/renewable/data.php

Table 3.3. (c) Renewable Energy Costs by Sectoral Consumption, in USD

(in USD)	Industry	Commercial	Residential	Transport
Hydroelectric Power	$14,501,258.93	$2,868,091.46	$54,894,355.56	$0.00
Geothermal Power	$9,010,144.08	$42,914,029.09	$0.00	$0.00

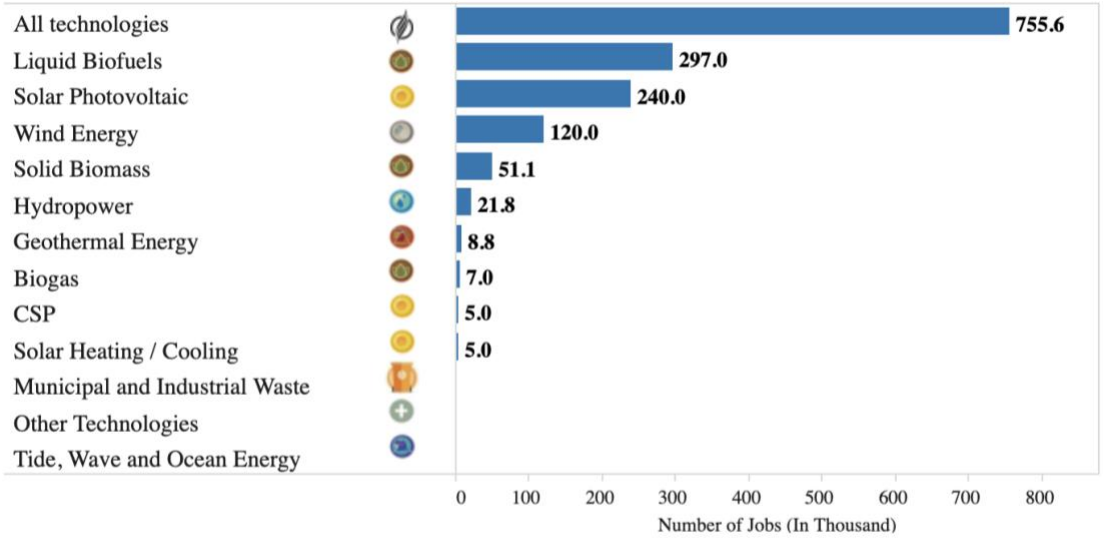
Solar Energy	$48,970,344.09	$188,402,218.22	$443,505,456.91	$0.00
Wind Energy	$2,171,297.02	$3,901,933.98	$0.00	$0.00
Biomass Energy	$6,292,949,425.94	$301,056,687.96	$0.00	$3,189,314,598.28
Total Renewable Energy (Other)	$4,934,022,367.02	$543,955,430.64	$1,544,208,423.65	$3,327,921,225.69

Source: Calculated from EIA Data. US Energy Information Agency. 2020. "Energy Consumption by Sector, Annual Data." Renewable and Alternative Fuel Statistics. https://www.eia.gov/renewable/data.php

3.4. Current Employment Data in the Renewable Energy Sector

The figure below from IRENA, an intergovernmental agency, with primary data from US Bureau of Labor Statistics identifies the number of renewable energy jobs currently present in the United States across all sectors.

Figure 3.4. Renewable Energy Jobs by Renewable Energy Sector in Thousands, including manufacturing



Source IRENA jobs database. Figures provided are the result of a comprehensive review of primary information sources by national entities such as ministries and statistical agencies, and secondary data sources such as regional and global studies.This is an ongoing effort to update and refine available knowledge. Totals may not add up due to rounding.'Other Technologies' include jobs which are not technology specific.

Source: IRENA. 2020. "Renewable Energy Employment By Country." International Renewable Energy Agency – Renewable Energy and Jobs 2020 Annual Review. https://www.irena.org/Statistics/View-Data-by-Topic/Benefits/Renewable-Energy-Employment-by-Country

The table presented below adds more detailed information from 2019 regarding the jobs in electricity production via each renewable energy, including recent data on number of specific jobs (excluding manufacturing), and more comprehensive annual wage data. Most median wages in these sectors are well above the current US median wage which stands at $53,490.

Table 3.4. Renewable Energy Employment and Wage Data, excluding manufacturing

Renewable Energy Sector	Number of Jobs	Annual Wage 25th percentile	Annual Median Wage	Annual Wage 75th percentile
Hydroelectric Power	6,210	50,920	75,490	97,010
Solar Electric Power	2,980	48,410	70,860	110,320
Wind Electric Power	6,200	51,030	69,850	97,850
Geothermal Electric Power	1,060	55,680	71,860	95,050
Biomass Electric Power	1,840	46,110	63,740	87,310

Source: US Bureau of Labor Statistics (2020). "Wage Data by Industry." Current Employee Statistics (National). https://www.bls.gov/ces/data/

4. Actual Estimates of Employment from Increased Investments in Renewable Energy

The tables under each category below presents the estimated job creation under all three investment scenarios, with an uniform investment in all sectors of the economy to determine job growth in (a) all sectors, assuming a 10% of jobs in the renewable sector for each sector and (b) the most energy intensive sectors. To get the estimation, we need to distribute the amount of investment uniformly across all industries. Then the total output increase of each sector caused by the investment increase in final demand is determined and the average wage of all the industries is taken from the Bureau of Labor Statistics in order to determine the employment growth in each sector. 2.1-2.4 show the detailed representatives of the industries, investment and the output breakdown for each industry. Appendix 1.1 shows the wages break-down. Using the input-output multipliers, we can get the total output increase in each sector. Then, using the total output increase amount in each sector divide the average wage in each sector, the estimation of the job creation of each investment level is acquired.

4.1. Employment Outcomes under different Investment levels, estimating an uniform percentage of jobs in the Renewable Energy Sector

Based on this methodology, an increase in renewable energy investment in all sectors of the economy will generate a significant number of jobs across all sectors but the highest number of job growth will be seen in administrative and support services, wholesale trade, real estate, primary metals and professional, scientific and technical services. The total jobs creation will amount to 388,809 jobs for the low investment scenario, 776,178 jobs for the medium investment scenario and 1,552,355 jobs for the high investment scenario.

Table 4.1. Estimated Employment Effects of Increased Spending in Renewable Energy, [assuming 10% of the jobs in renewable energy sector]

Scenario	0.5% of GDP	1% of GDP	2% of GDP
Amount	**107.15 billion**	**214.3 billion**	**428.6 billion**
Sectors			
farms	7,006	14,012	28,023
Forestry, fishing, and related activities	5,852	11,703	23,406
Oil and gas extraction	3,386	6,771	13,542
Mining, except oil and gas	4,496	8,992	17,985
support activities for mining	484	968	1,936
utilities	5,012	10,024	20,048
construction	6,183	12,367	24,733
wood products	7,131	14,262	28,524
nonmetallic mineral products	4,544	9,087	18,175

primary metals	11,790	23,580	47,161
fabricated metal products	9,699	19,397	38,795
machinery	7,601	15,201	30,402
computer and electronic products	3,545	7,090	14,180
electrical equipment, appliances,and components	5,691	11,381	22,762
motor vehicles, bodies and trailers, and parts	9,962	19,923	39,847
other transportation equipment	3,652	7,304	14,609
furniture and related products	4,097	8,195	16,390
miscellaneous manufacturing	3,500	6,999	13,999
food and beverage and tobacco products	9,238	18,476	36,951
textile mills and textile product mills	6,345	12,690	25,380
apparel and leather and allied products	5,688	11,375	22,750
paper products	7,066	14,133	28,265
printing and related support activities	4,815	9,630	19,260
petroleum and coal products	5,554	11,108	22,216
chemical products	12,293	24,585	49,171
plastics and rubber products	9,083	18,166	36,332
wholesale trade	4,408	8,815	17,631
motor vehicle and parts dealers	3,743	7,486	14,971
food and beverage stores	5,842	11,683	23,366
general merchandise store	5,063	10,126	20,251
other retail	5,519	11,038	22,076
Air transportation	2,532	5,064	10,129
Rail transportation	2,252	4,505	9,010
water transportation	2,419	4,838	9,677
truck transportation	3,509	7,017	14,034
transit and ground passenger transportation	5,948	11,896	23,792
pipeline transportation	2,110	4,221	8,442
other transportation and support activities	6,207	12,413	24,826
warehousing and storage	6,392	12,783	25,566
publishing industries, except internet(includes software)	2,311	4,621	9,243
motion picture and sound recording industries	3,230	6,460	12,919
broadcasting and telecommunications	4,350	8,701	17,402
data processing, internet publishing, and other information services	3,462	6,925	13,849
federal reserve banks, credit intermediation, and related services	8,666	17,333	34,666
securities, commodity contracts, and investments	4,983	9,966	19,931
insurance carriers and related activities	7,246	14,493	28,985

funds, trusts, and other financial vehicles	1,858	3,715	7,431
housing	3,401	6,802	13,603
other real estate	14,281	28,563	57,126
rental and leasing services and lessors of intangible assets	6,741	13,481	26,962
legal services	3,125	6,249	12,498
computer systems design and related services	2,861	5,722	11,445
miscellaneous professional, scientific, and technical services	10,568	21,137	42,273
management of companies and enterprises	6,109	12,217	24,434
administrative and support services	16,109	32,217	64,434
waste management and remediation services	4,232	8,464	16,927
educational services	3,040	6,079	12,159
ambulatory health care services	2,747	5,493	10,986
hospitals	2,229	4,458	8,917
Nursing and residential care facilities	3,697	7,394	14,788
social assistance	4,387	8,775	17,550
performing arts, spectator sports, museums, and related activities	5,790	11,580	23,159
amusements, gambling and recreation industries	4,415	8,831	17,661
accommodation	7,134	14,268	28,536
food services and drinking places	10,025	20,049	40,098
other services, except government	6,419	12,838	25,676
federal general government(defense)	2,804	5,609	11,218
federal general government(nondefense)	2,804	5,609	11,218
federal government enterprises	3,435	6,871	13,741
state and local general government	2,804	5,609	11,218
state and local government enterprises	3,172	6,344	12,687
TOTAL	388,089	776,178	1,552,355

Source: Author's Calculation from Input-Output Table and Bureau of Labor Statistics Wage Data.

4.2. Employment Outcomes under different Investment levels, focusing on Energy-Intensive Sectors

Due to the lack of input-output data available on renewable energy sectors to build predictive models on future industry trends in the area, an estimate can instead be built using current energy usage in different industries. Using data from the input-output table, and data from current energy industries like oil, gas and utilities as reference, one can look at the most energy intensive sectors currently by looking at the highest use of energy for oil, gas and utilities across the table. It can be assumed that when renewable energy technology is implemented across the economy, these are

the sectors that will have the largest outcomes in job growth. The table below presents the employment outcomes from these industries and the employment growth from these industries as a result of the three different investment scenarios. It should be noted that while the total employment outcome would be much higher, given the uniform investment across all sectors, the table below just identifies the primary areas of job growth.

Table 4.2. Estimated Employment Effects of Increased Spending in Renewable Energy, [in high intensity sectors]

Scenario	0.5% of GDP	1% of GDP	2% of GDP
Amount	**107.15 billion**	**214.3 billion**	**428.6 billion**
Sectors			
Oil and gas extraction	29,899	59,797	119,595
mining, except oil and gas	45,341	90,683	181,365
support activities for mining	4,679	9,357	18,714
utilities	42,690	85,380	170,760
construction	63,300	126,600	253,200
primary metals	117,902	235,804	471,608
fabricated metal products	96,987	193,975	387,950
machinery	64,076	128,153	256,306
petroleum and coal products	49,610	99,220	198,439
chemical products	88,767	177,534	355,068
wholesale trade	142,508	285,016	570,032
pipeline transportation	24,628	49,256	98,512
other transportation and support activities	69,454	138,908	277,817
federal reserve banks, credit intermediation, and related services	74,308	148,615	297,231
insurance carriers and related activities	72,463	144,927	289,854
rental and leasing services and lessors of intangible assets	72,580	145,161	290,322
legal services	31,349	62,699	125,397
computer systems design and related services	27,786	55,573	111,145
miscellaneous professional, scientific, and technical services	102,485	204,969	409,939
management of companies and enterprises	66,767	133,533	267,066
administrative and support services	156,060	312,120	624,240
TOTAL	1,406,466	2,812,933	5,625,866

Source: Author's Calculation from Input-Output Table and Bureau of Labor Statistics Wage Data.

4.3. Three Macro-Multisectoral Policy Scenarios and Employment Impact Estimation

In order to better provide a range of job estimations for varied spending levels, we refer to the policy proposal mentioned in the PERI paper (2009) to get the updated monetary amount of baseline scenario and high-end scenario investment. In PERI paper, the baseline assessment in

2007 was $87 billion per year which takes 0.6% of the 2007 GDP, and the high-end assessment in 2007 was $148 billion per year which takes 1% of the 2007 GDP. Taking into account the investment into renewable energy in 2019 (approximately $59 billion) and the urgency of the needed investment, the investment scenarios chosen for this paper are instead 0.5%, 1% and 2% of the GDP. If estimated proportionally, the low investment assessment in 2019 would be $107.15 billion, the medium investment would be $214.3 billion, and the high investment scenario would be $428.6 billion. If we could figure out the distribution of the investment spending, the job creation estimates could be calculated using the results in Appendix 1.1.

In contrast with the model used in PERI paper, we did not choose to use the standardized and somewhat rigid commercially marketed IMPLAN Pro 2.0, but rather used our own input-output model; so there are some differences of the distribution of the money amount for each sector. To keep the analysis simple, we assume that the investment distribution for each sector is uniform across all sectors.

4.4. Direct and Indirect Employment effects of the Three Policy Scenarios

Now, we can analyze the job creations under the three policy scenarios. Tables 4.1 and 4.2. shows the estimates. Based on the estimations, under the first methodology, the low assessment will generate around 388,089 more jobs, the medium assessment will generate around 776,178 and the high assessment will generate 1,552,355 more jobs. Under the second methodology, in the most energy-intensive sectors, 1,406,466 would be created in the low assessment, 2,812,933 in the medium, and 5,625,866 jobs will be generated in the high assessment.

If increasing the investment amount by $214.3 billion dollars as suggested by the high investment plan, the job creations of the industries quadruples the amount of the low-investment plan, with certain industries more likely to generate jobs than other industries such as: administrative and support services, wholesale trade, professional scientific and technical services, construction and machinery production. At least, when increasing the investment amount, the growing rates of the job creations in these industries are higher.

In spite of much talk about the decline of manufacturing, this sector is still very important. Undoubtedly, with offshore outsourcing and the advent of labor saving techniques like robotics, computer assisted designing, computer assisted manufacturing and nanotechnologies, the labor component per unit of output will decline in the US and elsewhere much further. Yet, for the next decade at least manufacturing will provide jobs to many. These along with the transportation sectors (if innovations occur in renewable energy technology in transportation) include the subsectors that are the most essential in running a nationally integrated complex production and distribution system. Hence the employment generated by these and the industries linked both backward and forward to these will be significant generators of income and employment in the US in the next few decades.

5. Conclusions

So, where do these estimates and projections---albeit in a simple multisectoral model--- lead us? Even if we lower the estimates by 20 percent, discounting for the fixed price effects and non-substitutability between public and private infrastructure investment, the output and employment effects remain impressive. We discuss the formal problem of substitutability between public and private infrastructure investment Appendix 2. It is not certain that at least in some areas the two types are not complementary. In fact, in roads, rail and air transportation there are both agglomeration effects and complementary private investment opportunities. Likewise, certain types of constructions---ports, storage facilities etc.--- can show complementarity between public and private investment. But there are subtle long run issues involved and these are covered in the appendix.

Assuming for the sake of simplicity that the effects that could generate induced expenditures from different types of households can be ignored actually means the results presented underestimate the total effects to that extent. Since we do not have a social accounting matrix with disaggregated households, the extent of this bias cannot be precisely measured.

Keeping these provisos in the previous two paragraphs in mind, it seems fair to conclude that in order to move to the production possibilities frontier quickly, green renewable energy investments are a must. In addition, both security needs and general infrastructure base improvement and extension will argue strongly for continued renewable energy investments. Hopefully with the reinstatement of the environmental agencies, the renewed regulations and the 2.3 trillion investment plan proposed by the Biden-Harris administration will be able to get through the political barriers and play a role in addressing some of these needs.

Finally, there is an opportunity that arises out of the infrastructure crisis for building “smart, sustainable and resilient” cities in the US. The smart cities slogan sounds rather hollow unless we specify energy savings, transition to green technologies, renewable energies and sustainable transportation infrastructure. It is urgent to transform the transportation sector into a green technology driven sector. Whether the US can meet this challenge as well as many other related challenges in the infrastructure will depend on sound economic analysis and intelligent political

debate. We have tried to contribute to the economic side of the debate in a modest way to get a much-needed intellectual conversation started.

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Appendix 1

1.1. Sector Name, Identifier and Average Wages

Sector ID	Sector Name	Average Industry Wage
S1	farms	50960
S2	Forestry, fishing, and related activities	48390
S3	Oil and gas extraction	141320
S4	minning,except oil and gas	59030
S5	support activities for mining	349280
S6	utilities	77990
S7	construction	44360
S8	wood products	39970
S9	nonmetallic mineral products	58360
S10	primary metals	49280
S11	fabricated metal products	49620
S12	machinery	46830
S13	computer and electronic products	96400
S14	electrical equipment, appliances,and components	46830
S15	motor vehicles, bodies and trailers, and parts	38700
S16	other transportation equipment	61620
S17	furniture and related products	43020
S18	miscellaneous manufacturing	54480
S19	food and beverage and tobacco products	39960
S20	textile mills and textile product mills	41000
S21	apparel and leather and allied products	31980
S22	paper products	48630
S23	printing and related support activities	38360
S24	petroleum and coal products	76460
S25	chemical products	67100
S26	plastics and rubber products	37490
S27	wholesale trade	45180
S28	motor vehicle and parts dealers	40080
S29	food and beverage stores	25680
S30	general merchandise store	29630
S31	other retail	27360
S32	Air transportation	78750
S33	Rail transportation	68240
S34	water transportation	62960
S35	truck transportation	47450
S36	transit and ground passenger transportation	30600
S37	pipeline transportation	71360
S38	other transportation and support activities	49750

S39	warehousing and storage	41110
S40	publishing industries,except internet(includes software)	74970
S41	motion picture and sound recording industries	63650
S42	broadcasting and telecommunications	69880
S43	data processing, internet publishing, and other information services	75330
S44	federal reserve banks, credit intermediation, and related services	49350
S45	securities, commodity contracts, and investments	82980
S46	insurance carriers and related activities	76030
S47	funds, trusts, and other financial vehicles	90260
S48	housing	44110
S49	other real estate	52770
S50	rental and leasing services and lessors of intagible assets	51190
S51	legal services	89490
S52	computer systems design and related services	99230
S53	miscellaneous professional, scientific, and technical services	85720
S54	management of companies and enterprises	87280
S55	administrative and suppport services	41600
S56	waste management and remediation services	50180
S57	educational services	53490
S58	ambulatory health care services	56870
S59	hospitals	67520
S60	Nursing and residential care facilities	40880
S61	social assistance	34200
S62	performing arts, spectator sports,museums, and related activities	37330
S63	amusements, gambling and recreation industries	34550
S64	accomodation	26980
S65	food services and drinking places	26950
S66	other services,except government	44220
S67	federal general government(defense)	53490
S68	federal general government(nondefense)	53490
S69	federal government enterprises	53490
S70	state and local general government	53490
S71	state and local government enterprises	53490

Source: US Bureau of Labor Statistics (2020). “Wage Data by Industry.” Current Employee Statistics (National). https://www.bls.gov/ces/data/
And Input-Output Table Data

Appendix 2

2.1. Output Increases at Different Levels of Investment (in millions)

Sectors	0.5% Investment Level	1% Investment Level	2% Investment Level
farms	2,959	5,917	11,835
Forestry, fishing, and related activities	2,422	4,844	9,688
Oil and gas extraction	4,225	8,451	16,901
minning,except oil and gas	2,676	5,353	10,706
support activities for mining	1,634	3,268	6,537
utilities	3,329	6,659	13,318
construction	2,808	5,616	11,232
wood products	2,565	5,130	10,259
nonmetallic mineral products	2,220	4,440	8,879
primary metals	5,464	10,928	21,856
fabricated metal products	3,958	7,915	15,830
machinery	3,001	6,001	12,003
computer and electronic products	3,287	6,574	13,148
electrical equipment, appliances,and components	2,211	4,422	8,844
motor vehicles, bodies and trailers, and parts	3,125	6,250	12,500
other transportation equipment	2,207	4,413	8,827
furniture and related products	1,713	3,426	6,851
miscellaneous manufacturing	1,823	3,647	7,293
food and beverage and tobacco products	3,067	6,133	12,266
textile mills and textile product mills	2,359	4,718	9,435
apparel and leather and allied products	1,905	3,811	7,621
paper products	2,862	5,725	11,450
printing and related support activities	1,827	3,654	7,309
petroleum and coal products	3,793	7,586	15,173
chemical products	5,956	11,913	23,825
plastics and rubber products	2,847	5,694	11,387
wholesale trade	6,439	12,877	25,754
motor vehicle and parts dealers	1,585	3,169	6,338
food and beverage stores	1,508	3,017	6,034
general merchandise store	1,531	3,063	6,125
other retail	1,928	3,857	7,713

Air transportation	2,069	4,138	8,275
Rail transportation	2,099	4,198	8,395
water transportation	1,657	3,314	6,628
truck transportation	2,819	5,639	11,278
transit and ground passenger transportation	1,684	3,368	6,735
pipeline transportation	1,757	3,515	7,030
other transportation and support activities	3,455	6,911	13,821
warehousing and storage	2,204	4,409	8,817
publishing industries,except internet(includes software)	1,864	3,728	7,455
motion picture and sound recording industries	1,904	3,808	7,616
broadcasting and telecommunications	3,115	6,229	12,458
data processing, internet publishing, and other information services	2,415	4,831	9,661
federal reserve banks, credit intermediation, and related services	3,667	7,334	14,668
securities, commodity contracts, and investments	3,464	6,929	13,857
insurance carriers and related activities	4,697	9,393	18,786
funds, trusts, and other financial vehicles	1,563	3,127	6,254
housing	1,500	3,000	6,000
other real estate	6,629	13,258	26,515
rental and leasing services and lessors of intagible assets	3,715	7,431	14,862
legal services	2,805	5,611	11,222
computer systems design and related services	2,757	5,514	11,029
miscellaneous professional, scientific, and technical services	8,785	17,570	35,140
management of companies and enterprises	5,827	11,655	23,310
administrative and suppport services	6,492	12,984	25,968
waste management and remediation services	2,289	4,578	9,157
educational services	1,628	3,256	6,512

ambulatory health care services	1,573	3,147	6,293
hospitals	1,504	3,007	6,015
Nursing and residential care facilities	1,523	3,046	6,092
social assistance	1,501	3,003	6,006
performing arts, spectator sports,museums, and related activities	2,045	4,089	8,179
amusements, gambling and recreation industries	1,569	3,138	6,277
accomodation	1,853	3,706	7,412
food services and drinking places	2,612	5,223	10,447
other services,except government	2,885	5,771	11,542
federal general government(defense)	1,500	3,000	6,000
federal general government(nondefense)	1,500	3,000	6,000
federal government enterprises	1,965	3,931	7,862
state and local general government	1,500	3,000	6,000
state and local government enterprises	1,644	3,287	6,574
TOTAL	197,272	394,544	789,089

Source: Author's Calculation from the Input-Output Table

2.2. Investment at 0.5% of GDP (21.43 trillion) = 107.15 billion; uniformly distributed at 1.5001 billion per sector (in millions)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15
S1	1,987.35	32.19	2.79	4.66	3.36	1.95	7.44	10.41	6.27	2.54	3.39	3.53	1.00	2.96	6.05
S2	130.11	1,783.25	1.35	4.56	2.17	1.09	16.63	348.50	5.53	3.38	3.34	4.62	1.08	4.16	8.36
S3	48.17	16.29	1,713.77	63.52	32.81	162.92	48.81	24.93	24.64	26.74	16.06	15.46	3.21	21.83	15.48
S4	20.70	2.59	11.01	1,611.23	8.02	44.69	46.57	9.55	182.70	151.10	42.55	26.77	3.11	30.78	33.48
S5	1.67	0.49	47.31	28.27	1,516.38	5.22	2.11	0.85	3.69	3.23	1.15	0.87	0.14	1.11	0.98
S6	46.86	8.20	43.17	55.32	12.08	1,586.24	23.34	36.87	52.69	56.68	39.42	28.45	9.42	26.50	34.79
S7	20.36	2.92	10.58	29.22	17.49	29.17	1,506.93	7.85	11.87	10.32	9.08	7.05	2.90	6.17	7.85
S8	7.41	2.33	2.68	7.64	5.86	2.69	79.82	1,924.60	12.71	8.53	6.63	11.91	3.40	9.84	23.23
S9	9.09	4.33	16.35	16.71	19.56	5.92	117.41	27.29	1,765.00	34.35	20.90	27.44	3.00	39.86	52.05
S10	30.67	8.94	90.14	55.59	46.22	15.62	86.01	56.99	50.18	2,189.68	535.22	314.49	31.91	343.94	371.31
S11	39.93	12.08	65.13	50.00	46.81	15.71	156.67	83.50	69.49	69.03	1,729.53	197.94	23.79	161.73	247.49
S12	44.37	15.03	95.08	117.55	103.75	23.13	67.49	28.63	25.83	35.41	41.76	1,716.73	4.42	47.95	150.30
S13	11.92	3.71	12.94	13.77	18.80	5.17	25.53	31.59	29.96	30.62	45.72	79.18	1,618.18	95.26	126.11
S14	22.98	7.76	11.21	13.16	18.46	4.64	71.39	48.75	9.58	27.61	27.97	106.37	11.30	1,663.82	53.78
S15	18.34	7.22	20.71	39.93	22.65	6.56	18.34	34.54	28.24	21.18	22.38	136.35	4.77	18.78	2,386.42
S16	0.37	1.79	0.34	1.25	0.46	0.46	0.46	1.90	0.55	0.42	0.65	1.16	0.17	0.30	1.99
S17	0.66	0.14	0.47	0.95	0.70	0.75	31.77	6.87	0.53	0.43	0.45	2.51	0.42	0.56	1.04
S18	2.57	0.63	1.85	2.66	2.17	0.89	3.60	2.25	3.57	1.83	1.94	15.77	0.50	15.04	12.31
S19	298.33	22.33	2.72	3.29	3.77	2.45	3.97	8.73	8.66	2.95	3.72	3.52	1.19	2.91	5.28
S20	3.61	2.99	1.32	2.29	1.72	0.75	8.62	17.35	10.15	1.73	1.95	10.39	0.48	2.49	29.45
S21	0.54	0.15	0.24	0.32	0.28	0.15	0.36	0.57	0.45	0.26	0.29	0.84	0.08	0.24	9.52
S22	25.10	3.92	7.18	12.23	7.90	4.19	16.53	24.46	38.33	23.46	27.41	26.44	4.84	30.78	34.65
S23	1.25	0.49	1.48	1.44	1.68	1.17	1.22	1.71	1.47	1.29	1.66	1.53	0.71	1.15	1.45
S24	69.46	24.25	44.34	94.91	50.82	82.77	75.08	34.52	31.95	35.52	20.13	20.47	3.79	30.96	18.99
S25	272.45	102.13	95.88	113.84	59.73	31.98	88.57	125.88	147.71	58.86	95.06	93.20	23.71	96.11	169.73
S26	29.09	8.27	10.53	35.12	22.45	5.89	62.04	28.43	36.00	17.90	26.31	59.69	7.51	40.44	148.19
S27	12.41	2.23	3.78	5.46	3.43	4.93	5.32	9.51	8.74	12.35	10.54	19.33	3.85	25.84	10.37
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	3.24	0.77	3.10	3.36	7.87	4.71	3.45	6.02	6.94	4.83	6.76	5.38	1.43	3.23	4.82
S33	0.06	0.03	0.08	0.10	0.10	0.47	0.07	0.13	0.10	0.08	0.10	0.08	0.04	0.07	0.08
S34	0.05	0.02	0.09	0.09	0.11	0.06	0.08	0.08	0.08	0.07	0.09	0.09	0.05	0.07	0.08
S35	1.27	0.23	0.55	0.83	2.56	0.59	0.93	3.51	1.49	1.91	3.27	1.66	0.84	1.23	1.72
S36	1.95	0.59	2.06	2.06	3.89	7.61	2.60	3.07	3.58	2.71	3.57	2.87	0.90	1.81	2.66
S37	0.06	0.02	2.11	0.08	0.04	0.20	0.06	0.03	0.03	0.03	0.02	0.02	0.00	0.03	0.02
S38	4.85	8.21	4.34	30.20	5.07	31.80	6.20	23.36	22.64	8.50	6.78	5.35	1.80	4.80	5.86
S39	7.40	1.58	2.73	9.75	3.07	3.43	9.33	69.68	31.39	5.45	12.55	9.24	10.26	6.73	11.75
S40	0.92	0.30	1.38	1.10	1.17	1.26	1.37	1.00	1.00	0.90	1.38	1.35	0.75	0.79	1.19
S41	0.91	0.30	1.31	1.06	1.50	0.97	1.19	1.00	1.10	0.85	1.19	1.07	0.45	0.75	0.96
S42	10.14	3.14	15.16	11.56	16.23	11.16	13.74	10.78	11.97	8.77	12.70	11.51	4.38	8.03	9.99

S43	5.43	1.79	7.68	6.92	7.46	9.63	8.77	17.03	14.87	13.31	18.21	14.83	5.00	9.83	12.14
S44	24.59	5.77	31.24	26.02	38.19	36.22	21.20	16.06	26.19	20.07	22.94	21.64	9.84	16.00	20.41
S45	7.12	2.94	30.63	35.48	78.18	9.13	8.86	6.18	10.10	18.06	16.71	15.68	3.54	10.32	13.33
S46	37.28	44.28	91.27	57.87	71.07	19.87	15.59	24.83	37.38	21.77	19.70	22.15	6.50	26.31	21.78
S47	0.29	0.34	0.71	0.45	0.55	0.15	0.12	0.19	0.29	0.17	0.16	0.18	0.06	0.21	0.17
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	150.53	13.87	39.49	29.95	33.12	31.32	45.88	43.36	39.19	25.20	50.58	38.56	30.89	29.26	38.96
S50	30.58	8.58	44.81	38.77	56.48	13.25	32.65	15.20	24.72	18.97	23.77	22.52	7.83	17.48	21.68
S51	10.55	4.85	25.60	18.11	26.34	16.99	14.12	19.12	14.89	14.46	23.97	17.34	16.86	11.41	18.98
S52	8.63	3.37	54.71	14.81	9.19	13.83	12.39	10.22	11.19	9.48	16.38	21.70	6.49	8.34	12.65
S53	59.16	27.29	89.24	90.64	128.22	69.00	97.42	93.74	86.95	84.95	105.44	87.11	53.44	68.77	88.50
S54	33.51	9.16	105.86	84.26	40.38	22.98	37.73	39.36	56.18	39.25	73.40	114.72	84.02	49.16	98.86
S55	37.98	9.52	36.77	38.50	47.03	66.10	38.03	40.26	47.92	50.05	71.33	44.21	23.84	33.99	49.25
S56	5.77	1.33	10.99	7.69	6.52	4.90	5.95	4.92	6.86	6.04	5.40	4.10	1.34	3.57	4.48
S57	0.29	0.22	0.19	0.21	0.24	0.98	0.23	0.28	0.29	0.28	0.32	0.26	0.10	0.21	0.26
S58	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	2.38	0.60	2.32	2.01	2.48	1.86	2.08	2.39	2.49	2.10	2.77	2.62	1.26	1.64	2.40
S63	0.19	0.03	0.18	0.17	0.26	0.17	0.18	0.20	0.23	0.17	0.25	0.24	0.11	0.13	0.22
S64	2.92	0.72	2.97	2.98	5.97	4.78	3.11	4.60	5.35	3.89	5.38	4.38	1.37	2.74	4.00
S65	9.47	2.83	6.59	6.60	13.19	9.35	6.20	9.27	9.82	7.77	10.11	8.60	3.29	5.75	7.91
S66	10.63	12.51	9.05	9.97	16.03	6.45	15.53	17.02	18.99	17.90	18.98	14.28	4.82	10.99	15.66
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	0.82	0.34	1.21	1.47	2.20	1.27	0.85	1.00	0.95	1.07	1.26	2.40	0.38	2.69	1.06
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	1.60	0.53	1.17	1.27	1.00	9.71	1.21	2.00	2.91	2.75	2.34	1.82	0.61	1.67	2.05

	S16	**S17**	**S18**	**S19**	**S20**	**S21**	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
S1	2.48	9.81	10.79	729.32	88.81	71.46	17.46	16.01	3.92	40.79	17.07	6.53	11.30	32.18	12.57
S2	2.68	47.89	9.90	76.46	10.32	18.45	114.64	16.21	1.76	8.30	28.03	3.27	2.73	13.98	2.85
S3	7.88	20.09	14.30	31.11	23.90	12.97	26.27	36.81	993.09	46.27	28.19	15.63	16.15	17.39	13.54
S4	13.78	19.24	14.11	18.09	14.18	5.90	24.32	8.93	21.17	21.39	15.31	3.39	4.46	5.01	4.27
S5	0.45	0.87	0.63	1.16	0.89	0.46	1.13	1.16	27.66	1.63	1.03	0.49	0.52	0.56	0.45
S6	18.34	35.92	23.00	45.63	55.55	27.60	62.66	45.46	47.94	47.15	54.11	31.58	43.01	77.81	63.19
S7	5.43	8.89	6.07	13.69	10.37	7.02	12.93	11.95	28.53	9.42	10.55	11.88	14.64	17.80	16.96
S8	6.80	229.43	20.24	10.71	7.54	4.57	92.81	12.91	3.38	4.91	21.06	8.18	5.49	11.05	5.14
S9	10.80	23.60	17.92	24.54	16.67	6.81	15.27	7.32	20.92	13.52	25.90	4.45	8.04	5.80	6.07
S10	153.82	188.10	120.34	55.12	45.23	24.19	53.83	36.95	57.55	28.24	58.09	13.76	19.45	13.10	10.82
S11	118.23	128.50	80.91	75.46	51.86	43.85	95.62	65.75	46.55	52.69	92.89	15.86	20.53	15.73	13.14
S12	54.04	19.89	29.19	37.75	18.83	12.30	31.84	50.27	60.30	38.34	36.17	11.84	13.36	10.10	8.96
S13	157.50	51.14	44.58	20.12	42.37	24.76	25.34	54.76	12.60	28.46	37.57	23.53	17.49	10.13	12.81
S14	28.55	17.82	23.01	16.95	10.65	6.75	17.57	13.62	9.45	10.54	22.92	5.41	7.90	5.73	7.55
S15	60.44	27.86	19.77	25.48	16.67	9.64	34.33	24.13	16.00	15.88	20.42	18.99	65.22	27.03	13.30

S16	1,911.15	0.67	0.39	0.43	0.39	0.37	0.57	0.51	0.35	0.31	0.46	0.86	1.34	0.45	0.48
S17	2.82	1,597.99	5.48	0.62	0.47	0.45	0.86	0.59	0.80	0.46	3.56	1.40	2.64	0.68	0.80
S18	2.11	2.05	1,571.83	1.96	5.68	21.48	1.76	2.42	1.54	3.08	3.24	2.88	4.54	2.31	1.58
S19	2.48	6.57	5.33	2,021.51	22.75	165.94	26.10	29.44	4.75	22.05	11.87	8.74	5.44	43.80	16.39
S20	9.23	89.26	28.77	5.78	1,824.91	227.70	49.22	21.00	1.74	2.46	27.62	5.00	3.09	3.44	48.51
S21	0.49	1.76	1.44	0.50	30.72	1,686.70	1.14	31.81	0.27	0.28	0.73	1.68	2.28	0.50	3.42
S22	14.43	54.72	38.23	106.78	38.61	29.59	1,980.76	214.98	8.20	34.91	62.72	16.41	7.88	25.28	12.13
S23	1.18	1.79	1.49	1.83	1.83	3.52	1.58	1,530.21	1.40	2.55	1.96	11.42	3.26	3.17	3.25
S24	9.90	25.97	18.54	42.81	25.56	15.94	31.84	51.26	1,596.38	45.51	31.12	20.79	20.37	18.46	13.95
S25	54.73	201.14	164.91	181.74	605.90	155.03	297.10	258.62	117.83	2,248.55	758.39	32.51	34.74	35.64	38.81
S26	36.08	150.78	81.42	71.75	37.11	48.97	53.06	33.91	12.05	52.73	1,663.42	22.12	31.62	25.92	10.83
S27	3.97	16.17	25.07	16.41	15.20	8.57	17.50	7.52	3.60	15.81	19.42	1,539.68	15.38	4.55	2.20
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.32	0.00	3.52
S32	4.24	8.02	5.24	5.09	4.47	4.77	5.19	10.21	3.56	3.48	6.67	10.40	4.97	4.26	4.76
S33	0.06	0.11	0.09	0.08	0.11	0.09	0.11	0.15	0.09	0.06	0.11	0.29	0.26	0.23	0.19
S34	0.07	0.10	0.09	0.08	0.09	0.10	0.08	0.10	0.08	0.07	0.09	0.20	0.16	0.12	0.14
S35	0.94	3.07	2.05	1.21	2.38	1.94	2.50	2.40	2.19	0.86	2.41	3.73	8.41	5.80	7.22
S36	2.29	4.02	3.01	2.78	2.51	2.66	2.86	4.96	2.18	2.05	3.47	3.69	3.23	2.68	2.92
S37	0.01	0.02	0.02	0.04	0.03	0.02	0.03	0.05	1.22	0.06	0.03	0.02	0.02	0.02	0.02
S38	3.42	14.66	7.10	7.25	8.47	5.14	12.66	15.19	9.57	5.21	10.89	51.63	21.49	12.51	11.40
S39	5.37	21.53	12.63	17.03	62.12	42.85	47.09	46.26	14.08	14.37	48.57	23.47	53.61	54.47	75.24
S40	1.36	1.27	1.27	1.13	1.15	1.24	1.10	2.34	1.22	1.06	1.21	3.53	2.98	1.82	2.68
S41	0.80	1.20	1.06	1.06	1.04	1.07	1.01	1.59	1.14	0.84	1.16	2.47	4.43	3.33	1.60
S42	8.25	12.60	11.34	11.25	10.91	11.06	10.66	18.00	12.87	8.71	12.45	29.06	25.21	15.37	16.98
S43	11.75	19.70	13.11	9.99	12.83	13.70	14.33	15.66	8.36	7.70	14.35	13.30	24.14	15.52	16.13
S44	16.47	26.67	20.19	25.69	22.25	25.59	16.93	22.67	24.30	16.63	24.23	39.40	31.77	41.48	51.00
S45	10.24	17.33	12.80	7.73	6.63	6.85	6.57	7.52	20.21	5.91	7.19	10.68	7.15	8.75	13.13
S46	28.97	29.00	19.07	32.61	33.00	45.18	20.62	19.00	58.21	19.81	21.74	52.84	40.02	31.09	31.82
S47	0.23	0.23	0.15	0.26	0.26	0.36	0.16	0.15	0.46	0.16	0.17	0.41	0.31	0.24	0.26
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	46.23	59.14	40.69	84.84	62.57	51.37	46.82	74.82	33.69	37.83	54.41	130.89	141.09	197.28	179.55
S50	18.42	17.92	21.79	28.81	19.75	22.69	22.20	25.35	35.97	25.48	22.37	43.43	19.28	22.88	34.67
S51	23.83	18.57	21.57	12.45	17.32	17.88	18.03	21.16	21.33	16.55	20.42	21.00	12.27	11.11	16.73
S52	14.78	12.75	11.46	11.59	12.08	12.22	10.83	18.77	37.73	10.90	12.25	23.53	25.75	12.71	20.10
S53	77.64	120.68	99.71	88.41	101.57	109.31	86.82	102.68	81.97	76.19	103.67	156.95	174.30	110.87	134.17
S54	61.65	47.82	61.41	83.15	79.15	102.92	61.50	55.56	97.86	84.55	64.92	97.31	30.14	54.07	179.88
S55	55.01	45.45	42.53	43.49	49.15	67.57	50.20	100.83	40.96	39.23	51.44	108.45	78.68	71.19	78.25
S56	3.41	6.45	3.96	7.56	8.00	4.52	7.23	6.31	9.79	8.66	7.44	6.31	10.60	8.23	6.94
S57	0.19	0.28	0.24	0.30	0.29	0.26	0.36	2.15	0.33	0.25	0.34	2.92	0.74	9.18	0.42
S58	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	1.96	2.76	2.32	2.75	2.56	2.72	2.47	3.47	2.36	1.94	2.83	5.81	7.59	7.10	4.35
S63	0.18	0.26	0.21	0.24	0.17	0.19	0.20	0.34	0.19	0.17	0.24	0.39	0.19	0.36	0.29

S64	3.49	6.09	4.57	4.17	3.85	4.01	4.19	9.26	3.16	3.00	5.56	6.09	3.95	4.30	4.44
S65	6.90	11.07	8.43	9.85	8.71	8.98	8.55	13.90	7.26	6.11	10.07	15.60	14.67	16.04	16.43
S66	9.32	15.73	12.17	15.87	16.52	11.69	26.76	21.42	12.37	16.30	19.74	34.14	21.98	29.62	25.37
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	0.74	1.18	1.22	0.91	1.03	0.88	0.98	2.15	1.25	0.91	1.09	12.59	4.46	3.53	3.21
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	1.26	2.39	1.72	3.14	3.90	2.26	3.47	2.63	2.29	4.38	3.35	2.31	3.46	3.44	2.74

	S31	**S32**	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**	**S41**	**S42**	**S43**	**S44**	**S45**
S1	6.77	11.11	2.31	13.53	3.27	2.78	0.85	4.80	3.08	1.69	3.25	2.83	3.76	2.45	3.05
S2	3.26	2.73	13.82	2.79	2.05	2.86	0.55	3.70	3.10	1.43	1.78	2.25	3.31	1.32	1.49
S3	15.97	82.36	109.04	62.99	102.26	49.61	4.12	102.81	23.17	4.73	8.31	7.92	10.12	16.13	17.15
S4	4.78	3.23	11.01	5.58	4.93	3.93	1.79	5.29	7.97	1.41	2.49	5.06	5.64	1.89	2.21
S5	0.52	2.32	3.18	1.83	2.90	1.43	0.15	2.92	0.77	0.16	0.28	0.31	0.38	0.48	0.51
S6	53.90	13.05	14.46	20.60	24.26	17.21	11.99	18.03	138.49	8.17	16.86	17.96	17.30	15.09	17.11
S7	20.89	8.12	42.11	10.13	11.30	18.86	11.28	16.92	27.22	3.18	7.72	10.10	6.99	10.64	11.96
S8	8.39	2.15	72.42	3.52	4.57	4.20	1.29	5.04	9.56	2.02	4.13	6.28	11.23	2.59	2.87
S9	8.07	4.12	8.78	5.63	6.11	5.09	2.03	6.26	9.84	1.64	2.87	13.62	8.89	2.93	3.40
S10	17.39	10.99	48.69	38.38	21.75	17.56	11.83	25.57	25.78	5.64	6.89	24.48	15.46	5.38	6.79
S11	19.98	12.30	31.50	81.50	24.53	23.35	33.00	26.52	28.42	9.80	8.40	46.42	20.95	7.04	9.01
S12	11.60	12.57	20.74	17.97	20.41	15.31	4.96	52.46	21.05	4.09	6.06	13.98	12.18	4.29	5.72
S13	15.82	5.49	13.33	17.10	11.07	9.22	3.14	10.41	14.03	21.84	17.60	64.99	35.71	6.10	9.07
S14	7.01	3.27	11.35	7.64	6.20	15.46	2.21	7.20	16.07	2.22	3.48	23.15	7.27	3.30	3.94
S15	27.33	6.08	10.66	14.62	48.42	25.62	2.37	12.07	75.22	5.08	8.11	11.95	9.05	4.21	5.53
S16	0.74	11.12	44.97	88.58	2.26	1.42	0.29	11.41	0.51	0.32	0.68	0.57	0.72	0.44	0.65
S17	4.20	0.41	1.33	2.68	1.12	0.72	0.34	0.92	0.89	0.24	0.65	1.34	2.35	0.50	1.15
S18	4.72	1.08	1.13	1.89	1.81	2.68	0.45	3.48	6.50	0.65	1.19	2.09	2.01	1.30	1.21
S19	9.79	26.64	2.70	31.15	4.98	3.82	1.17	5.20	3.65	2.60	5.75	4.48	6.00	4.42	5.59
S20	7.36	1.03	1.82	9.12	1.99	1.86	0.41	3.15	2.26	0.99	3.76	1.94	1.72	0.78	1.00
S21	2.13	0.23	0.24	0.57	0.68	0.49	0.11	0.44	0.54	0.60	1.04	3.28	0.95	0.25	0.40
S22	14.00	8.26	7.74	11.91	10.88	32.91	2.92	36.14	14.56	15.53	9.19	9.00	12.12	7.58	7.57
S23	13.80	1.85	1.75	3.58	4.78	4.43	0.77	6.65	1.63	21.61	15.20	4.07	31.74	3.42	7.66
S24	18.79	131.08	173.86	96.85	161.08	77.57	4.56	163.14	20.25	6.38	10.98	10.26	13.79	23.90	24.70
S25	36.89	21.18	37.65	33.74	33.27	24.87	7.51	42.69	60.91	17.04	22.31	27.75	30.39	13.42	17.29
S26	21.56	8.68	8.87	11.61	16.75	8.55	4.65	35.19	18.67	5.15	6.81	20.82	9.31	4.28	5.26
S27	27.05	3.34	3.46	2.31	2.77	2.38	0.61	2.28	2.36	4.34	1.82	4.82	1.91	0.95	1.34
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	1,501.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	5.93	1,505.41	3.90	15.98	10.88	5.50	1.27	9.49	5.51	4.85	9.95	8.11	13.25	10.92	16.88
S33	0.29	0.30	1,501.63	0.65	16.24	0.15	0.14	2.06	0.46	0.07	0.14	0.51	0.16	0.11	0.25
S34	0.20	0.05	0.08	1,500.68	0.23	0.11	0.16	0.09	0.09	0.08	0.18	0.15	0.18	0.13	0.30
S35	6.14	7.99	3.47	4.54	1,522.77	1.96	0.49	16.07	1.48	0.82	1.48	0.61	1.69	0.36	0.60
S36	3.71	1.83	10.68	4.07	2.49	1,503.18	0.90	2.65	3.31	2.57	6.19	7.66	7.70	6.50	8.38
S37	0.02	0.10	0.13	0.08	0.13	0.06	1,500.11	0.13	0.03	0.01	0.01	0.01	0.01	0.02	0.02

S38	31.43	161.94	45.30	151.63	213.18	21.27	14.76	1,711.87	23.89	11.23	21.75	7.05	23.27	5.61	14.88
S39	44.66	3.45	5.65	27.68	47.93	6.21	1.22	10.90	1,625.93	4.14	5.64	4.48	6.71	1.37	1.74
S40	2.96	1.19	2.22	2.60	2.02	1.63	0.48	3.90	2.44	1,557.37	2.22	3.49	8.63	1.92	4.26
S41	3.11	1.55	1.16	1.90	2.65	2.80	3.42	2.57	1.54	1.52	1,750.99	109.82	3.42	2.24	2.77
S42	32.30	12.57	11.44	22.03	33.96	36.99	16.76	33.24	18.43	16.95	16.91	1,730.91	42.73	26.74	31.96
S43	20.02	8.62	8.08	14.64	10.54	12.73	3.54	12.25	9.43	13.54	10.61	19.49	1,568.09	21.55	18.46
S44	51.71	35.59	94.65	62.45	48.27	203.28	8.26	23.91	36.63	16.45	38.36	27.23	24.45	1,586.08	156.84
S45	10.03	49.09	27.49	279.20	16.97	53.80	4.28	21.55	7.82	4.66	11.35	6.75	6.27	72.43	1,670.80
S46	38.72	18.45	17.76	47.08	99.61	120.88	12.94	36.12	52.11	8.90	46.69	22.44	18.76	24.01	67.81
S47	0.30	0.14	0.14	0.37	0.77	0.94	0.10	0.28	0.40	0.07	0.36	0.18	0.15	0.19	0.53
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	236.47	36.57	30.54	65.89	68.25	67.12	12.53	45.34	275.15	35.75	98.93	69.72	78.12	89.02	120.30
S50	31.46	83.99	98.34	35.32	59.76	57.86	4.93	22.01	24.35	15.69	47.39	40.33	40.39	21.75	32.39
S51	17.77	8.54	17.23	21.39	12.64	15.01	6.55	12.61	13.64	16.12	20.40	18.57	22.54	13.76	30.70
S52	18.51	9.33	33.27	17.27	16.93	15.00	2.90	11.91	11.46	29.46	16.11	24.05	47.39	22.16	33.77
S53	185.61	47.58	92.12	119.59	80.98	97.94	69.71	62.68	82.07	88.19	204.59	180.85	193.21	136.49	174.95
S54	63.54	34.07	26.14	72.99	65.23	41.88	6.93	51.33	28.33	36.39	29.13	28.88	30.22	23.31	56.05
S55	110.86	90.23	58.13	246.46	108.44	151.69	36.65	83.86	109.70	66.31	77.13	93.51	159.34	72.51	86.05
S56	8.59	3.01	4.42	5.91	8.99	5.50	1.21	6.10	16.19	1.77	3.11	2.97	2.96	3.59	3.42
S57	11.48	1.68	1.20	0.73	0.78	0.55	0.43	0.88	0.44	0.23	1.56	1.17	1.38	0.36	0.46
S58	0.03	0.01	0.01	0.03	0.02	0.02	0.01	0.02	0.02	0.01	0.08	0.05	0.03	0.02	0.02
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	5.73	2.85	6.58	3.89	4.38	4.24	1.42	5.33	3.97	2.66	126.66	65.34	5.16	5.18	6.02
S63	0.68	0.17	0.14	0.31	0.19	0.22	0.05	0.17	0.21	0.18	0.41	0.35	0.50	0.40	0.55
S64	5.53	3.22	3.49	6.90	4.02	4.75	1.28	7.62	5.87	4.41	8.77	7.82	13.77	11.11	15.05
S65	19.05	110.17	6.57	15.30	17.16	14.24	3.69	16.74	13.72	6.94	16.74	12.41	18.53	20.41	22.84
S66	27.22	11.79	11.36	17.37	63.50	36.17	8.11	24.15	22.54	6.98	10.60	15.49	20.01	15.89	18.25
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	7.66	2.50	1.51	88.43	28.77	6.67	1.38	6.87	4.24	2.56	5.32	1.85	5.42	5.33	30.95
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	3.17	1.20	1.13	1.77	2.53	1.46	0.56	1.86	7.23	0.87	1.65	1.45	1.48	1.56	1.63

	S46	**S47**	**S48**	**S49**	**S50**	**S51**	**S52**	**S53**	**S54**	**S55**	**S56**	**S57**	**S58**	**S59**	**S60**
S1	1.98	2.94	0.66	6.06	2.48	2.40	2.22	8.40	2.88	11.54	3.38	15.99	5.02	12.06	26.32
S2	1.04	1.38	0.93	5.29	1.99	1.26	0.94	2.90	1.42	3.19	2.12	3.15	2.22	3.34	5.09
S3	5.26	19.68	2.82	31.55	15.06	5.93	5.47	9.54	10.80	15.85	26.42	10.66	8.26	12.49	13.51
S4	1.58	2.48	1.82	9.56	2.79	1.65	1.40	4.97	2.93	4.50	7.14	4.51	3.38	4.40	4.37
S5	0.17	0.59	0.11	1.03	0.46	0.19	0.18	0.40	0.36	0.52	0.85	0.37	0.29	0.42	0.45
S6	16.30	28.52	2.62	137.32	17.59	15.52	6.69	16.17	35.08	18.00	19.45	44.49	17.29	29.14	35.88
S7	10.93	12.23	49.05	102.46	7.54	9.57	3.08	7.49	10.33	7.46	6.60	13.92	7.66	10.53	15.94
S8	2.53	2.64	3.97	20.10	4.77	2.60	1.44	3.98	2.76	5.37	3.71	3.40	3.53	4.77	4.74
S9	2.27	3.30	4.28	11.98	5.51	2.31	2.31	9.81	3.42	7.19	9.90	3.63	8.51	9.94	6.72
S10	4.95	6.69	4.19	23.72	12.16	4.74	7.05	14.91	8.46	17.12	52.11	10.35	9.52	13.15	12.50
S11	5.92	8.80	6.39	27.80	16.07	6.25	10.23	18.70	11.65	20.35	68.37	11.74	11.13	15.52	14.15

S12	6.19	5.77	2.75	13.58	18.54	3.73	8.50	10.97	7.60	16.45	81.75	12.41	7.43	9.67	8.99
S13	4.59	14.62	1.92	10.71	8.68	10.58	26.17	18.33	33.10	19.18	24.02	8.87	24.37	10.48	9.19
S14	2.86	3.76	2.73	12.83	5.27	2.78	6.86	11.66	4.32	11.14	27.50	7.93	3.68	6.42	13.36
S15	3.75	5.12	1.15	9.59	15.27	3.58	4.19	12.61	8.45	31.24	50.93	6.07	5.81	10.56	7.80
S16	0.34	0.59	0.05	0.74	0.42	0.34	0.37	3.82	0.70	0.72	1.39	0.34	0.33	0.48	0.41
S17	0.39	0.91	8.30	2.61	0.45	0.47	0.23	1.00	0.48	0.50	0.51	0.51	1.34	0.88	0.64
S18	0.84	1.10	0.24	2.95	1.49	1.06	1.00	4.70	1.17	5.79	10.33	3.27	36.39	46.96	10.35
S19	3.60	5.56	0.89	9.25	3.82	4.30	3.72	14.39	4.85	8.38	4.81	40.14	6.95	26.00	64.78
S20	0.62	0.90	0.76	2.17	2.66	0.72	0.64	1.96	0.92	2.48	5.60	1.19	1.91	3.80	27.17
S21	0.29	0.36	0.05	0.42	0.87	0.27	0.19	0.49	0.37	1.13	2.90	0.64	0.47	0.99	0.73
S22	3.68	6.26	1.37	10.83	11.45	6.56	4.86	12.83	7.12	17.45	13.86	6.91	8.91	15.35	21.38
S23	5.31	5.87	0.31	3.00	3.36	4.69	2.28	9.09	4.51	7.58	2.16	5.78	4.03	7.46	2.81
S24	6.39	27.78	4.17	34.41	21.45	7.25	7.79	12.62	12.95	22.56	39.55	11.77	9.88	15.38	16.61
S25	11.61	15.78	5.58	60.62	21.90	14.48	11.51	49.89	22.76	45.84	50.06	21.25	118.19	100.86	66.74
S26	3.58	4.88	3.16	12.41	15.03	3.95	5.55	15.02	5.78	13.00	19.34	8.36	22.90	17.95	21.14
S27	0.81	1.21	0.34	2.12	31.66	0.94	1.15	1.82	2.01	1.99	4.16	1.46	2.50	2.75	2.24
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	4.40	15.61	1.26	17.33	8.50	9.87	10.42	10.41	5.23	17.83	13.23	6.48	8.12	5.19	7.62
S33	0.39	0.21	0.01	0.17	0.15	0.24	0.11	0.48	0.10	0.31	0.11	0.07	0.08	0.17	0.09
S34	0.09	0.23	0.01	0.17	0.09	0.08	0.09	1.25	0.36	0.13	0.09	1.37	0.08	0.23	0.10
S35	0.29	0.55	0.08	0.65	0.97	0.64	0.43	1.89	0.43	0.98	1.44	0.39	0.56	0.82	0.62
S36	5.35	7.84	1.09	9.91	4.91	6.36	5.92	10.05	3.45	10.65	5.95	3.93	5.26	6.21	7.81
S37	0.01	0.02	0.00	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.02	0.02
S38	3.85	11.53	0.73	9.43	14.90	7.98	5.28	20.23	6.33	11.81	29.12	5.80	6.63	10.29	7.63
S39	1.17	1.66	0.54	3.58	4.19	2.16	1.63	3.62	1.74	6.00	4.75	2.35	3.57	4.64	4.64
S40	1.39	3.47	0.22	2.35	2.42	6.75	4.09	6.22	6.95	5.40	1.44	4.03	3.56	3.66	1.94
S41	1.85	2.88	0.36	3.27	3.78	2.59	1.78	5.05	2.78	3.13	1.84	18.46	1.62	1.82	15.18
S42	23.00	34.86	4.56	35.99	17.12	33.35	20.26	25.94	25.67	36.40	20.86	18.62	17.46	19.59	17.80
S43	8.58	23.87	1.80	14.08	31.15	21.77	15.43	27.13	25.80	48.02	21.65	25.88	8.70	16.82	10.14
S44	41.60	137.49	77.17	105.55	103.76	32.43	19.82	37.16	55.09	35.00	20.79	27.68	28.77	24.35	38.24
S45	32.43	1,078.92	4.39	19.49	14.19	9.69	5.23	10.25	33.61	11.91	8.69	7.80	7.80	28.49	10.35
S46	2,359.04	179.47	17.47	95.44	37.28	35.65	12.47	26.23	15.52	33.63	36.75	27.52	26.12	216.06	35.11
S47	18.20	1,635.29	0.14	0.74	0.29	0.28	0.10	0.21	0.22	0.27	0.29	0.21	0.21	1.67	0.27
S48	0.00	0.00	1,500.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	160.48	103.76	15.32	1,698.19	72.42	134.07	35.39	83.04	124.13	72.95	58.00	181.73	97.95	123.71	212.11
S50	15.08	24.97	2.72	19.71	1,539.11	22.47	14.18	28.22	63.31	27.12	40.05	15.51	15.75	21.60	15.54
S51	52.86	36.31	3.24	35.54	9.67	1,516.39	18.83	21.28	30.75	21.94	14.99	8.57	14.53	38.29	17.06
S52	13.61	30.08	2.08	14.81	10.69	25.65	1,525.16	26.66	59.78	31.47	13.62	12.26	14.70	27.69	16.04
S53	105.96	160.13	13.87	215.79	82.27	84.54	110.37	1,688.81	189.09	140.04	93.85	65.29	87.21	133.65	112.68
S54	17.34	46.22	3.65	35.49	39.40	40.99	32.81	45.00	1,518.13	101.81	76.40	29.07	54.23	41.13	48.41
S55	52.80	70.99	11.41	211.79	92.63	77.86	101.65	99.15	64.33	1,656.73	91.05	51.46	68.43	133.45	107.47
S56	6.74	7.49	0.61	23.23	4.26	3.25	1.84	4.68	4.72	6.88	1,658.22	6.26	6.33	9.21	10.82
S57	0.30	0.43	0.04	0.70	0.54	0.30	0.51	0.54	0.44	2.55	0.53	1,520.19	0.27	0.58	0.39
S58	0.02	0.02	0.00	0.04	0.02	0.02	0.02	0.12	0.03	0.14	0.02	0.01	1,523.46	27.58	0.46
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,505.17	0.00

S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	3.62	6.72	0.56	12.47	4.06	6.30	3.66	9.53	11.65	7.93	4.19	9.51	3.67	4.95	5.93
S63	0.21	0.50	0.05	0.62	0.28	0.47	0.41	0.46	1.32	0.93	0.43	0.37	0.41	0.23	0.35
S64	5.57	13.81	1.33	16.37	8.18	11.00	10.92	10.65	6.18	17.28	13.10	5.68	8.12	4.91	6.67
S65	18.34	25.15	4.87	48.06	15.49	22.33	17.40	26.88	18.21	34.97	17.07	14.78	36.80	33.48	62.89
S66	23.17	20.65	1.84	23.29	40.19	11.38	6.98	16.70	23.41	28.80	45.81	10.39	14.32	37.17	19.91
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	1.43	20.33	0.34	2.13	3.59	2.25	1.22	3.31	1.91	3.07	2.66	2.54	1.90	4.14	2.70
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	0.98	1.43	0.18	3.27	5.01	3.31	1.21	3.14	2.12	4.00	2.91	1.27	2.03	3.11	3.54

	S61	**S62**	**S63**	**S64**	**S65**	**S66**	**S67**	**S68**	**S69**	**S70**	**S71**
S1	37.77	6.46	53.46	29.13	75.40	6.99	5.01	-0.16	8.31	28.17	3.40
S2	8.01	1.61	11.25	9.69	20.78	3.49	1.56	1.11	3.29	8.69	3.83
S3	14.00	6.82	23.26	15.21	19.71	14.12	38.19	4.84	64.95	53.06	182.13
S4	5.35	4.89	11.41	4.58	7.50	6.37	4.24	5.45	3.98	6.80	50.44
S5	0.48	0.27	0.83	0.50	0.67	0.50	1.12	0.22	1.85	1.57	5.84
S6	26.68	18.64	46.51	47.91	64.92	25.69	11.97	9.36	23.01	26.11	24.59
S7	15.52	9.63	18.45	12.38	18.81	17.30	21.51	9.68	17.29	24.44	219.81
S8	16.35	2.74	7.79	9.28	8.43	6.27	3.07	1.88	7.60	8.23	14.50
S9	8.40	2.61	7.79	5.37	13.40	9.67	5.54	3.92	4.87	8.01	34.88
S10	21.92	7.01	20.20	12.58	17.32	28.26	27.35	7.39	21.55	14.76	42.20
S11	31.32	7.66	23.48	20.24	26.49	29.84	35.33	10.03	26.03	19.32	60.61
S12	10.31	5.12	11.76	8.03	12.40	31.37	13.38	4.08	21.31	14.77	38.46
S13	11.43	4.77	10.53	10.59	10.34	25.31	101.84	14.72	7.39	9.19	19.97
S14	9.39	3.65	10.89	9.30	8.04	16.98	9.42	7.94	5.73	6.83	30.61
S15	24.77	13.04	9.70	8.01	10.97	73.94	25.26	2.56	34.16	13.54	15.26
S16	0.43	0.32	0.53	0.40	0.50	2.19	132.99	2.91	1.42	0.32	1.68
S17	1.57	3.08	5.87	0.61	1.63	1.55	0.83	0.32	35.40	0.77	5.21
S18	14.25	1.57	9.61	1.53	3.24	5.65	1.57	1.36	0.97	8.64	2.35
S19	100.09	15.64	115.07	74.53	184.99	14.64	10.78	2.05	20.36	63.50	3.46
S20	12.83	1.12	7.41	18.25	3.04	6.33	4.33	1.71	3.23	4.88	2.63
S21	3.72	1.70	0.87	0.76	0.67	5.29	0.68	0.29	1.57	2.68	0.55
S22	21.48	6.31	15.36	26.35	23.60	11.99	5.67	7.13	6.67	21.18	8.46
S23	12.07	8.48	4.78	6.95	3.35	7.53	3.29	3.90	1.74	9.49	4.20
S24	16.84	8.55	31.20	18.15	23.34	18.91	59.76	6.40	68.24	81.42	119.67
S25	45.28	18.09	50.83	30.44	47.53	46.70	29.39	17.54	24.48	69.90	63.76
S26	20.14	4.90	14.13	9.12	29.81	26.22	12.97	4.30	10.06	18.49	27.23
S27	2.40	1.09	3.79	2.11	3.29	2.12	1.48	0.69	1.62	2.17	2.65
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
S32	7.93	4.50	8.43	5.25	7.17	6.76	12.30	6.59	5.58	5.41	3.64
S33	0.09	0.07	0.11	0.10	0.11	0.13	0.33	0.18	6.09	0.31	0.11

S34	0.09	0.09	0.12	0.13	0.15	0.11	3.82	0.23	8.25	0.23	0.11
S35	0.95	0.50	0.62	0.51	0.73	0.83	3.49	0.24	4.54	0.64	0.88
S36	3.91	19.76	4.34	3.25	4.43	3.72	1.86	1.64	1.82	14.84	6.79
S37	0.02	0.01	0.03	0.02	0.02	0.02	0.05	0.01	0.08	0.07	0.22
S38	12.35	9.45	14.95	5.67	6.89	9.68	5.22	2.69	13.94	4.70	25.26
S39	5.60	3.01	4.58	7.59	6.52	4.86	3.22	1.54	2.56	6.17	4.93
S40	7.25	1.15	2.18	2.12	1.81	3.45	4.31	3.15	4.88	7.97	1.65
S41	11.74	2.73	3.82	15.74	7.75	3.96	5.10	2.56	1.34	3.53	1.28
S42	18.27	11.35	28.93	23.37	24.81	23.71	17.69	15.58	14.78	38.03	14.19
S43	16.11	11.10	17.86	12.30	16.74	29.31	33.25	14.76	10.14	15.16	15.52
S44	29.87	19.95	39.23	26.66	30.79	45.67	10.16	12.19	48.44	16.50	56.70
S45	23.19	8.12	9.02	24.65	15.22	48.00	4.89	6.81	9.49	23.28	21.37
S46	65.44	36.04	48.90	25.23	30.92	32.22	10.09	365.32	19.31	14.17	75.10
S47	0.51	0.28	0.38	0.20	0.25	0.25	0.08	2.82	0.15	0.11	0.58
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	166.66	112.42	198.14	96.01	211.56	135.08	31.13	65.76	39.89	48.07	47.28
S50	13.85	24.01	33.40	26.83	32.73	15.14	9.91	6.11	16.36	13.90	18.64
S51	14.81	16.08	31.44	23.53	16.44	16.57	9.83	11.36	18.80	11.69	14.07
S52	15.69	7.50	21.41	14.98	15.98	15.87	57.42	41.48	12.49	18.97	22.70
S53	95.70	79.32	131.55	114.94	134.67	104.25	130.23	56.21	59.05	72.27	126.09
S54	36.69	33.23	46.29	143.45	143.96	40.07	23.36	8.77	27.13	20.52	32.89
S55	66.00	70.57	86.87	80.02	75.31	68.30	60.95	26.19	56.13	50.96	60.57
S56	9.62	3.42	16.12	10.60	10.93	8.45	3.01	2.73	5.23	15.58	20.26
S57	0.31	17.49	3.63	0.40	0.49	10.13	3.99	0.27	2.65	11.89	0.35
S58	0.08	0.82	0.04	0.02	0.02	0.20	0.02	2.17	0.01	5.84	0.02
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.49	0.00	0.70	0.00
S61	1,500.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00
S62	5.61	1,669.26	16.26	6.93	8.30	10.55	5.33	1.81	2.81	3.62	2.26
S63	0.37	1.57	1,500.39	2.05	0.87	0.27	0.36	0.09	0.11	0.36	1.10
S64	6.59	4.01	6.44	1,506.12	7.31	6.10	5.02	3.33	2.85	4.46	3.87
S65	23.22	11.77	29.53	52.72	1,519.03	16.82	7.09	6.58	20.22	15.07	9.03
S66	13.77	13.80	25.43	22.14	32.96	1,528.03	11.74	6.63	22.81	22.02	17.85
S67	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10	0.00	0.00	0.00
S69	3.28	1.77	1.96	5.23	6.30	4.05	0.95	0.92	1,501.42	1.89	1.71
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,500.10	0.00
S71	19.43	1.20	4.52	4.98	4.61	3.59	1.87	1.37	3.07	4.67	1,504.84

2.3. Investment at 1% of GDP (21.43 trillion) = 214.3 billion; uniformly distributed at 3.0002 billion per sector (in millions)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15
S1	3,974.69	64.38	5.58	9.31	6.72	3.89	14.88	20.82	12.54	5.09	6.78	7.05	2.01	5.91	12.11
S2	260.22	3,566.51	2.70	9.11	4.34	2.18	33.25	697.00	11.05	6.76	6.67	9.24	2.16	8.32	16.72
S3	96.35	32.58	3,427.54	127.03	65.63	325.83	97.62	49.85	49.28	53.48	32.12	30.91	6.42	43.66	30.95
S4	41.40	5.18	22.01	3,222.46	16.04	89.39	93.14	19.11	365.41	302.20	85.10	53.54	6.23	61.57	66.96
S5	3.34	0.98	94.62	56.54	3,032.76	10.44	4.22	1.69	7.38	6.45	2.29	1.74	0.28	2.22	1.96
S6	93.72	16.41	86.34	110.64	24.16	3,172.48	46.68	73.73	105.37	113.35	78.84	56.90	18.84	53.00	69.58
S7	40.72	5.84	21.16	58.45	34.97	58.34	3,013.86	15.70	23.75	20.65	18.16	14.11	5.79	12.33	15.71
S8	14.83	4.66	5.37	15.28	11.72	5.38	159.65	3,849.20	25.43	17.06	13.27	23.83	6.81	19.67	46.45
S9	18.18	8.65	32.69	33.42	39.12	11.85	234.82	54.58	3,530.00	68.70	41.80	54.88	6.00	79.72	104.11
S10	61.34	17.87	180.28	111.17	92.44	31.24	172.02	113.98	100.37	4,379.35	1,070.43	628.98	63.81	687.89	742.62
S11	79.86	24.16	130.26	100.01	93.63	31.41	313.34	167.00	138.98	138.07	3,459.06	395.88	47.59	323.47	494.98
S12	88.75	30.07	190.15	235.09	207.49	46.26	134.98	57.26	51.66	70.81	83.52	3,433.45	8.83	95.91	300.60
S13	23.84	7.43	25.87	27.54	37.60	10.35	51.06	63.17	59.91	61.23	91.45	158.36	3,236.37	190.51	252.21
S14	45.97	15.52	22.42	26.33	36.91	9.28	142.78	97.50	19.16	55.22	55.95	212.73	22.60	3,327.64	107.57
S15	36.67	14.45	41.42	79.86	45.30	13.11	36.67	69.07	56.49	42.37	44.75	272.70	9.53	37.57	4,772.83
S16	0.75	3.59	0.68	2.50	0.93	0.93	0.91	3.80	1.10	0.83	1.31	2.32	0.33	0.61	3.98
S17	1.31	0.28	0.93	1.90	1.39	1.50	63.54	13.74	1.05	0.87	0.91	5.01	0.83	1.13	2.08
S18	5.13	1.25	3.70	5.32	4.34	1.78	7.21	4.49	7.14	3.66	3.88	31.55	1.00	30.09	24.63
S19	596.66	44.67	5.43	6.57	7.54	4.89	7.95	17.45	17.31	5.90	7.44	7.03	2.37	5.83	10.55
S20	7.22	5.99	2.63	4.59	3.43	1.51	17.24	34.71	20.30	3.46	3.91	20.79	0.95	4.98	58.90
S21	1.08	0.30	0.48	0.64	0.57	0.31	0.72	1.14	0.90	0.51	0.58	1.68	0.17	0.48	19.04
S22	50.21	7.84	14.35	24.46	15.79	8.38	33.06	48.92	76.65	46.92	54.81	52.88	9.67	61.57	69.29
S23	2.50	0.97	2.96	2.88	3.35	2.34	2.43	3.42	2.93	2.59	3.32	3.05	1.42	2.31	2.90
S24	138.91	48.49	88.68	189.83	101.65	165.54	150.16	69.05	63.90	71.04	40.25	40.95	7.58	61.92	37.98
S25	544.90	204.26	191.75	227.68	119.47	63.96	177.14	251.76	295.42	117.71	190.11	186.40	47.42	192.21	339.45
S26	58.19	16.53	21.05	70.23	44.91	11.78	124.07	56.86	71.99	35.79	52.61	119.38	15.01	80.88	296.39
S27	24.83	4.46	7.55	10.91	6.85	9.86	10.64	19.02	17.49	24.71	21.08	38.65	7.69	51.68	20.75
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	6.49	1.54	6.19	6.73	15.74	9.41	6.91	12.05	13.88	9.66	13.53	10.75	2.85	6.46	9.64
S33	0.13	0.06	0.15	0.21	0.20	0.94	0.13	0.25	0.20	0.17	0.21	0.16	0.07	0.13	0.15
S34	0.10	0.05	0.17	0.17	0.22	0.12	0.16	0.16	0.15	0.15	0.19	0.19	0.11	0.14	0.17
S35	2.55	0.46	1.10	1.65	5.11	1.19	1.86	7.01	2.98	3.83	6.53	3.31	1.68	2.46	3.44
S36	3.91	1.19	4.12	4.11	7.78	15.22	5.20	6.14	7.16	5.42	7.13	5.73	1.81	3.63	5.31
S37	0.12	0.04	4.23	0.16	0.08	0.40	0.12	0.06	0.06	0.07	0.04	0.04	0.01	0.05	0.04
S38	9.70	16.43	8.68	60.39	10.15	63.59	12.39	46.71	45.28	17.01	13.56	10.70	3.61	9.60	11.71
S39	14.79	3.17	5.46	19.51	6.14	6.85	18.65	139.37	62.78	10.91	25.09	18.48	20.51	13.46	23.50
S40	1.85	0.60	2.75	2.21	2.35	2.52	2.73	1.99	2.00	1.80	2.76	2.70	1.49	1.57	2.37
S41	1.81	0.61	2.61	2.13	3.00	1.94	2.39	2.01	2.20	1.71	2.38	2.13	0.91	1.50	1.92
S42	20.29	6.29	30.32	23.12	32.46	22.32	27.48	21.56	23.93	17.54	25.41	23.01	8.77	16.06	19.98
S43	10.87	3.58	15.36	13.84	14.93	19.25	17.55	34.05	29.74	26.61	36.41	29.65	10.01	19.66	24.28
S44	49.17	11.54	62.49	52.05	76.38	72.44	42.40	32.11	52.38	40.14	45.87	43.28	19.68	32.01	40.83

S45	14.23	5.88	61.26	70.97	156.36	18.25	17.73	12.36	20.19	36.11	33.42	31.36	7.08	20.63	26.67
S46	74.56	88.55	182.53	115.75	142.14	39.75	31.19	49.66	74.76	43.55	39.40	44.30	13.01	52.62	43.56
S47	0.58	0.68	1.42	0.90	1.10	0.31	0.25	0.39	0.58	0.34	0.31	0.36	0.11	0.41	0.35
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	301.06	27.74	78.98	59.90	66.24	62.64	91.77	86.73	78.39	50.39	101.15	77.11	61.78	58.51	77.91
S50	61.15	17.16	89.62	77.53	112.96	26.51	65.30	30.40	49.44	37.93	47.54	45.04	15.66	34.97	43.36
S51	21.10	9.70	51.20	36.21	52.68	33.98	28.24	38.23	29.77	28.92	47.94	34.68	33.73	22.83	37.96
S52	17.25	6.75	109.43	29.61	18.38	27.66	24.78	20.44	22.39	18.96	32.76	43.39	12.97	16.68	25.30
S53	118.31	54.58	178.48	181.28	256.45	138.01	194.83	187.47	173.90	169.89	210.87	174.21	106.89	137.53	176.99
S54	67.02	18.32	211.73	168.51	80.76	45.97	75.47	78.72	112.36	78.50	146.80	229.44	168.04	98.32	197.71
S55	75.96	19.04	73.54	77.00	94.06	132.19	76.06	80.51	95.85	100.10	142.66	88.42	47.67	67.99	98.50
S56	11.55	2.66	21.98	15.39	13.05	9.79	11.90	9.83	13.73	12.08	10.81	8.21	2.68	7.14	8.96
S57	0.58	0.44	0.39	0.42	0.48	1.95	0.47	0.56	0.58	0.56	0.64	0.52	0.20	0.43	0.51
S58	0.02	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.01	0.02	0.02
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	4.75	1.20	4.65	4.03	4.96	3.72	4.17	4.78	4.99	4.20	5.55	5.23	2.51	3.28	4.81
S63	0.39	0.07	0.37	0.35	0.52	0.34	0.36	0.40	0.46	0.34	0.51	0.49	0.23	0.27	0.44
S64	5.85	1.44	5.95	5.95	11.94	9.56	6.22	9.19	10.71	7.78	10.76	8.77	2.73	5.48	8.01
S65	18.95	5.66	13.17	13.20	26.38	18.71	12.40	18.54	19.65	15.54	20.23	17.21	6.58	11.50	15.82
S66	21.25	25.02	18.09	19.95	32.07	12.90	31.05	34.04	37.98	35.80	37.96	28.56	9.65	21.98	31.32
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	1.64	0.68	2.41	2.95	4.40	2.53	1.70	2.01	1.90	2.15	2.51	4.81	0.77	5.39	2.12
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	3.21	1.06	2.33	2.54	2.00	19.43	2.42	4.00	5.81	5.50	4.69	3.64	1.22	3.33	4.10

	S16	**S17**	**S18**	**S19**	**S20**	**S21**	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
S1	4.96	19.62	21.58	1,458.65	177.63	142.92	34.91	32.01	7.84	81.58	34.14	13.07	22.60	64.36	25.14
S2	5.35	95.77	19.81	152.92	20.63	36.89	229.28	32.42	3.51	16.61	56.06	6.54	5.46	27.96	5.69
S3	15.75	40.18	28.60	62.22	47.80	25.94	52.54	73.61	1,986.19	92.55	56.38	31.26	32.30	34.77	27.08
S4	27.56	38.47	28.22	36.19	28.36	11.79	48.64	17.85	42.34	42.77	30.63	6.77	8.93	10.02	8.53
S5	0.89	1.75	1.26	2.31	1.79	0.92	2.25	2.33	55.32	3.25	2.06	0.98	1.05	1.13	0.90
S6	36.68	71.83	46.00	91.27	111.10	55.20	125.31	90.92	95.88	94.30	108.22	63.17	86.02	155.63	126.38
S7	10.87	17.78	12.14	27.37	20.74	14.04	25.87	23.91	57.06	18.85	21.10	23.76	29.28	35.60	33.92
S8	13.61	458.87	40.48	21.41	15.08	9.13	185.62	25.81	6.76	9.82	42.12	16.37	10.99	22.11	10.28
S9	21.60	47.21	35.83	49.09	33.33	13.61	30.54	14.64	41.84	27.03	51.80	8.89	16.08	11.60	12.13
S10	307.65	376.19	240.68	110.25	90.46	48.39	107.66	73.89	115.11	56.48	116.18	27.51	38.90	26.20	21.64
S11	236.45	256.99	161.83	150.92	103.72	87.70	191.24	131.51	93.10	105.37	185.78	31.71	41.05	31.47	26.27
S12	108.07	39.77	58.39	75.50	37.65	24.60	63.68	100.54	120.61	76.68	72.35	23.68	26.72	20.21	17.93
S13	315.00	102.27	89.15	40.24	84.74	49.53	50.69	109.51	25.19	56.93	75.13	47.06	34.98	20.25	25.63
S14	57.09	35.65	46.02	33.90	21.31	13.49	35.13	27.24	18.90	21.08	45.85	10.81	15.80	11.46	15.10
S15	120.88	55.72	39.54	50.97	33.34	19.29	68.66	48.26	32.00	31.77	40.85	37.99	130.43	54.06	26.59
S16	3,822.30	1.34	0.77	0.87	0.77	0.74	1.14	1.01	0.70	0.63	0.93	1.72	2.69	0.90	0.96
S17	5.63	3,195.98	10.96	1.23	0.94	0.90	1.71	1.17	1.60	0.92	7.11	2.81	5.27	1.37	1.60

S18	4.23	4.10	3,143.66	3.91	11.36	42.96	3.52	4.85	3.09	6.17	6.47	5.76	9.08	4.62	3.17
S19	4.96	13.14	10.67	4,043.03	45.50	331.88	52.19	58.88	9.49	44.11	23.74	17.47	10.87	87.60	32.78
S20	18.46	178.53	57.53	11.56	3,649.81	455.39	98.43	42.00	3.48	4.92	55.24	9.99	6.18	6.88	97.02
S21	0.98	3.52	2.89	0.99	61.45	3,373.41	2.29	63.62	0.54	0.56	1.46	3.35	4.55	0.99	6.84
S22	28.86	109.43	76.46	213.56	77.21	59.18	3,961.53	429.96	16.39	69.83	125.43	32.83	15.75	50.57	24.26
S23	2.36	3.57	2.99	3.66	3.65	7.04	3.17	3,060.41	2.80	5.10	3.92	22.83	6.53	6.34	6.49
S24	19.80	51.95	37.08	85.61	51.11	31.88	63.68	102.52	3,192.76	91.02	62.24	41.57	40.74	36.91	27.90
S25	109.47	402.27	329.83	363.48	1,211.81	310.06	594.20	517.24	235.66	4,497.11	1,516.78	65.02	69.49	71.27	77.61
S26	72.17	301.57	162.84	143.50	74.23	97.94	106.11	67.82	24.09	105.46	3,326.83	44.24	63.24	51.84	21.67
S27	7.94	32.34	50.13	32.81	30.39	17.15	35.00	15.04	7.19	31.61	38.84	3,079.35	30.75	9.10	4.40
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.64	0.00	7.04
S32	8.48	16.04	10.48	10.17	8.94	9.53	10.38	20.41	7.11	6.96	13.34	20.80	9.95	8.51	9.52
S33	0.12	0.22	0.18	0.15	0.21	0.18	0.21	0.31	0.19	0.13	0.21	0.58	0.52	0.46	0.37
S34	0.14	0.20	0.18	0.16	0.18	0.20	0.15	0.19	0.16	0.14	0.18	0.40	0.31	0.23	0.28
S35	1.89	6.14	4.10	2.41	4.76	3.89	5.00	4.80	4.38	1.72	4.81	7.47	16.83	11.60	14.45
S36	4.58	8.04	6.01	5.57	5.02	5.32	5.72	9.92	4.36	4.10	6.94	7.38	6.46	5.36	5.84
S37	0.02	0.05	0.04	0.08	0.06	0.03	0.06	0.09	2.45	0.11	0.07	0.04	0.04	0.04	0.03
S38	6.84	29.33	14.21	14.51	16.95	10.28	25.32	30.38	19.13	10.43	21.78	103.26	42.98	25.02	22.80
S39	10.75	43.06	25.26	34.06	124.25	85.71	94.17	92.51	28.15	28.73	97.14	46.94	107.21	108.95	150.47
S40	2.71	2.53	2.54	2.26	2.30	2.49	2.19	4.68	2.45	2.13	2.42	7.07	5.96	3.64	5.37
S41	1.59	2.39	2.11	2.12	2.08	2.14	2.02	3.18	2.28	1.68	2.33	4.93	8.86	6.65	3.21
S42	16.50	25.20	22.69	22.50	21.81	22.12	21.31	35.99	25.75	17.43	24.90	58.13	50.42	30.75	33.96
S43	23.49	39.40	26.22	19.97	25.66	27.40	28.66	31.33	16.72	15.39	28.70	26.60	48.29	31.05	32.25
S44	32.93	53.35	40.38	51.39	44.50	51.17	33.86	45.33	48.61	33.26	48.46	78.81	63.53	82.95	102.00
S45	20.49	34.66	25.60	15.47	13.27	13.69	13.15	15.04	40.42	11.81	14.37	21.36	14.30	17.51	26.25
S46	57.94	58.00	38.13	65.22	65.99	90.36	41.24	38.00	116.42	39.62	43.47	105.69	80.03	62.18	63.64
S47	0.46	0.45	0.30	0.51	0.52	0.71	0.33	0.30	0.91	0.32	0.34	0.83	0.62	0.49	0.51
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	92.46	118.28	81.38	169.68	125.15	102.74	93.65	149.65	67.38	75.65	108.82	261.77	282.19	394.56	359.11
S50	36.84	35.84	43.58	57.63	39.51	45.38	44.40	50.70	71.95	50.96	44.73	86.86	38.56	45.76	69.33
S51	47.67	37.15	43.14	24.90	34.64	35.77	36.05	42.32	42.67	33.11	40.84	41.99	24.53	22.22	33.46
S52	29.56	25.51	22.92	23.19	24.17	24.45	21.67	37.55	75.46	21.80	24.51	47.07	51.50	25.43	40.21
S53	155.29	241.36	199.42	176.82	203.15	218.62	173.65	205.35	163.94	152.38	207.34	313.91	348.60	221.73	268.34
S54	123.30	95.64	122.83	166.29	158.31	205.84	123.01	111.13	195.72	169.10	129.83	194.61	60.29	108.14	359.76
S55	110.01	90.91	85.06	86.98	98.31	135.13	100.41	201.65	81.93	78.45	102.89	216.90	157.36	142.38	156.51
S56	6.83	12.90	7.92	15.12	16.00	9.04	14.47	12.63	19.57	17.31	14.88	12.62	21.20	16.46	13.87
S57	0.39	0.56	0.49	0.60	0.57	0.52	0.73	4.30	0.66	0.51	0.68	5.85	1.48	18.37	0.84
S58	0.02	0.03	0.02	0.02	0.03	0.03	0.03	0.04	0.02	0.02	0.03	0.05	0.05	0.04	0.04
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	3.91	5.52	4.64	5.51	5.13	5.44	4.93	6.94	4.73	3.89	5.65	11.63	15.19	14.19	8.70
S63	0.35	0.53	0.42	0.48	0.34	0.38	0.40	0.68	0.38	0.35	0.49	0.79	0.38	0.72	0.59
S64	6.98	12.17	9.14	8.34	7.70	8.01	8.38	18.51	6.33	5.99	11.12	12.19	7.91	8.60	8.87
S65	13.80	22.14	16.86	19.70	17.41	17.96	17.11	27.79	14.53	12.22	20.15	31.20	29.35	32.08	32.86

S66	18.65	31.47	24.34	31.73	33.03	23.38	53.51	42.84	24.73	32.61	39.49	68.28	43.95	59.24	50.75
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	1.48	2.36	2.45	1.82	2.06	1.76	1.96	4.31	2.51	1.82	2.18	25.18	8.91	7.06	6.43
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	2.51	4.77	3.44	6.27	7.80	4.52	6.95	5.26	4.58	8.77	6.71	4.62	6.91	6.88	5.49

	S31	**S32**	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**	**S41**	**S42**	**S43**	**S44**	**S45**
S1	13.54	22.21	4.62	27.07	6.54	5.55	1.71	9.59	6.16	3.38	6.49	5.67	7.52	4.90	6.11
S2	6.52	5.46	27.63	5.58	4.11	5.71	1.11	7.41	6.20	2.87	3.55	4.50	6.62	2.64	2.98
S3	31.94	164.71	218.09	125.99	204.52	99.21	8.24	205.62	46.35	9.46	16.62	15.84	20.25	32.26	34.29
S4	9.57	6.47	22.01	11.16	9.85	7.85	3.58	10.59	15.93	2.81	4.99	10.11	11.28	3.79	4.41
S5	1.05	4.64	6.37	3.66	5.79	2.86	0.29	5.83	1.54	0.31	0.55	0.61	0.76	0.96	1.03
S6	107.81	26.10	28.93	41.20	48.51	34.42	23.98	36.07	276.97	16.35	33.71	35.92	34.61	30.18	34.22
S7	41.77	16.23	84.22	20.25	22.60	37.72	22.55	33.84	54.43	6.35	15.45	20.20	13.98	21.28	23.91
S8	16.78	4.29	144.84	7.04	9.14	8.39	2.58	10.09	19.12	4.04	8.27	12.57	22.46	5.17	5.74
S9	16.13	8.25	17.56	11.26	12.23	10.18	4.06	12.52	19.68	3.27	5.74	27.24	17.79	5.85	6.79
S10	34.77	21.98	97.39	76.76	43.49	35.13	23.67	51.14	51.56	11.28	13.77	48.97	30.91	10.75	13.58
S11	39.97	24.59	62.99	163.00	49.05	46.71	66.00	53.04	56.84	19.60	16.79	92.83	41.90	14.08	18.01
S12	23.21	25.15	41.49	35.93	40.81	30.62	9.91	104.93	42.11	8.18	12.13	27.95	24.35	8.57	11.45
S13	31.65	10.97	26.65	34.20	22.15	18.44	6.28	20.81	28.05	43.68	35.19	129.99	71.43	12.20	18.15
S14	14.02	6.53	22.69	15.28	12.41	30.92	4.43	14.40	32.14	4.44	6.96	46.30	14.55	6.61	7.88
S15	54.65	12.16	21.31	29.23	96.83	51.24	4.75	24.14	150.43	10.15	16.21	23.91	18.10	8.41	11.06
S16	1.47	22.23	89.95	177.16	4.53	2.85	0.57	22.82	1.01	0.65	1.37	1.15	1.45	0.89	1.31
S17	8.40	0.82	2.67	5.35	2.25	1.44	0.67	1.85	1.78	0.47	1.31	2.67	4.69	1.00	2.29
S18	9.44	2.16	2.26	3.77	3.62	5.37	0.89	6.96	13.00	1.30	2.38	4.18	4.02	2.60	2.42
S19	19.58	53.27	5.39	62.31	9.96	7.65	2.35	10.40	7.30	5.20	11.50	8.97	11.99	8.84	11.18
S20	14.72	2.05	3.63	18.23	3.99	3.72	0.81	6.30	4.52	1.97	7.52	3.88	3.44	1.56	1.99
S21	4.26	0.47	0.47	1.14	1.35	0.99	0.22	0.87	1.08	1.20	2.09	6.56	1.90	0.50	0.79
S22	27.99	16.52	15.48	23.82	21.76	65.81	5.84	72.27	29.12	31.07	18.38	18.01	24.24	15.15	15.14
S23	27.60	3.70	3.50	7.16	9.56	8.86	1.53	13.30	3.25	43.22	30.40	8.14	63.47	6.84	15.32
S24	37.58	262.15	347.72	193.71	322.16	155.14	9.12	326.28	40.50	12.76	21.95	20.52	27.58	47.80	49.40
S25	73.77	42.36	75.30	67.48	66.54	49.74	15.02	85.38	121.81	34.09	44.62	55.49	60.77	26.84	34.58
S26	43.12	17.36	17.75	23.22	33.50	17.10	9.30	70.38	37.35	10.30	13.62	41.64	18.62	8.55	10.52
S27	54.10	6.68	6.92	4.63	5.54	4.75	1.21	4.56	4.73	8.69	3.65	9.64	3.81	1.90	2.69
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	3,002.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	11.86	3,010.83	7.80	31.95	21.77	11.00	2.55	18.98	11.03	9.69	19.90	16.21	26.50	21.84	33.76
S33	0.58	0.61	3,003.26	1.31	32.47	0.31	0.27	4.13	0.91	0.15	0.28	1.03	0.32	0.23	0.50
S34	0.39	0.11	0.16	3,001.36	0.45	0.23	0.33	0.18	0.17	0.17	0.37	0.29	0.35	0.26	0.61
S35	12.27	15.98	6.94	9.08	3,045.54	3.91	0.97	32.14	2.95	1.64	2.97	1.21	3.39	0.72	1.20
S36	7.42	3.65	21.35	8.13	4.98	3,006.35	1.81	5.31	6.62	5.15	12.38	15.32	15.40	12.99	16.77
S37	0.04	0.20	0.27	0.16	0.25	0.12	3,000.21	0.25	0.06	0.01	0.02	0.02	0.02	0.04	0.04
S38	62.87	323.89	90.61	303.27	426.35	42.54	29.52	3,423.73	47.79	22.45	43.50	14.09	46.54	11.22	29.75
S39	89.33	6.90	11.29	55.36	95.86	12.42	2.45	21.81	3,251.86	8.29	11.27	8.96	13.41	2.73	3.47

S40	5.93	2.38	4.43	5.19	4.03	3.27	0.96	7.80	4.87	3,114.73	4.45	6.98	17.26	3.85	8.52
S41	6.22	3.11	2.31	3.80	5.30	5.59	6.85	5.14	3.08	3.05	3,501.97	219.64	6.85	4.49	5.54
S42	64.60	25.13	22.89	44.05	67.92	73.97	33.53	66.48	36.86	33.90	33.83	3,461.81	85.47	53.48	63.93
S43	40.03	17.24	16.16	29.29	21.08	25.47	7.09	24.51	18.86	27.08	21.22	38.98	3,136.18	43.10	36.91
S44	103.42	71.18	189.31	124.90	96.55	406.56	16.52	47.82	73.27	32.90	76.71	54.47	48.89	3,172.16	313.68
S45	20.07	98.19	54.98	558.39	33.95	107.60	8.55	43.10	15.64	9.31	22.71	13.49	12.53	144.87	3,341.60
S46	77.45	36.90	35.52	94.16	199.21	241.76	25.88	72.23	104.21	17.81	93.38	44.88	37.53	48.01	135.62
S47	0.61	0.29	0.28	0.74	1.55	1.87	0.20	0.56	0.81	0.14	0.72	0.35	0.29	0.37	1.05
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	472.95	73.14	61.07	131.79	136.50	134.24	25.05	90.68	550.30	71.50	197.87	139.44	156.23	178.03	240.60
S50	62.93	167.99	196.68	70.64	119.52	115.71	9.85	44.03	48.70	31.38	94.78	80.66	80.77	43.49	64.77
S51	35.53	17.08	34.46	42.78	25.29	30.02	13.10	25.21	27.28	32.23	40.79	37.13	45.08	27.51	61.41
S52	37.03	18.66	66.55	34.55	33.86	30.01	5.79	23.83	22.92	58.93	32.22	48.09	94.78	44.33	67.53
S53	371.22	95.16	184.24	239.19	161.96	195.88	139.42	125.36	164.14	176.38	409.17	361.71	386.41	272.97	349.90
S54	127.09	68.13	52.28	145.97	130.45	83.76	13.85	102.66	56.66	72.77	58.25	57.76	60.45	46.62	112.10
S55	221.72	180.45	116.26	492.93	216.88	303.38	73.29	167.73	219.41	132.62	154.27	187.01	318.67	145.01	172.10
S56	17.18	6.01	8.84	11.83	17.99	10.99	2.43	12.20	32.38	3.53	6.22	5.93	5.92	7.17	6.84
S57	22.96	3.37	2.39	1.46	1.56	1.10	0.86	1.77	0.89	0.46	3.13	2.35	2.75	0.72	0.91
S58	0.05	0.02	0.03	0.06	0.05	0.05	0.02	0.03	0.04	0.03	0.16	0.10	0.06	0.04	0.04
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	11.46	5.69	13.16	7.78	8.75	8.48	2.84	10.67	7.95	5.33	253.32	130.68	10.31	10.35	12.04
S63	1.35	0.34	0.27	0.63	0.38	0.43	0.10	0.34	0.42	0.37	0.82	0.70	1.00	0.79	1.09
S64	11.05	6.44	6.99	13.81	8.04	9.50	2.55	15.23	11.74	8.81	17.55	15.65	27.55	22.22	30.09
S65	38.11	220.34	13.13	30.59	34.32	28.49	7.38	33.49	27.44	13.87	33.49	24.83	37.06	40.82	45.69
S66	54.45	23.58	22.71	34.74	126.99	72.34	16.23	48.30	45.08	13.96	21.19	30.99	40.02	31.77	36.50
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	15.32	5.00	3.03	176.86	57.54	13.33	2.77	13.74	8.47	5.13	10.63	3.69	10.85	10.66	61.89
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	6.34	2.40	2.25	3.53	5.05	2.91	1.11	3.71	14.47	1.75	3.29	2.90	2.96	3.13	3.26

	S46	**S47**	**S48**	**S49**	**S50**	**S51**	**S52**	**S53**	**S54**	**S55**	**S56**	**S57**	**S58**	**S59**	**S60**
S1	3.95	5.88	1.32	12.11	4.95	4.79	4.44	16.79	5.77	23.08	6.76	31.97	10.05	24.12	52.64
S2	2.08	2.75	1.85	10.58	3.97	2.53	1.88	5.81	2.84	6.38	4.23	6.29	4.43	6.68	10.19
S3	10.52	39.37	5.64	63.10	30.11	11.87	10.94	19.08	21.61	31.71	52.85	21.32	16.51	24.98	27.03
S4	3.17	4.96	3.64	19.11	5.57	3.31	2.80	9.94	5.86	9.00	14.29	9.02	6.76	8.79	8.75
S5	0.35	1.18	0.22	2.06	0.93	0.39	0.35	0.80	0.72	1.03	1.70	0.74	0.57	0.84	0.90
S6	32.60	57.04	5.24	274.63	35.18	31.03	13.37	32.35	70.15	36.01	38.90	88.99	34.58	58.27	71.75
S7	21.85	24.47	98.10	204.92	15.08	19.14	6.16	14.97	20.65	14.91	13.20	27.85	15.33	21.06	31.87
S8	5.07	5.28	7.95	40.20	9.54	5.20	2.88	7.96	5.51	10.74	7.42	6.80	7.06	9.53	9.48
S9	4.54	6.60	8.56	23.96	11.02	4.62	4.61	19.62	6.85	14.38	19.81	7.26	17.03	19.88	13.44
S10	9.89	13.39	8.39	47.43	24.33	9.47	14.10	29.81	16.92	34.23	104.22	20.69	19.04	26.30	25.01
S11	11.83	17.59	12.77	55.60	32.13	12.50	20.45	37.40	23.31	40.70	136.74	23.47	22.26	31.03	28.29
S12	12.38	11.54	5.50	27.16	37.07	7.46	17.00	21.94	15.21	32.91	163.51	24.82	14.85	19.33	17.98
S13	9.18	29.24	3.84	21.42	17.36	21.16	52.33	36.66	66.20	38.37	48.04	17.75	48.73	20.97	18.37

S14	5.71	7.53	5.46	25.66	10.54	5.55	13.73	23.32	8.65	22.28	55.01	15.86	7.35	12.84	26.71
S15	7.49	10.23	2.30	19.18	30.54	7.16	8.38	25.22	16.90	62.48	101.86	12.14	11.62	21.11	15.59
S16	0.67	1.17	0.11	1.47	0.85	0.68	0.75	7.63	1.39	1.45	2.78	0.68	0.66	0.97	0.82
S17	0.78	1.82	16.59	5.23	0.90	0.95	0.46	2.00	0.96	1.01	1.02	1.03	2.67	1.76	1.28
S18	1.68	2.20	0.48	5.90	2.98	2.11	2.00	9.39	2.33	11.57	20.67	6.54	72.77	93.92	20.70
S19	7.21	11.11	1.78	18.51	7.63	8.60	7.44	28.78	9.70	16.76	9.63	80.27	13.90	51.99	129.56
S20	1.25	1.80	1.52	4.34	5.33	1.45	1.28	3.92	1.85	4.97	11.20	2.38	3.81	7.59	54.34
S21	0.58	0.71	0.09	0.84	1.73	0.54	0.38	0.98	0.73	2.25	5.80	1.29	0.95	1.98	1.46
S22	7.36	12.52	2.75	21.67	22.91	13.12	9.73	25.66	14.23	34.89	27.73	13.83	17.82	30.70	42.75
S23	10.62	11.74	0.61	6.01	6.72	9.38	4.55	18.17	9.02	15.15	4.31	11.56	8.05	14.93	5.61
S24	12.78	55.57	8.35	68.81	42.89	14.50	15.59	25.25	25.91	45.12	79.10	23.54	19.76	30.76	33.23
S25	23.21	31.56	11.16	121.23	43.80	28.95	23.01	99.78	45.51	91.67	100.11	42.49	236.39	201.72	133.48
S26	7.17	9.76	6.33	24.83	30.06	7.89	11.09	30.05	11.56	25.99	38.68	16.72	45.79	35.90	42.27
S27	1.62	2.42	0.67	4.24	63.32	1.88	2.30	3.65	4.02	3.98	8.33	2.91	4.99	5.49	4.49
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	8.80	31.21	2.52	34.66	17.00	19.73	20.84	20.82	10.46	35.67	26.47	12.96	16.25	10.38	15.24
S33	0.78	0.42	0.03	0.34	0.30	0.49	0.23	0.96	0.20	0.63	0.22	0.13	0.16	0.34	0.18
S34	0.17	0.47	0.02	0.35	0.17	0.16	0.18	2.50	0.72	0.27	0.19	2.75	0.16	0.46	0.21
S35	0.58	1.09	0.15	1.31	1.93	1.27	0.85	3.79	0.85	1.96	2.88	0.79	1.13	1.64	1.24
S36	10.70	15.68	2.18	19.82	9.83	12.71	11.84	20.10	6.90	21.30	11.90	7.87	10.51	12.42	15.62
S37	0.01	0.05	0.01	0.08	0.04	0.01	0.01	0.02	0.03	0.04	0.07	0.03	0.02	0.03	0.03
S38	7.70	23.07	1.47	18.86	29.80	15.96	10.56	40.45	12.67	23.62	58.25	11.61	13.26	20.57	15.25
S39	2.34	3.32	1.09	7.15	8.38	4.33	3.26	7.25	3.48	12.00	9.50	4.71	7.14	9.28	9.27
S40	2.78	6.94	0.44	4.70	4.84	13.50	8.18	12.44	13.90	10.79	2.87	8.06	7.11	7.33	3.88
S41	3.71	5.76	0.71	6.53	7.56	5.17	3.55	10.10	5.55	6.25	3.69	36.93	3.25	3.64	30.36
S42	46.00	69.73	9.11	71.98	34.23	66.70	40.52	51.88	51.33	72.80	41.73	37.24	34.91	39.17	35.59
S43	17.15	47.75	3.60	28.16	62.30	43.55	30.86	54.27	51.61	96.04	43.30	51.75	17.39	33.63	20.28
S44	83.20	274.97	154.35	211.10	207.51	64.86	39.63	74.32	110.19	70.00	41.57	55.37	57.54	48.71	76.47
S45	64.86	2,157.85	8.78	38.98	28.39	19.38	10.47	20.49	67.22	23.81	17.38	15.61	15.59	56.98	20.70
S46	4,718.08	358.95	34.93	190.88	74.55	71.30	24.95	52.46	31.05	67.25	73.50	55.05	52.25	432.12	70.21
S47	36.41	3,270.57	0.27	1.48	0.58	0.56	0.20	0.41	0.44	0.53	0.58	0.43	0.41	3.34	0.55
S48	0.00	0.00	3,000.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	320.95	207.52	30.63	3,396.37	144.84	268.14	70.78	166.09	248.26	145.90	115.99	363.46	195.91	247.43	424.21
S50	30.16	49.95	5.44	39.42	3,078.22	44.94	28.36	56.44	126.63	54.23	80.11	31.03	31.50	43.20	31.08
S51	105.71	72.62	6.48	71.08	19.34	3,032.78	37.67	42.56	61.50	43.87	29.99	17.14	29.07	76.58	34.11
S52	27.22	60.17	4.16	29.62	21.38	51.29	3,050.32	53.32	119.55	62.95	27.24	24.52	29.40	55.37	32.08
S53	211.91	320.26	27.73	431.59	164.54	169.08	220.75	3,377.62	378.18	280.08	187.71	130.58	174.42	267.29	225.36
S54	34.67	92.43	7.30	70.98	78.81	81.97	65.63	89.99	3,036.27	203.62	152.81	58.14	108.46	82.26	96.82
S55	105.59	141.98	22.82	423.59	185.27	155.71	203.31	198.29	128.67	3,313.47	182.10	102.92	136.86	266.89	214.95
S56	13.48	14.98	1.22	46.46	8.51	6.51	3.69	9.35	9.44	13.75	3,316.45	12.53	12.67	18.43	21.65
S57	0.60	0.86	0.09	1.39	1.07	0.60	1.03	1.09	0.88	5.10	1.06	3,040.39	0.54	1.17	0.79
S58	0.03	0.04	0.00	0.08	0.04	0.03	0.03	0.24	0.05	0.27	0.04	0.03	3,046.91	55.16	0.91
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,010.33	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

S62	7.24	13.44	1.12	24.93	8.12	12.59	7.32	19.06	23.30	15.85	8.39	19.03	7.35	9.90	11.87
S63	0.43	1.00	0.10	1.23	0.57	0.95	0.82	0.92	2.65	1.85	0.86	0.74	0.82	0.46	0.70
S64	11.14	27.62	2.67	32.73	16.37	21.99	21.83	21.30	12.35	34.57	26.20	11.37	16.24	9.82	13.34
S65	36.68	50.30	9.73	96.11	30.97	44.66	34.79	53.77	36.41	69.93	34.14	29.55	73.59	66.97	125.77
S66	46.33	41.31	3.67	46.59	80.39	22.77	13.96	33.40	46.82	57.60	91.61	20.78	28.65	74.34	39.83
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	2.86	40.66	0.69	4.26	7.17	4.50	2.44	6.62	3.82	6.14	5.32	5.08	3.80	8.27	5.41
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	1.96	2.86	0.35	6.55	10.01	6.62	2.43	6.28	4.25	8.01	5.82	2.54	4.05	6.21	7.08

	S61	**S62**	**S63**	**S64**	**S65**	**S66**	**S67**	**S68**	**S69**	**S70**	**S71**
S1	75.54	12.91	106.92	58.26	150.81	13.98	10.03	-0.32	16.61	56.33	6.80
S2	16.01	3.21	22.50	19.37	41.56	6.99	3.11	2.22	6.58	17.38	7.66
S3	28.00	13.64	46.52	30.43	39.43	28.23	76.37	9.68	129.91	106.12	364.26
S4	10.69	9.78	22.83	9.15	15.01	12.75	8.49	10.90	7.96	13.60	100.87
S5	0.95	0.54	1.66	1.00	1.34	0.99	2.25	0.45	3.71	3.15	11.69
S6	53.35	37.28	93.02	95.82	129.85	51.38	23.94	18.72	46.02	52.21	49.18
S7	31.03	19.26	36.91	24.75	37.62	34.61	43.03	19.37	34.58	48.88	439.61
S8	32.70	5.48	15.58	18.55	16.86	12.54	6.15	3.77	15.21	16.45	29.00
S9	16.81	5.21	15.58	10.75	26.80	19.34	11.08	7.85	9.74	16.02	69.76
S10	43.84	14.01	40.39	25.16	34.65	56.51	54.70	14.79	43.10	29.51	84.41
S11	62.65	15.31	46.96	40.47	52.97	59.69	70.66	20.07	52.06	38.64	121.22
S12	20.61	10.24	23.52	16.05	24.80	62.74	26.77	8.16	42.63	29.55	76.92
S13	22.86	9.54	21.05	21.18	20.68	50.61	203.67	29.43	14.78	18.37	39.93
S14	18.78	7.31	21.78	18.60	16.08	33.96	18.84	15.87	11.45	13.65	61.23
S15	49.54	26.08	19.39	16.02	21.93	147.88	50.52	5.12	68.32	27.07	30.53
S16	0.86	0.64	1.07	0.81	0.99	4.38	265.99	5.81	2.84	0.65	3.35
S17	3.15	6.15	11.73	1.23	3.26	3.10	1.66	0.63	70.81	1.54	10.42
S18	28.50	3.14	19.23	3.05	6.49	11.30	3.14	2.72	1.94	17.28	4.71
S19	200.18	31.29	230.13	149.05	369.98	29.28	21.55	4.10	40.73	127.00	6.92
S20	25.66	2.24	14.83	36.49	6.08	12.65	8.65	3.42	6.46	9.75	5.25
S21	7.44	3.40	1.74	1.53	1.34	10.57	1.35	0.58	3.13	5.35	1.10
S22	42.97	12.62	30.71	52.69	47.20	23.98	11.34	14.27	13.33	42.36	16.92
S23	24.14	16.95	9.55	13.89	6.71	15.05	6.59	7.79	3.47	18.98	8.40
S24	33.68	17.09	62.40	36.30	46.68	37.81	119.52	12.80	136.47	162.83	239.35
S25	90.57	36.18	101.66	60.87	95.06	93.39	58.77	35.09	48.96	139.80	127.52
S26	40.29	9.80	28.25	18.24	59.63	52.43	25.94	8.61	20.13	36.97	54.46
S27	4.79	2.19	7.58	4.22	6.57	4.25	2.96	1.38	3.24	4.35	5.29
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
S32	15.85	9.00	16.85	10.49	14.33	13.51	24.60	13.19	11.17	10.81	7.29
S33	0.19	0.13	0.21	0.20	0.23	0.25	0.65	0.36	12.18	0.63	0.21
S34	0.19	0.17	0.23	0.26	0.31	0.22	7.64	0.46	16.50	0.45	0.21
S35	1.90	1.00	1.24	1.02	1.46	1.66	6.99	0.48	9.08	1.28	1.76

S36	7.82	39.53	8.69	6.50	8.86	7.44	3.73	3.28	3.63	29.67	13.58
S37	0.03	0.02	0.06	0.04	0.05	0.03	0.09	0.01	0.16	0.13	0.45
S38	24.70	18.91	29.89	11.35	13.78	19.36	10.45	5.38	27.88	9.40	50.52
S39	11.21	6.03	9.16	15.17	13.03	9.72	6.45	3.08	5.12	12.34	9.86
S40	14.50	2.30	4.36	4.25	3.62	6.90	8.62	6.29	9.76	15.94	3.30
S41	23.49	5.47	7.63	31.47	15.50	7.93	10.21	5.11	2.68	7.06	2.56
S42	36.54	22.70	57.87	46.74	49.62	47.43	35.39	31.16	29.57	76.07	28.37
S43	32.21	22.20	35.72	24.60	33.47	58.62	66.50	29.52	20.29	30.32	31.04
S44	59.75	39.89	78.46	53.31	61.58	91.34	20.33	24.38	96.87	33.00	113.40
S45	46.39	16.24	18.04	49.30	30.45	96.00	9.78	13.62	18.98	46.55	42.74
S46	130.88	72.08	97.80	50.46	61.83	64.43	20.18	730.65	38.62	28.33	150.19
S47	1.01	0.56	0.76	0.41	0.50	0.50	0.16	5.64	0.30	0.22	1.16
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	333.33	224.84	396.28	192.02	423.11	270.16	62.26	131.52	79.78	96.13	94.56
S50	27.70	48.01	66.80	53.67	65.46	30.28	19.82	12.22	32.71	27.80	37.29
S51	29.63	32.16	62.88	47.05	32.87	33.14	19.67	22.73	37.60	23.37	28.13
S52	31.37	14.99	42.82	29.96	31.96	31.75	114.83	82.97	24.97	37.95	45.40
S53	191.39	158.64	263.10	229.87	269.34	208.50	260.47	112.41	118.11	144.54	252.19
S54	73.39	66.47	92.58	286.89	287.92	80.15	46.73	17.54	54.26	41.04	65.79
S55	131.99	141.15	173.74	160.03	150.62	136.59	121.89	52.38	112.26	101.93	121.15
S56	19.24	6.85	32.24	21.20	21.86	16.91	6.02	5.46	10.46	31.17	40.51
S57	0.62	34.98	7.26	0.80	0.98	20.27	7.97	0.54	5.31	23.78	0.70
S58	0.16	1.64	0.09	0.04	0.04	0.40	0.03	4.33	0.02	11.67	0.03
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.99	0.00	1.39	0.00
S61	3,000.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00
S62	11.22	3,338.53	32.51	13.86	16.60	21.10	10.66	3.63	5.63	7.24	4.53
S63	0.74	3.13	3,000.79	4.09	1.73	0.54	0.71	0.18	0.23	0.71	2.20
S64	13.19	8.02	12.89	3,012.25	14.62	12.19	10.04	6.67	5.70	8.91	7.74
S65	46.45	23.54	59.06	105.43	3,038.05	33.63	14.17	13.15	40.45	30.15	18.06
S66	27.55	27.59	50.85	44.28	65.92	3,056.07	23.49	13.25	45.63	44.05	35.70
S67	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20	0.00	0.00	0.00
S69	6.56	3.54	3.92	10.46	12.61	8.09	1.90	1.83	3,002.85	3.78	3.42
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.20	0.00
S71	38.87	2.39	9.05	9.96	9.23	7.18	3.75	2.74	6.15	9.35	3,009.68

2.4. Investment at 2% of GDP (21.43 trillion) = 428.6 billion; uniformly distributed at 6.0004 billion per sector (in millions)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15
S1	7,949.38	128.75	11.16	18.62	13.44	7.78	29.77	41.63	25.09	10.18	13.56	14.10	4.01	11.83	7,949.38
S2	520.44	7,133.01	5.41	18.22	8.68	4.35	66.50	1,394.00	22.11	13.51	13.35	18.48	4.32	16.65	520.44
S3	192.70	65.17	6,855.09	254.06	131.25	651.67	195.23	99.71	98.57	106.96	64.24	61.83	12.84	87.32	192.70
S4	82.80	10.36	44.03	6,444.92	32.09	178.77	186.27	38.22	730.81	604.40	170.19	107.08	12.46	123.13	82.80
S5	6.67	1.97	189.25	113.08	6,065.52	20.87	8.45	3.38	14.75	12.90	4.58	3.48	0.57	4.44	6.67
S6	187.43	32.82	172.68	221.27	48.31	6,344.97	93.37	147.46	210.74	226.70	157.69	113.79	37.68	105.99	187.43
S7	81.45	11.68	42.32	116.90	69.94	116.68	6,027.72	31.39	47.50	41.30	36.31	28.21	11.59	24.67	81.45
S8	29.66	9.31	10.73	30.57	23.45	10.77	319.29	7,698.39	50.86	34.11	26.53	47.65	13.61	39.35	29.66
S9	36.36	17.31	65.39	66.85	78.23	23.69	469.63	109.17	7,060.01	137.40	83.61	109.76	12.00	159.44	36.36
S10	122.69	35.74	360.57	222.34	184.87	62.48	344.03	227.96	200.73	8,758.71	2,140.87	1,257.96	127.63	1,375.77	122.69
S11	159.73	48.33	260.51	200.01	187.25	62.82	626.69	333.99	277.97	276.14	6,918.11	791.76	95.18	646.94	159.73
S12	177.49	60.14	380.31	470.18	414.99	92.53	269.96	114.51	103.32	141.63	167.03	6,866.91	17.67	191.81	177.49
S13	47.69	14.86	51.74	55.08	75.19	20.70	102.12	126.34	119.82	122.47	182.89	316.71	6,472.73	381.02	47.69
S14	91.93	31.04	44.84	52.65	73.83	18.55	285.56	195.01	38.32	110.44	111.90	425.47	45.21	6,655.29	91.93
S15	73.34	28.89	82.84	159.72	90.59	26.23	73.35	138.15	112.98	84.73	89.50	545.39	19.06	75.13	73.34
S16	1.49	7.17	1.36	5.00	1.86	1.86	1.82	7.61	2.20	1.67	2.61	4.64	0.66	1.21	1.49
S17	2.63	0.56	1.86	3.80	2.79	3.00	127.08	27.48	2.11	1.74	1.81	10.02	1.67	2.26	2.63
S18	10.26	2.50	7.40	10.64	8.67	3.56	14.41	8.99	14.28	7.32	7.76	63.09	2.00	60.17	10.26
S19	1,193.33	89.34	10.87	13.15	15.08	9.79	15.89	34.90	34.62	11.80	14.89	14.07	4.74	11.65	1,193.33
S20	14.43	11.98	5.26	9.18	6.87	3.01	34.48	69.41	40.60	6.92	7.81	41.57	1.90	9.97	14.43
S21	2.17	0.59	0.96	1.28	1.14	0.62	1.43	2.28	1.81	1.02	1.16	3.35	0.34	0.96	2.17
S22	100.42	15.69	28.70	48.92	31.59	16.76	66.11	97.84	153.30	93.85	109.62	105.77	19.34	123.14	100.42
S23	4.99	1.94	5.92	5.76	6.71	4.69	4.87	6.84	5.87	5.18	6.63	6.11	2.84	4.62	4.99
S24	277.83	96.99	177.36	379.65	203.29	331.07	300.31	138.09	127.79	142.08	80.50	81.90	15.16	123.84	277.83
S25	1,089.79	408.53	383.50	455.35	238.94	127.91	354.29	503.52	590.84	235.42	380.23	372.79	94.83	384.43	1,089.79
S26	116.38	33.07	42.10	140.47	89.81	23.56	248.14	113.73	143.99	71.58	105.23	238.76	30.03	161.77	116.38
S27	49.66	8.91	15.11	21.83	13.70	19.72	21.28	38.05	34.97	49.42	42.16	77.31	15.38	103.37	49.66
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	12.98	3.08	12.38	13.46	31.48	18.82	13.81	24.09	27.77	19.32	27.06	21.50	5.70	12.92	12.98
S33	0.26	0.12	0.30	0.42	0.41	1.88	0.26	0.50	0.41	0.34	0.41	0.31	0.15	0.27	0.26
S34	0.21	0.09	0.35	0.34	0.44	0.24	0.32	0.32	0.31	0.29	0.38	0.37	0.21	0.29	0.21
S35	5.09	0.93	2.21	3.30	10.22	2.38	3.73	14.03	5.95	7.65	13.06	6.63	3.35	4.92	5.09
S36	7.81	2.37	8.23	8.23	15.57	30.44	10.41	12.27	14.32	10.84	14.26	11.47	3.62	7.25	7.81
S37	0.24	0.08	8.45	0.31	0.16	0.80	0.24	0.12	0.12	0.13	0.08	0.08	0.02	0.11	0.24
S38	19.40	32.86	17.35	120.78	20.29	127.19	24.78	93.42	90.55	34.02	27.11	21.39	7.22	19.21	19.40
S39	29.58	6.34	10.92	39.01	12.28	13.71	37.30	278.73	125.57	21.82	50.18	36.96	41.02	26.92	29.58
S40	3.70	1.19	5.50	4.42	4.69	5.05	5.47	3.99	3.99	3.60	5.51	5.41	2.98	3.15	3.70
S41	3.63	1.22	5.23	4.25	6.01	3.89	4.78	4.01	4.39	3.41	4.75	4.26	1.82	2.99	3.63
S42	40.57	12.58	60.63	46.24	64.93	44.65	54.96	43.11	47.86	35.08	50.81	46.02	17.54	32.12	40.57
S43	21.74	7.15	30.72	27.67	29.86	38.51	35.10	68.10	59.49	53.22	72.82	59.30	20.01	39.32	21.74
S44	98.35	23.08	124.97	104.10	152.76	144.88	84.80	64.23	104.76	80.29	91.75	86.55	39.37	64.01	98.35

S45	28.46	11.75	122.51	141.93	312.72	36.50	35.45	24.72	40.39	72.23	66.83	62.72	14.17	41.27	28.46
S46	149.12	177.11	365.06	231.49	284.28	79.50	62.38	99.32	149.53	87.10	78.80	88.60	26.02	105.25	149.12
S47	1.16	1.37	2.84	1.81	2.20	0.62	0.49	0.78	1.17	0.68	0.63	0.71	0.22	0.82	1.16
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	602.13	55.48	157.95	119.80	132.48	125.28	183.54	173.46	156.78	100.79	202.31	154.22	123.55	117.03	602.13
S50	122.31	34.32	179.24	155.07	225.91	53.02	130.60	60.81	98.88	75.86	95.09	90.08	31.31	69.94	122.31
S51	42.20	19.39	102.41	72.42	105.35	67.96	56.47	76.46	59.54	57.84	95.88	69.37	67.46	45.66	42.20
S52	34.50	13.50	218.85	59.22	36.75	55.33	49.56	40.88	44.77	37.92	65.52	86.79	25.95	33.36	34.50
S53	236.62	109.15	356.97	362.55	512.89	276.02	389.66	374.94	347.80	339.79	421.75	348.43	213.77	275.06	236.62
S54	134.05	36.63	423.46	337.03	161.52	91.93	150.94	157.44	224.71	157.00	293.61	458.88	336.07	196.65	134.05
S55	151.93	38.08	147.08	154.01	188.13	264.38	152.12	161.03	191.69	200.20	285.32	176.85	95.35	135.97	151.93
S56	23.10	5.32	43.96	30.78	26.09	19.59	23.81	19.67	27.46	24.15	21.61	16.42	5.36	14.28	23.10
S57	1.16	0.88	0.78	0.85	0.97	3.91	0.93	1.12	1.16	1.13	1.28	1.03	0.40	0.85	1.16
S58	0.04	0.02	0.04	0.04	0.06	0.04	0.05	0.05	0.05	0.05	0.06	0.05	0.03	0.04	0.04
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	9.51	2.39	9.29	8.06	9.92	7.45	8.34	9.56	9.97	8.39	11.10	10.47	5.02	6.55	9.51
S63	0.77	0.14	0.74	0.69	1.05	0.69	0.71	0.81	0.92	0.69	1.02	0.97	0.45	0.54	0.77
S64	11.69	2.88	11.89	11.90	23.87	19.12	12.43	18.38	21.41	15.56	21.53	17.53	5.46	10.96	11.69
S65	37.90	11.32	26.35	26.40	52.75	37.41	24.80	37.09	39.29	31.07	40.45	34.42	13.16	23.01	37.90
S66	42.51	50.05	36.19	39.90	64.14	25.80	62.10	68.09	75.97	71.60	75.92	57.11	19.30	43.96	42.51
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	3.29	1.35	4.83	5.89	8.79	5.07	3.40	4.02	3.80	4.29	5.02	9.61	1.54	10.78	3.29
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	6.41	2.12	4.66	5.08	4.01	38.86	4.84	8.00	11.63	11.01	9.38	7.27	2.44	6.66	6.41

	S16	**S17**	**S18**	**S19**	**S20**	**S21**	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
S1	9.91	39.24	43.16	2,917.30	355.25	285.84	69.83	64.02	15.67	163.16	68.27	26.13	45.20	128.72	50.27
S2	10.71	191.55	39.62	305.85	41.27	73.78	458.57	64.84	7.02	33.21	112.11	13.08	10.91	55.92	11.39
S3	31.51	80.37	57.20	124.43	95.60	51.89	105.08	147.23	3,972.38	185.09	112.76	62.52	64.60	69.54	54.17
S4	55.12	76.94	56.43	72.38	56.73	23.59	97.28	35.70	84.68	85.55	61.26	13.55	17.85	20.05	17.07
S5	1.78	3.49	2.52	4.63	3.58	1.83	4.50	4.65	110.64	6.51	4.12	1.96	2.09	2.26	1.79
S6	73.37	143.67	92.01	182.53	222.20	110.40	250.62	181.84	191.76	188.59	216.44	126.33	172.05	311.25	252.75
S7	21.73	35.55	24.28	54.75	41.47	28.09	51.73	47.81	114.12	37.69	42.21	47.52	58.57	71.20	67.85
S8	27.22	917.74	80.97	42.83	30.16	18.27	371.23	51.63	13.52	19.65	84.23	32.74	21.97	44.22	20.57
S9	43.20	94.42	71.67	98.17	66.67	27.23	61.09	29.28	83.69	54.07	103.59	17.79	32.17	23.19	24.26
S10	615.30	752.39	481.35	220.49	180.93	96.78	215.32	147.79	230.21	112.97	232.36	55.02	77.80	52.39	43.28
S11	472.91	513.99	323.66	301.85	207.45	175.40	382.49	263.02	186.20	210.75	371.56	63.42	82.10	62.94	52.55
S12	216.15	79.54	116.77	151.00	75.31	49.21	127.37	201.09	241.21	153.37	144.70	47.35	53.43	40.42	35.85
S13	630.00	204.55	178.31	80.48	169.49	99.06	101.38	219.02	50.39	113.85	150.27	94.13	69.97	40.50	51.26
S14	114.19	71.30	92.03	67.81	42.61	26.99	70.27	54.48	37.80	42.16	91.70	21.63	31.60	22.91	30.20
S15	241.76	111.45	79.07	101.94	66.68	38.57	137.31	96.53	64.01	63.53	81.70	75.97	260.87	108.12	53.19
S16	7,644.59	2.67	1.54	1.74	1.55	1.49	2.28	2.02	1.41	1.25	1.86	3.44	5.37	1.80	1.91
S17	11.26	6,391.96	21.92	2.47	1.89	1.79	3.42	2.34	3.20	1.84	14.22	5.62	10.54	2.74	3.20

S18	8.46	8.20	6,287.31	7.82	22.73	85.92	7.04	9.69	6.17	12.34	12.95	11.52	18.17	9.25	6.33
S19	9.93	26.27	21.34	8,086.06	90.99	663.77	104.39	117.77	18.99	88.22	47.48	34.95	21.74	175.20	65.56
S20	36.92	357.05	115.06	23.12	7,299.63	910.79	196.87	84.01	6.97	9.84	110.48	19.98	12.36	13.77	194.03
S21	1.96	7.03	5.77	1.99	122.90	6,746.82	4.58	127.25	1.08	1.12	2.93	6.70	9.10	1.98	13.68
S22	57.71	218.87	152.91	427.13	154.42	118.36	7,923.06	859.93	32.79	139.66	250.86	65.65	31.51	101.14	48.52
S23	4.73	7.15	5.97	7.32	7.31	14.09	6.34	6,120.83	5.59	10.20	7.84	45.67	13.06	12.67	12.98
S24	39.60	103.90	74.16	171.22	102.22	63.76	127.35	205.04	6,385.53	182.03	124.48	83.15	81.47	73.82	55.81
S25	218.94	804.54	659.66	726.97	2,423.61	620.11	1,188.40	1,034.48	471.31	8,994.22	3,033.56	130.04	138.97	142.54	155.22
S26	144.33	603.14	325.68	286.99	148.46	195.88	212.23	135.63	48.19	210.92	6,653.66	88.48	126.49	103.68	43.34
S27	15.88	64.69	100.26	65.63	60.79	34.30	70.00	30.07	14.39	63.22	77.67	6,158.70	61.51	18.21	8.80
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.27	0.00	14.08
S32	16.96	32.07	20.96	20.34	17.89	19.06	20.76	40.82	14.22	13.92	26.68	41.61	19.89	17.02	19.03
S33	0.23	0.45	0.36	0.31	0.42	0.37	0.42	0.61	0.38	0.26	0.42	1.16	1.03	0.92	0.74
S34	0.28	0.40	0.35	0.32	0.36	0.39	0.31	0.38	0.32	0.29	0.36	0.79	0.62	0.46	0.56
S35	3.78	12.29	8.20	4.83	9.52	7.78	10.01	9.61	8.75	3.43	9.62	14.94	33.65	23.19	28.89
S36	9.16	16.08	12.02	11.13	10.05	10.63	11.43	19.83	8.73	8.21	13.87	14.76	12.92	10.73	11.68
S37	0.04	0.10	0.07	0.15	0.12	0.06	0.13	0.18	4.90	0.23	0.14	0.08	0.08	0.09	0.07
S38	13.68	58.66	28.41	29.01	33.89	20.56	50.64	60.77	38.26	20.86	43.56	206.51	85.95	50.03	45.61
S39	21.50	86.13	50.53	68.11	248.50	171.42	188.35	185.02	56.30	57.47	194.29	93.89	214.42	217.89	300.94
S40	5.42	5.06	5.08	4.51	4.60	4.97	4.38	9.35	4.90	4.26	4.85	14.13	11.92	7.29	10.73
S41	3.19	4.79	4.23	4.24	4.15	4.29	4.03	6.36	4.56	3.37	4.66	9.87	17.72	13.30	6.41
S42	32.99	50.41	45.38	45.00	43.63	44.25	42.62	71.99	51.49	34.85	49.81	116.25	100.83	61.50	67.92
S43	46.98	78.80	52.44	39.94	51.33	54.80	57.32	62.66	33.44	30.79	57.41	53.20	96.57	62.09	64.51
S44	65.87	106.69	80.76	102.78	89.00	102.35	67.73	90.66	97.21	66.51	96.93	157.62	127.07	165.91	203.99
S45	40.98	69.32	51.20	30.93	26.54	27.39	26.30	30.08	80.84	23.63	28.75	42.73	28.61	35.02	52.50
S46	115.88	116.01	76.26	130.43	131.99	180.73	82.47	75.99	232.84	79.24	86.95	211.38	160.07	124.37	127.28
S47	0.91	0.91	0.60	1.03	1.04	1.42	0.65	0.60	1.82	0.63	0.69	1.66	1.24	0.97	1.03
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	184.91	236.56	162.76	339.37	250.30	205.47	187.29	299.29	134.77	151.30	217.65	523.54	564.38	789.11	718.22
S50	73.68	71.67	87.16	115.26	79.02	90.76	88.80	101.40	143.89	101.92	89.47	173.73	77.13	91.52	138.67
S51	95.33	74.29	86.27	49.81	69.28	71.54	72.11	84.63	85.34	66.22	81.69	83.98	49.07	44.45	66.92
S52	59.13	51.01	45.84	46.38	48.33	48.89	43.33	75.09	150.91	43.60	49.01	94.14	103.00	50.85	80.42
S53	310.58	482.72	398.84	353.64	406.30	437.24	347.30	410.71	327.88	304.76	414.68	627.81	697.19	443.46	536.69
S54	246.59	191.28	245.66	332.58	316.62	411.68	246.01	222.25	391.44	338.19	259.67	389.22	120.58	216.28	719.53
S55	220.02	181.82	170.12	173.97	196.62	270.27	200.82	403.31	163.85	156.91	205.78	433.79	314.72	284.76	313.01
S56	13.66	25.80	15.84	30.24	31.99	18.08	28.93	25.26	39.14	34.62	29.76	25.23	42.39	32.92	27.75
S57	0.78	1.13	0.97	1.19	1.14	1.03	1.45	8.59	1.31	1.02	1.36	11.70	2.96	36.73	1.67
S58	0.04	0.06	0.05	0.05	0.05	0.06	0.05	0.07	0.04	0.04	0.06	0.10	0.09	0.08	0.08
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	7.82	11.04	9.29	11.01	10.25	10.88	9.86	13.88	9.45	7.77	11.31	23.26	30.38	28.38	17.39
S63	0.71	1.05	0.83	0.95	0.67	0.75	0.81	1.35	0.76	0.69	0.98	1.57	0.76	1.43	1.17
S64	13.97	24.34	18.27	16.69	15.41	16.03	16.76	37.03	12.66	11.98	22.25	24.37	15.82	17.19	17.75
S65	27.61	44.28	33.73	39.40	34.83	35.92	34.22	55.59	29.05	24.44	40.29	62.40	58.69	64.15	65.71

S66	37.30	62.93	48.67	63.47	66.06	46.77	107.03	85.69	49.47	65.22	78.98	136.57	87.90	118.47	101.49
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	2.96	4.72	4.90	3.63	4.12	3.53	3.92	8.61	5.01	3.65	4.35	50.35	17.82	14.13	12.86
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	5.03	9.55	6.89	12.54	15.59	9.05	13.90	10.53	9.17	17.53	13.41	9.24	13.82	13.76	10.97

	S31	**S32**	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**	**S41**	**S42**	**S43**	**S44**	**S45**
S1	27.08	44.42	9.25	54.13	13.08	11.11	3.41	19.19	12.32	6.75	12.99	11.33	15.04	9.79	12.22
S2	13.03	10.93	55.27	11.16	8.21	11.42	2.22	14.81	12.39	5.73	7.10	9.00	13.24	5.28	5.95
S3	63.89	329.43	436.18	251.98	409.03	198.42	16.48	411.25	92.69	18.92	33.24	31.67	40.50	64.52	68.59
S4	19.13	12.93	44.02	22.31	19.70	15.71	7.16	21.18	31.87	5.62	9.98	20.22	22.57	7.57	8.83
S5	2.10	9.28	12.73	7.31	11.58	5.73	0.58	11.67	3.08	0.63	1.11	1.23	1.51	1.92	2.06
S6	215.62	52.20	57.85	82.40	97.02	68.85	47.95	72.13	553.95	32.69	67.42	71.84	69.21	60.35	68.45
S7	83.54	32.47	168.43	40.51	45.21	75.44	45.11	67.67	108.86	12.70	30.89	40.40	27.97	42.57	47.83
S8	33.56	8.58	289.68	14.09	18.29	16.78	5.15	20.18	38.23	8.08	16.54	25.14	44.92	10.34	11.47
S9	32.27	16.50	35.13	22.51	24.46	20.36	8.12	25.04	39.35	6.54	11.48	54.48	35.58	11.70	13.58
S10	69.54	43.96	194.77	153.51	86.99	70.26	47.33	102.28	103.13	22.55	27.55	97.93	61.83	21.50	27.17
S11	79.93	49.18	125.98	326.01	98.10	93.42	132.00	106.07	113.67	39.21	33.58	185.67	83.80	28.17	36.03
S12	46.42	50.30	82.98	71.86	81.63	61.23	19.83	209.85	84.21	16.37	24.26	55.90	48.70	17.15	22.90
S13	63.30	21.94	53.31	68.39	44.30	36.88	12.57	41.63	56.10	87.37	70.39	259.97	142.86	24.39	36.30
S14	28.04	13.06	45.38	30.56	24.82	61.85	8.85	28.80	64.28	8.89	13.93	92.59	29.10	13.21	15.75
S15	109.30	24.33	42.62	58.47	193.66	102.48	9.49	48.28	300.87	20.30	32.42	47.82	36.20	16.83	22.13
S16	2.95	44.46	179.89	354.33	9.05	5.69	1.14	45.65	2.02	1.29	2.74	2.29	2.89	1.77	2.61
S17	16.79	1.64	5.34	10.71	4.50	2.88	1.34	3.70	3.55	0.95	2.62	5.34	9.39	1.99	4.59
S18	18.88	4.33	4.53	7.55	7.23	10.73	1.79	13.92	26.00	2.60	4.75	8.36	8.04	5.21	4.85
S19	39.16	106.54	10.78	124.61	19.91	15.29	4.70	20.81	14.59	10.40	23.00	17.94	23.98	17.67	22.36
S20	29.44	4.10	7.26	36.47	7.98	7.45	1.62	12.60	9.04	3.94	15.05	7.75	6.87	3.12	3.99
S21	8.51	0.93	0.95	2.29	2.70	1.97	0.43	1.74	2.17	2.41	4.18	13.12	3.80	1.01	1.58
S22	55.99	33.03	30.95	47.64	43.53	131.62	11.67	144.55	58.25	62.14	36.75	36.02	48.48	30.31	30.28
S23	55.21	7.40	7.00	14.32	19.12	17.72	3.07	26.60	6.50	86.44	60.80	16.28	126.94	13.68	30.64
S24	75.16	524.31	695.43	387.42	644.32	310.28	18.25	652.56	81.00	25.52	43.90	41.05	55.15	95.61	98.80
S25	147.54	84.72	150.60	134.97	133.07	99.49	30.04	170.77	243.63	68.17	89.24	110.99	121.55	53.69	69.17
S26	86.25	34.71	35.49	46.43	66.99	34.20	18.60	140.76	74.70	20.60	27.24	83.28	37.24	17.10	21.04
S27	108.19	13.36	13.83	9.25	11.07	9.51	2.43	9.11	9.45	17.38	7.29	19.27	7.62	3.79	5.37
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	6,004.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	23.71	6,021.66	15.59	63.90	43.53	22.00	5.09	37.95	22.06	19.38	39.80	32.43	53.00	43.67	67.52
S33	1.16	1.22	6,006.52	2.62	64.95	0.61	0.54	8.26	1.83	0.29	0.56	2.06	0.64	0.46	1.00
S34	0.78	0.22	0.32	6,002.72	0.90	0.45	0.65	0.36	0.35	0.33	0.73	0.58	0.70	0.53	1.22
S35	24.54	31.95	13.87	18.16	6,091.08	7.83	1.95	64.29	5.90	3.28	5.94	2.42	6.78	1.44	2.40
S36	14.84	7.31	42.71	16.26	9.95	6,012.71	3.61	10.62	13.24	10.29	24.77	30.64	30.80	25.98	33.54
S37	0.08	0.41	0.54	0.31	0.50	0.24	6,000.42	0.51	0.11	0.02	0.04	0.04	0.05	0.08	0.08
S38	125.74	647.77	181.21	606.53	852.70	85.08	59.04	6,847.46	95.58	44.91	87.00	28.19	93.08	22.44	59.50
S39	178.66	13.80	22.58	110.73	191.71	24.83	4.90	43.62	6,503.72	16.57	22.54	17.91	26.82	5.46	6.94

S40	11.85	4.75	8.86	10.38	8.06	6.53	1.93	15.60	9.75	6,229.46	8.90	13.95	34.52	7.70	17.03
S41	12.44	6.21	4.62	7.59	10.61	11.19	13.69	10.28	6.16	6.10	7,003.95	439.29	13.69	8.98	11.08
S42	129.21	50.27	45.78	88.10	135.84	147.95	67.05	132.96	73.72	67.79	67.66	6,923.63	170.94	106.96	127.86
S43	80.06	34.48	32.32	58.58	42.16	50.94	14.18	49.01	37.71	54.15	42.44	77.96	6,272.35	86.20	73.83
S44	206.84	142.36	378.62	249.81	193.10	813.13	33.04	95.64	146.53	65.80	153.43	108.93	97.78	6,344.32	627.36
S45	40.14	196.38	109.95	1,116.78	67.89	215.19	17.11	86.20	31.27	18.63	45.42	26.99	25.06	289.74	6,683.19
S46	154.89	73.80	71.04	188.32	398.42	483.53	51.75	144.47	208.42	35.61	186.76	89.76	75.05	96.02	271.25
S47	1.21	0.58	0.55	1.47	3.09	3.74	0.40	1.13	1.62	0.28	1.45	0.70	0.59	0.75	2.11
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	945.90	146.27	122.15	263.57	273.00	268.47	50.11	181.36	1,100.61	143.00	395.74	278.88	312.46	356.07	481.20
S50	125.85	335.98	393.37	141.29	239.05	231.43	19.70	88.05	97.40	62.76	189.55	161.31	161.55	86.98	129.55
S51	71.07	34.16	68.91	85.57	50.58	60.03	26.20	50.43	54.56	64.46	81.59	74.26	90.17	55.02	122.82
S52	74.06	37.31	133.10	69.10	67.73	60.01	11.58	47.66	45.84	117.85	64.43	96.18	189.55	88.65	135.07
S53	742.44	190.32	368.49	478.37	323.92	391.75	278.83	250.71	328.27	352.77	818.35	723.41	772.83	545.95	699.80
S54	254.18	136.27	104.56	291.95	260.90	167.51	27.71	205.31	113.32	145.55	116.51	115.52	120.89	93.24	224.21
S55	443.44	360.91	232.52	985.86	433.76	606.75	146.58	335.45	438.81	265.23	308.54	374.03	637.34	290.02	344.19
S56	34.36	12.03	17.69	23.65	35.98	21.99	4.85	24.41	64.75	7.07	12.44	11.86	11.84	14.34	13.67
S57	45.92	6.74	4.79	2.92	3.11	2.20	1.72	3.53	1.78	0.92	6.25	4.70	5.51	1.44	1.82
S58	0.10	0.05	0.06	0.12	0.09	0.09	0.03	0.06	0.07	0.05	0.33	0.21	0.11	0.07	0.09
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S62	22.93	11.39	26.33	15.56	17.51	16.96	5.67	21.33	15.89	10.65	506.64	261.35	20.62	20.70	24.07
S63	2.70	0.68	0.55	1.25	0.75	0.87	0.21	0.69	0.83	0.74	1.64	1.39	2.01	1.59	2.18
S64	22.10	12.89	13.98	27.62	16.09	18.99	5.10	30.47	23.49	17.63	35.09	31.29	55.09	44.44	60.19
S65	76.22	440.69	26.26	61.18	68.65	56.97	14.75	66.98	54.88	27.75	66.97	49.66	74.12	81.64	91.37
S66	108.89	47.17	45.43	69.48	253.99	144.68	32.45	96.60	90.17	27.91	42.39	61.98	80.04	63.54	73.01
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	30.64	10.00	6.05	353.72	115.07	26.67	5.54	27.47	16.95	10.25	21.27	7.38	21.70	21.33	123.78
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	12.67	4.80	4.51	7.06	10.10	5.83	2.23	7.43	28.94	3.50	6.58	5.81	5.92	6.25	6.51

	S46	**S47**	**S48**	**S49**	**S50**	**S51**	**S52**	**S53**	**S54**	**S55**	**S56**	**S57**	**S58**	**S59**	**S60**
S1	7.91	11.76	2.65	24.23	9.91	9.59	8.87	33.58	11.53	46.15	13.53	63.95	20.10	48.23	105.28
S2	4.16	5.51	3.70	21.17	7.94	5.06	3.75	11.61	5.67	12.77	8.46	12.59	8.86	13.36	20.38
S3	21.04	78.74	11.29	126.20	60.23	23.73	21.89	38.15	43.21	63.41	105.70	42.64	33.02	49.95	54.05
S4	6.33	9.93	7.29	38.22	11.15	6.62	5.60	19.88	11.73	17.99	28.58	18.04	13.52	17.58	17.50
S5	0.70	2.35	0.43	4.13	1.85	0.77	0.71	1.60	1.43	2.06	3.39	1.48	1.14	1.68	1.79
S6	65.20	114.09	10.49	549.26	70.36	62.07	26.74	64.69	140.31	72.01	77.80	177.98	69.16	116.54	143.51
S7	43.70	48.94	196.21	409.85	30.16	38.27	12.31	29.95	41.31	29.82	26.41	55.70	30.66	42.12	63.74
S8	10.13	10.57	15.89	80.40	19.08	10.41	5.76	15.93	11.02	21.47	14.85	13.60	14.12	19.06	18.96
S9	9.08	13.20	17.11	47.92	22.04	9.25	9.22	39.24	13.70	28.75	39.61	14.52	34.05	39.76	26.88
S10	19.79	26.77	16.78	94.86	48.65	18.94	28.19	59.62	33.84	68.46	208.44	41.38	38.07	52.60	50.02
S11	23.67	35.18	25.55	111.20	64.27	25.00	40.91	74.80	46.61	81.40	273.48	46.94	44.52	62.07	56.58
S12	24.76	23.07	11.00	54.33	74.15	14.93	33.99	43.88	30.41	65.82	327.02	49.64	29.71	38.66	35.96
S13	18.35	58.49	7.68	42.85	34.72	42.32	104.67	73.32	132.39	76.74	96.08	35.50	97.47	41.94	36.75

S14	11.42	15.06	10.92	51.32	21.07	11.11	27.46	46.64	17.29	44.56	110.02	31.73	14.70	25.68	53.42
S15	14.99	20.47	4.59	38.36	61.09	14.31	16.76	50.44	33.81	124.96	203.73	24.27	23.24	42.23	31.19
S16	1.35	2.34	0.22	2.95	1.70	1.37	1.49	15.27	2.79	2.89	5.57	1.36	1.33	1.93	1.64
S17	1.57	3.64	33.18	10.45	1.79	1.89	0.92	4.01	1.93	2.02	2.03	2.05	5.34	3.52	2.56
S18	3.37	4.41	0.96	11.81	5.96	4.22	4.00	18.78	4.66	23.14	41.34	13.08	145.55	187.85	41.41
S19	14.42	22.22	3.57	37.02	15.26	17.20	14.87	57.56	19.40	33.53	19.26	160.55	27.81	103.98	259.12
S20	2.49	3.61	3.04	8.68	10.65	2.89	2.55	7.84	3.69	9.94	22.41	4.75	7.63	15.18	108.68
S21	1.16	1.43	0.18	1.67	3.46	1.08	0.75	1.97	1.47	4.51	11.61	2.57	1.89	3.96	2.92
S22	14.72	25.04	5.49	43.34	45.82	26.24	19.46	51.32	28.47	69.79	55.45	27.66	35.64	61.40	85.50
S23	21.23	23.47	1.23	12.02	13.44	18.77	9.10	36.35	18.04	30.31	8.62	23.12	16.11	29.85	11.22
S24	25.57	111.14	16.69	137.62	85.79	29.01	31.18	50.50	51.82	90.25	158.21	47.09	39.51	61.53	66.46
S25	46.42	63.12	22.32	242.47	87.61	57.90	46.03	199.57	91.02	183.35	200.22	84.98	472.77	403.44	266.95
S26	14.33	19.51	12.65	49.65	60.13	15.78	22.19	60.10	23.12	51.99	77.35	33.44	91.59	71.79	84.55
S27	3.24	4.83	1.34	8.47	126.65	3.75	4.61	7.29	8.03	7.95	16.65	5.83	9.98	10.99	8.97
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S32	17.61	62.43	5.03	69.31	34.00	39.47	41.69	41.63	20.92	71.34	52.93	25.93	32.49	20.77	30.48
S33	1.56	0.84	0.06	0.67	0.60	0.97	0.45	1.92	0.40	1.25	0.45	0.26	0.32	0.68	0.36
S34	0.35	0.94	0.05	0.69	0.34	0.32	0.37	4.99	1.44	0.54	0.37	5.49	0.33	0.91	0.41
S35	1.16	2.18	0.31	2.62	3.86	2.54	1.71	7.57	1.70	3.91	5.76	1.57	2.25	3.28	2.48
S36	21.39	31.36	4.35	39.64	19.65	25.43	23.68	40.20	13.80	42.60	23.81	15.73	21.03	24.85	31.24
S37	0.03	0.10	0.01	0.16	0.07	0.03	0.03	0.05	0.05	0.08	0.13	0.05	0.04	0.06	0.07
S38	15.39	46.13	2.94	37.71	59.60	31.92	21.11	80.90	25.33	47.24	116.50	23.21	26.52	41.15	30.50
S39	4.68	6.65	2.18	14.31	16.77	8.65	6.52	14.50	6.96	24.00	19.00	9.42	14.29	18.57	18.54
S40	5.57	13.88	0.88	9.40	9.69	27.00	16.36	24.88	27.81	21.58	5.74	16.12	14.23	14.65	7.76
S41	7.42	11.52	1.43	13.06	15.12	10.35	7.10	20.19	11.10	12.50	7.38	73.85	6.50	7.28	60.71
S42	92.00	139.45	18.22	143.95	68.47	133.41	81.04	103.76	102.67	145.61	83.46	74.48	69.82	78.34	71.18
S43	34.30	95.49	7.19	56.32	124.59	87.10	61.72	108.53	103.21	192.07	86.61	103.50	34.78	67.26	40.56
S44	166.40	549.94	308.70	422.21	415.02	129.71	79.27	148.64	220.37	139.99	83.14	110.73	115.08	97.42	152.94
S45	129.73	4,315.69	17.55	77.95	56.78	38.75	20.94	40.99	134.44	47.62	34.76	31.22	31.19	113.97	41.39
S46	9,436.15	717.89	69.86	381.75	149.11	142.61	49.90	104.91	62.09	134.50	147.01	110.10	104.49	864.23	140.42
S47	72.81	6,541.14	0.54	2.95	1.16	1.11	0.39	0.82	0.87	1.06	1.15	0.86	0.82	6.68	1.10
S48	0.00	0.00	6,000.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	641.91	415.03	61.27	6,792.75	289.68	536.27	141.57	332.17	496.52	291.80	231.99	726.92	391.81	494.86	848.43
S50	60.32	99.89	10.89	78.84	6,156.43	89.87	56.72	112.89	253.26	108.46	160.21	62.06	63.00	86.40	62.16
S51	211.43	145.24	12.96	142.16	38.69	6,065.56	75.33	85.12	123.01	87.74	59.97	34.28	58.14	153.16	68.23
S52	54.43	120.33	8.32	59.24	42.76	102.59	6,100.64	106.64	239.11	125.90	54.48	49.05	58.79	110.75	64.16
S53	423.82	640.51	55.46	863.18	329.07	338.17	441.49	6,755.25	756.37	560.15	375.42	261.16	348.85	534.58	450.73
S54	69.35	184.87	14.60	141.97	157.62	163.94	131.25	179.98	6,072.53	407.23	305.62	116.28	216.93	164.52	193.64
S55	211.18	283.96	45.65	847.18	370.53	311.43	406.61	396.59	257.34	6,626.94	364.21	205.84	273.72	533.79	429.89
S56	26.95	29.97	2.45	92.93	17.02	13.01	7.38	18.71	18.87	27.50	6,632.89	25.06	25.33	36.85	43.29
S57	1.20	1.73	0.17	2.78	2.15	1.20	2.06	2.18	1.76	10.21	2.13	6,080.77	1.08	2.33	1.58
S58	0.06	0.08	0.01	0.15	0.07	0.06	0.07	0.48	0.10	0.55	0.08	0.05	6,093.82	110.31	1.82
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,020.66	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40
S61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

S62	14.48	26.88	2.23	49.87	16.24	25.19	14.64	38.12	46.60	31.71	16.77	38.06	14.69	19.81	23.74
S63	0.86	2.01	0.20	2.46	1.14	1.90	1.64	1.84	5.29	3.70	1.71	1.48	1.65	0.92	1.39
S64	22.28	55.23	5.34	65.47	32.74	43.98	43.67	42.61	24.71	69.14	52.41	22.73	32.49	19.65	26.69
S65	73.36	100.59	19.46	192.22	61.95	89.33	69.59	107.54	72.83	139.87	68.28	59.11	147.19	133.93	251.54
S66	92.66	82.62	7.35	93.17	160.78	45.54	27.92	66.79	93.64	115.21	183.23	41.55	57.30	148.69	79.65
S67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S69	5.73	81.32	1.38	8.51	14.34	9.00	4.87	13.25	7.63	12.27	10.65	10.15	7.60	16.55	10.81
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S71	3.93	5.71	0.71	13.09	20.03	13.25	4.86	12.55	8.49	16.02	11.65	5.08	8.11	12.42	14.15

	S61	**S62**	**S63**	**S64**	**S65**	**S66**	**S67**	**S68**	**S69**	**S70**	**S71**
S1	151.09	25.83	213.84	116.52	301.62	27.97	20.05	-0.64	33.23	112.66	13.60
S2	32.03	6.42	45.01	38.74	83.11	13.98	6.23	4.44	13.17	34.77	15.32
S3	55.99	27.28	93.03	60.85	78.86	56.46	152.75	19.36	259.82	212.23	728.52
S4	21.38	19.56	45.66	18.30	30.01	25.49	16.98	21.79	15.91	27.21	201.75
S5	1.90	1.08	3.33	1.99	2.68	1.99	4.50	0.90	7.41	6.29	23.37
S6	106.71	74.55	186.05	191.64	259.69	102.76	47.87	37.44	92.03	104.43	98.36
S7	62.07	38.52	73.82	49.51	75.23	69.21	86.05	38.73	69.16	97.76	879.23
S8	65.40	10.96	31.17	37.10	33.72	25.08	12.30	7.53	30.42	32.90	58.01
S9	33.62	10.42	31.15	21.49	53.60	38.68	22.16	15.70	19.47	32.03	139.53
S10	87.67	28.03	80.79	50.33	69.30	113.02	109.40	29.58	86.21	59.03	168.82
S11	125.29	30.62	93.93	80.95	105.94	119.38	141.32	40.13	104.12	77.29	242.44
S12	41.23	20.49	47.04	32.11	49.61	125.47	53.53	16.31	85.26	59.09	153.83
S13	45.72	19.09	42.10	42.36	41.35	101.22	407.34	58.87	29.56	36.75	79.87
S14	37.57	14.61	43.57	37.21	32.17	67.92	37.68	31.75	22.90	27.31	122.45
S15	99.08	52.16	38.78	32.04	43.87	295.77	101.03	10.23	136.65	54.15	61.06
S16	1.71	1.27	2.13	1.62	1.98	8.76	531.98	11.62	5.69	1.29	6.71
S17	6.30	12.30	23.46	2.45	6.53	6.20	3.32	1.26	141.61	3.07	20.85
S18	57.00	6.28	38.45	6.11	12.97	22.61	6.29	5.45	3.88	34.55	9.41
S19	400.35	62.57	460.26	298.11	739.97	58.57	43.11	8.21	81.45	254.00	13.84
S20	51.32	4.48	29.65	72.98	12.16	25.30	17.30	6.84	12.91	19.51	10.50
S21	14.88	6.79	3.47	3.06	2.68	21.15	2.71	1.16	6.27	10.71	2.20
S22	85.94	25.24	61.43	105.39	94.39	47.96	22.68	28.53	26.66	84.72	33.84
S23	48.29	33.90	19.11	27.79	13.41	30.11	13.17	15.59	6.95	37.95	16.81
S24	67.35	34.19	124.80	72.60	93.35	75.62	239.04	25.59	272.95	325.66	478.70
S25	181.13	72.36	203.32	121.74	190.11	186.78	117.55	70.17	97.92	279.60	255.05
S26	80.58	19.61	56.50	36.49	119.26	104.86	51.88	17.22	40.25	73.94	108.91
S27	9.58	4.37	15.17	8.43	13.14	8.50	5.92	2.75	6.48	8.69	10.59
S28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S31	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
S32	31.71	17.99	33.71	20.99	28.67	27.03	49.19	26.37	22.34	21.62	14.58
S33	0.37	0.27	0.42	0.39	0.46	0.50	1.31	0.72	24.36	1.25	0.42
S34	0.37	0.35	0.46	0.53	0.61	0.45	15.28	0.93	32.99	0.91	0.42
S35	3.80	2.00	2.47	2.05	2.93	3.31	13.97	0.97	18.15	2.56	3.52

S36	15.64	79.05	17.38	13.00	17.73	14.89	7.45	6.56	7.27	59.34	27.16
S37	0.07	0.03	0.11	0.08	0.10	0.07	0.19	0.02	0.32	0.26	0.90
S38	49.40	37.81	59.79	22.69	27.56	38.71	20.89	10.77	55.76	18.81	101.03
S39	22.41	12.05	18.31	30.35	26.06	19.43	12.89	6.17	10.24	24.68	19.71
S40	29.00	4.60	8.71	8.49	7.24	13.80	17.24	12.59	19.52	31.89	6.60
S41	46.97	10.94	15.26	62.94	30.99	15.86	20.42	10.23	5.36	14.11	5.12
S42	73.08	45.40	115.73	93.48	99.24	94.85	70.78	62.31	59.13	152.13	56.75
S43	64.43	44.39	71.44	49.20	66.95	117.24	132.99	59.05	40.57	60.64	62.09
S44	119.49	79.79	156.92	106.62	123.17	182.67	40.66	48.76	193.75	66.00	226.79
S45	92.77	32.48	36.09	98.61	60.90	192.01	19.56	27.25	37.95	93.10	85.47
S46	261.76	144.15	195.60	100.93	123.67	128.86	40.36	1,461.30	77.25	56.66	300.38
S47	2.03	1.12	1.52	0.82	0.99	1.00	0.32	11.28	0.60	0.44	2.33
S48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S49	666.66	449.67	792.56	384.04	846.23	540.32	124.52	263.04	159.55	192.27	189.13
S50	55.41	96.03	133.60	107.34	130.93	60.56	39.63	24.44	65.43	55.60	74.58
S51	59.25	64.32	125.77	94.11	65.74	66.28	39.34	45.45	75.19	46.75	56.27
S52	62.74	29.99	85.63	59.91	63.92	63.50	229.66	165.94	49.95	75.90	90.80
S53	382.79	317.28	526.21	459.75	538.68	417.01	520.94	224.83	236.22	289.08	504.38
S54	146.78	132.94	185.16	573.79	575.84	160.29	93.46	35.09	108.51	82.08	131.58
S55	263.98	282.30	347.48	320.07	301.24	273.18	243.78	104.77	224.53	203.85	242.30
S56	38.49	13.69	64.48	42.41	43.73	33.82	12.04	10.91	20.92	62.34	81.03
S57	1.23	69.96	14.52	1.60	1.97	40.54	15.95	1.08	10.62	47.55	1.40
S58	0.33	3.29	0.18	0.08	0.09	0.80	0.07	8.67	0.05	23.35	0.06
S59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.97	0.00	2.78	0.00
S61	6,000.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64	0.00
S62	22.45	6,677.06	65.03	27.71	33.21	42.19	21.33	7.26	11.26	14.48	9.05
S63	1.48	6.26	6,001.58	8.18	3.46	1.08	1.42	0.35	0.45	1.43	4.41
S64	26.37	16.03	25.78	6,024.49	29.25	24.39	20.08	13.33	11.39	17.83	15.47
S65	92.90	47.08	118.11	210.87	6,076.10	67.27	28.35	26.31	80.90	60.30	36.11
S66	55.10	55.18	101.71	88.56	131.85	6,112.14	46.98	26.50	91.25	88.10	71.41
S67	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40	0.00	0.00	0.00	0.00
S68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40	0.00	0.00	0.00
S69	13.13	7.08	7.83	20.93	25.21	16.19	3.80	3.66	6,005.69	7.56	6.84
S70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.40	0.00
S71	77.73	4.78	18.10	19.92	18.45	14.37	7.49	5.47	12.29	18.69	6,019.37

Appendix 3

Public and Private Investment Longrun Relationships---Modeling and Econometric Issues: Public investment in core economic infrastructure and private productivity

There is some controversy in this area that is discussed here. We know that research studies in the late1980s and early 1990s presented results suggesting that U.S. public investment could improve private sector productivity (Aschauer 1989a, 1989b; Munnell 1990a, 1990b). However, advances in time-series econometrics led to the view is that these studies failed to address the possibility that the results were spurious due to the presence of unit roots in key variables. It was also established that the relevant variables, at least in the case of the U.S., are non-stationary (Tatom 1991; Sturm and Haan 1995). These studies find that when the relevant variables are transformed into first differences to eliminate the unit roots, the results no longer show that the impact of public investment on private investment is positive.

Munnell (1992) rightly points out that models estimated in first differences will at most capture short-run adjustments. The more significant link between public capital and private investment productivity is likely to be characterized by a long-run equilibrium relationship. Specifically, a past record of low rates of public capital accumulation should continue to affect current economic performance, even if current rates of public investment have improved. We expect short-term changes in public capital stock to be less relevant than the overall stock of public assets and its trajectory over time.

Morrison and Schwartz, 1996 (U.S., state-level, manufacturing); Nadiri and Mamuneas, 1994 (U.S., national, manufacturing); and Moreno, López-Bazo, and Artís, 2002 (Spain, manufacturing) examined the impact of public investment by estimating neoclassical cost functions. Even though the techniques, and data sources vary, these studies have found significant effects of public capital on reducing production costs.

It is useful to return to the earlier studies of Aschauer and Munnell and examine the question of a long-run relationship between public capital and private economic performance in the presence of non-stationary variables. One approach is to estimate a standard production function in which public capital is included as a factor of production:

(1) $Y = Ak^{\alpha} L^{\lambda} P^{\gamma}$

with K representing private fixed capital, L labor inputs, and P public capital assets. A is a general productivity parameter, representing technical improvements in the production process.

Does public investment influence the productivity of private capital? In order to answer this question, we express the production function in terms of average capital productivity:

(2) $\frac{Y}{K} = AK^{\alpha-1} L^{\lambda} P^{\gamma}$

With constant returns to scale of the model expressed in terms of the output-capital ratio, the exponential coefficients in Equation (2) will sum to zero. Taking the natural logarithm of Equation (2), and assuming that parameter A increases at an exogenously given rate of δ, yields the following model expressed as a long-run relationship:

(3a) $\ln (\frac{Y}{K})^{*} = \ln A^{*} + \beta \ln K^{*} + \lambda \ln L^{*} + \gamma \ln P^{*} + \delta t$

in which β = α-1. With constant returns to scale across all three productive inputs, the relationship becomes:

(3b) $\ln (\frac{Y}{K})^{*} = \ln A^{*} + \lambda (\ln \frac{L}{K})^{*} + \gamma \ln (\frac{P}{K})^{*} + \delta t$

It is possible to estimate the basic relationships shown in Equations (3a) and (3b) using a standard error corrections model based on an autoregressive distributed lag specification, ADL (1,1). For the unrestricted production function of Equation (3a) the model is:

(4) $\Delta \ln (\frac{Y}{K})_t = c + \{(\pi_{\gamma} - 1) \ln (\frac{Y}{K})_{t-1} + (\beta_1 + \beta_2) \ln K_{t-1} + (\lambda_1 + \lambda_2) \ln L_{t-1} + (\gamma_1 + \gamma_2) \ln P_{t-1}\} + \beta_1 \Delta \ln K_t + \lambda_1 \Delta \ln K_t + \gamma_1 \Delta \ln P_1 + \delta t + \varepsilon_t$

Using this model, the earlier work found qualified support for the inference that there are some positive impacts of public investment on private productivity. More recent data did not contradict this inference.

Appendix 4

Discussion of Input-Output Matrix Multipliers

Fixed price modelling in a SAM-based framework

In this section the social accounting matrix is presented as a data-gathering framework as well as an analytical tool for studying the effects of the energy sectors on growth. Appendix 2 presents the methodology for estimating the impact of growth generated by the energy sectors on poverty alleviation. The origins of social accounting can be traced as far back as Gregory King's efforts in 1681, but more recent work stems from the attempts by Richard Stone, Graham Pyatt, Erik Thorbecke, and others.[3]

In the methodological framework of this study, the SAM is used for mapping production and distribution at the economy-wide level. In this section, first a general SAM is described. Then it is shown how the method for studying the effect of growth within this framework follows logically from its structure. The model used is a simple version of a class of SAM-based general equilibrium models.[4] It summarizes succinctly the interdependence between productive activities, factor shares, household income distribution, balance of payments, capital accounts, and so on, for the economy as a whole at a point in time. Given the technical conditions of production, the value added is distributed to the factors in a determinate fashion. The value added accrued by the factors is further received by households according to their ownership of assets and the prevailing wage structure. In the matrix form the SAM consists of rows and columns representing receipts and expenditures, respectively. As an accounting constraint receipts must equal expenditures.

As is elaborated further in Khan and Thorbecke (1988, Khan 1999, Khan 2006, Khan 2010), the SAM framework can be used to depict a set of linear relationships in a fixed coefficient model. For deciding the question of determination, the accounts need to be divided into exogenous and endogenous ones. For instance, in the Bangladesh SAM, there are three endogenous accounts.

These are factors, households and production activities, leaving the government, capital and the rest of the world accounts as exogenous.[5]

Table :Simplified schematic social accounting matrix

	EXPENDITURES		
	Endogenous accounts	Exogenous	Total

[3] For a description of SAM as a data-gathering device, see Pyatt and Thorbecke (1976). Khan (1997) also has a chapter on this alone.

[4] In Walrasian general equilibrium models the flexible price vector determines the equilibrium. In a Keynesian (dis)equilibrium model in the short-run the quantities vary while the price vector remains fixed.

[5] See Khan and Thorbecke (1988: ch. II) for more theoretical details and empirical examples. The presentations here follow the cited work closely.

			1	2	3	4	5
		Endogenous accounts					
RECEIPTS	Factors	1	0	0	$T_{1.3}$	x_1	y_1
	Households	2	$T_{2.1}$	$T_{2.2}$	0	x_2	y_2
	Production activities	3	0	$T_{3.2}$	$T_{3.3}$	x_3	y_3
		Exogenous accounts					
	Sum. of other accounts	4	l_1'	l_2'	l_3'	t	y_x
	Total	5	y_1'	y_2'	y_3'	y_x'	

Table :
Schematic representation of endogenous and exogenous accounts in an Input-Output System for the Entire Economy

		EXPENDITURES				Totals
		Endogenous	Sum	Exogenous	Sum	
RECEIPTS	Endogenous	T_{nn}	N	Injections T_{nx}	x	y_n
	Exogenous	Leakages T_{xn}	1	Residual balances T_{xx}	t	y_x
Totals		y_n'		y_x'		

Source: Author's Schematization

Looking at the table above which represents an I-O system, we can see immediately that

$$y = n + x \tag{1}$$

$$y = 1 + t \tag{2}$$

Now if we divide the entries in the matrix T_{nn} by the corresponding total income (that is, y_n), we can define a corresponding matrix of average expenditure propensities. Let us call this matrix A. We now have:

$$y = n + x = Ay + x \tag{3}$$

$$y = (1 - A)^{-1} x = Mx \tag{4}$$

M is the standard I-O matrix of multipliers.at led to them. Let us now partition the matrix A in the following way (Khan and Thorbecke).

$$A = \begin{bmatrix} 0 & 0 & A_{13} \\ A_{21} & A_{22} & 0 \\ 0 & A_{32} & A_{33} \end{bmatrix} \tag{5}$$

Given the accounts factors, household and the production activities, now we see that the income levels of these accounts (call them y_1, y_2, y_3, respectively) are determined as functions of the exogenous demand of all other accounts. In this respect, what we have is a reduced-form model which can be consistent with a number of structural forms. This is quite satisfactory as far as tracing the effects of a certain injection in the economy is concerned or for prediction purposes when the structural coefficients are more or less unchanged.In a SAM as opposed to the I-O system, the final demand in I-O can be broken down according to a finer classification of different types of households.

One limitation of the I-O multiplier matrix M as derived in equation (4) is that it implies unitary expenditure elasticities (the prevailing average expenditure propensities in A are assumed to apply to any incremental injection). A more realistic alternative in a SAM with a finer households types classification is to specify a matrix of marginal expenditure propensities (C_n below) corresponding to the observed income and expenditure elasticities of the different agents, under the assumption that prices remain fixed. The C_n matrix can be partitioned in the same way as the A matrix above. The most important difference between the two partitioned matrices is that $C_{32} \neq A_{32}$. Expressing the changes in income (dy) resulting from changes in injections (dx), one obtains

$$\mathrm{d}\, y_n = C_n\, \mathrm{d}\, y_n + \mathrm{d}\, x \tag{6}$$

$$= (I - C_n)^{-1}\, \mathrm{d}\, x = M_c\, \mathrm{d}\, x \tag{7}$$

M_c has been called a fixed price multiplier matrix and its advantage is that it allows any nonnegative income and expenditure elasticities to be reflected in M_c. In particular, in exploring the macroeconomic effects of exogenous changes in the output of different product-cum-technologies on other macroeconomic variables, it would be very unrealistic to assume that consumers react to any given proportional change in their incomes by increasing expenditures on

the different commodities by exactly that same proportion (that is, assuming that the income elasticities of demand of the various socioeconomic household groups for the various commodities were all unity). Since the expenditure (income) elasticity is equal to the ratio of the marginal expenditure propensity (MEP_i) to the average expenditure propensity (AEP_i) for any given good i, it follows that the marginal expenditure propensity can be readily obtained once the expenditure elasticity and the average expenditure propensities are known, that is,

$$y_i = MEP_i/AEP_i \tag{8}$$

$$MEP_i = y_i\, AEP_i \tag{9}$$

and

$$\sum_i MEP_i = 1 \tag{10}$$

Thus, given the matrix A_{32} of average expenditure propensities, and the corresponding expenditure elasticities of demand, y_i the corresponding marginal expenditure propensities matrix C_{32} could easily be derived.[6]

These multipliers can be further decomposed for more refined causal analysis of direct, indirect and feedback loop causal influence paths and graphs.

[6] See Khan and Thorbecke (1988, Khan 1999: 2004a, b;2006; 2010) for some examples. See also Pyatt and Round (1979: 861).