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Assessing US Policies for Health Care through the Dynamic CGE Approach

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The sustainability of the health care expenditure is a topic that at the present time is strongly discussed in the literature. Indeed the "health industry" can be considered as a strategic one within the industries that shape the economy, since it is able to stimulate many other production processes, within the economy, that activate, at their turn, the sectoral income generation. Thus the policy maker has the possibility of implementing a policy, in health care, able to achieve a composite objective: the level of public health care expenditure should be made consistent with the growth path of the economy sought after, both in the aggregate and in its sectoral composition. In this work we concentrate on health expenditure and income generation trying to verify the impact of a change in the inner composition of the health care demands. Our aim is that of determining the impacts of the announced new allocation of health care expenditure in U.S. alongside the multisectoral income circular flow. We develop a dynamic CGE model, calibrated on an USA Social Accounting Matrix, that we have purposely built, in which health care reform and its direct and indirect effects on the main macroeconomic variables are determined and quantified.

INTRODUCTION

The increase in health care expenditure emphasizes the relevance of health sector in world production and confirms the prominence of the health commodity within national economy (Works, 2003; Busse, 2002). Economic literature on this subject typically focuses on theoretical reasons allowing public involvement in production of health. Even if the topics of the debate on the health care services, i.e. the health commodity, usually raised, consist in the discussion on the efficiency of the health expenditures and on the equity in its allocation among people, the actual features of the production process involved and their impact on income and employment are often neglected (Hughes and

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Walker, 2003). Since health commodity interacts with the other commodities and the institutional sectors, it is crucial to verify the ways through which the health output is able to affect and stimulate the growth of the most important macroeconomic aggregates (Clair *et. al.*, 2005; Martine and Geoffrey, 2009).

The debate on U.S. health policy, in particular, emphasizes the control of the growth of health expenditure, which is now around 18 percent of real GDP and its public share accounts for almost half of the total.[1] In this debate, many of the important questions related to rising health expenses involve the identification of the institutional sector that should take the burden of funding them. From this perspective, even though the mainstream suggests the reduction of the public involvement in health care expenditure, an understanding of the expansive capacity of public policies is re-emerging. These policies should be able either to ensure society's efficient consumption of health services and grant its sustainability by taking into account the driving force of health care services in determining the total output of the U.S. economy. Indeed rising health care spending is a topic of absolutely general concern, but unlike the past, increasingly literature focuses on the positive relation between health demand, output stimulus, income growth and better health interventions (Hall and Jones, 2007).

Following this approach, the health sector can be treated as a prominent activity and its expansion can potentially stimulate many other industries such as the traditional sectors of manufacturing, education, financial services, communications and construction (Fogel, 2009). This fact shifts the debate on health care from the limits on spending for public health to the often neglected evaluation of the direct and indirect expansionary effects of the actual production process of the health commodity (Al-Ississ and Miller, 2013). The recent approval of the federal Patient Protection and Affordable Care Act (PPACA - 23.03.2010) represents an outstanding measure on this direction. The importance and the size of this act confirms the economic importance of health care spending in U.S. economy and prove the intentions of the policy maker to activate a new deal starting from this sector. This reform is one of the largest laws ever approved by the Member States and aims to expand access to insurance, increase consumer protections, emphasize prevention and wellness, improve quality and system performance, expand the health workforce, and curb rising health care costs.

Actually, in U.S the Health care system is centred on insurance contracts that are directly stipulated by people or by employers and

provide health protection only to a small amount of people. The elderly and low-income people can take advantage also of two other main protection programs known as Medicaid and Medicare. The first one provides health protection to low-income people, the second one offers protection to the elderly. The PPACA is intended to maintain this arrangement of the health care system but increases substantially the expenditure to enlarge health care coverage. More specifically, the act aims to intensify health insurance by means of shared responsibility, to increase admissibility for Medicaid to lower income people and to improve the quality and efficiency of U.S. medical care services for all patients, especially those included in Medicare and Medicaid programs. The Federal Government will assume responsibility for much of the cost of this expansion.

Since the US Health care system is strongly integrated with all other production processes, this huge policy measure will generate effects on US economic system, both in terms of industry outputs and in terms of sectoral value added and income. An analysis capable of quantifying the direct and indirect effects of the health care policy in a multisectoral framework is then required (Ciaschini *et al.*, 2012). Computable General Equilibrium models (CGE) are widely considered in the literature as suitable instruments of analysis to quantify the impacts of an exogenous shock on macroeconomic variables along the income circular flow (Ciaschini *et al.*, 2012). Moreover, since the health care reform approved by the U.S. economy is supposed to embrace at least a decade, the analysis must be carried out taking into account these long term targets and move from the static to the dynamic approach.

In order to verify the compatibility between the need of redistributing the burden of the health care expenditure between public and private institutional sectors, without neglecting the "side-effect" of the simultaneously generated output growth, we develop a multi sectoral dynamic CGE model for the US economy. The analysis is carried out on a U.S. Social Accounting Matrix (SAM) that we have elaborated from the US official statistics, as the suitable instrument to describe all phases of the output generation and income distribution (Ciaschini *et al.*, 2009).

The identification of the potential economic impacts of health system among all components of total output has led to the quantification of the complexity of the flows that this industry keeps up with the rest of the economy.[2] This detailed database represents the benchmark for the CGE model that is calibrated on the SAM and allows discussing the results of the policy proposals in terms of changes

in prices, total output, final demand and GDP. It is worth to mention that, since we do not consider any benefit of increased productive labour from health care nor include any efficiency gains or expansions in productive factors; in general we expect an underestimation of the policy results.

The next section briefly defines the main features of the database and the dynamic CGE model used to investigate the effects of the policy reform. The third section describes some characteristics of the Institutional framework of U.S. health care system and the policy implemented. The fourth section presents the major results stressing the impact of the policy in terms of changes in GDP, employment, value added and total output by commodity. The sensitivity analysis presented in the Appendix establishes the robustness of the results when the elasticity of substitution between labour and capital assumes different values; thus, the last part offers a discussion on the role played by the health commodity and the health policy reform in the US economy.

SOCIAL ACCOUNTING MATRIX AND DYNAMIC CGE MODEL (HEALTHMAC 14)

Healthmac 14 is a multisectoral dynamic CGE model developed to investigate the role and the potential impact of health care policies within the economic system. It describes the entire process of generation, primary and secondary distribution of income and is calibrated on the SAM database. Thus, we can say that the blocks of the SAM determine the blocks of the equations providing a picture of the income circular flow (Ciaschini *et al.*, 2010).

Social Accounting Matrix for health expenditure: the U.S. case

Healthmac14 is calibrated on the Social Accounting Matrix, at market prices and the flows are expressed in million of US dollars, for the United States (year 2009). It is obtained through the link between the I-O table and the national economic accounts by institutional sectors (BEA, 2009). Therefore it quantifies and connects data on the production process (final demand, total output and value added generation) gathered by activities, with data on the distribution process (value added by primary factors, primary and secondary distribution of incomes) collected by Institutional Sectors. In other words, the SAM scheme provides the detailed description of all phases of the multi-industry multi-sectoral income circular flow for the whole economy that is essential to calibrate the CGE model. For our purposes we

highlighted the production and the demand for health care services within the income circular flow treating these flows exactly as those of any other type of commodity. The SAM indeed is the accounting scheme able to properly identify the role of health care services within the production process, its ability to generate value added and influence income distribution and final demand (Ciaschini *et al.*, 2011a).

Accounts in SAM are given in rows and columns, as shown in Table 1, and they correspond to: Output [67 Input-Output commodities], Value Added components [Compensation of employees, Taxes on production and imports, less subsidies, Gross operating surplus], Institutional Sectors [Households, Business, Federal Government, State and Local Government and Rest of the World], Capital formation.

Inside this structure, the health care services flows have been identified using the dataset provided by the U.S. Bureau of Economic Analysis (BEA, 2008). Following the final consumption programmed by Households and others Institutional Sectors, we disaggregated the private health care output in two types of activities: *Ambulatory health care service*} (823.703 million of dollars) and *Hospitals and nursing and residential care facilities* (889.594 million of dollars). It represents the 56.6% of the total health care services. The remaining part (43.4%) is split into *Federal Government* health production (884.400 million of dollars) and State/Local government health production (431.200 million of dollars) (BEA, 2009).

Dynamic CGE model

Healthmac 14 is a recursive dynamic CGE model where the evolution path is a sequence of single period static equilibria linked each other by the capital accumulation condition (Lau *et al.*, 2002). Given the structure of the economy described in the SAM (see previous paragraph), to determine prices and quantities that maximize producers' profits and consumer's utility in each period, we solve the Arrow-Debreu (1954) problem as an optimization problem of the agents subject to income, technology and feasibility constraints. In each period, we consider an open economy with m commodities, c components of value added and i Institutional Sectors (including Households, Firms, Government and Rest of the World). The maximization problem is turned into a Mixed Complementarity Problem (MCP) and solved as a system of non-linear equations.

Following the structure described in Table 2, the total output (X) resulting from the sum of domestic and imported output (M)[3] is equal to intermediate demand (B), final consumption expenditures (C), final

Table 1
SAM for the USA economy, year 2009 (million of dollars)

	Commodities	Compensation of employees	Taxes on production and imports, less subsidies	Gross operating surplus	Households and istitutions	Business	Federal Government	State and Local Government Current	Rest of Word	Private investment	National Gross investmert	State and local government gross investment	TOTAL
Commodities	10685115	0	0	0	10001330	0	987138	1424388	1421693	1589202	152427	350953	26612245
Compensation of employees	7819518	0	0	0	0	0	0	0	0	0	0	0	7819518
Taxes on production and imports, less subsidies	964357	0	0	0	0	0	0	0	0	0	0	0	964357
Gross operating surplus	5335164	0	0	0	0	0	0	0	0	0	0	0	5335164
Households and istitutions	0	7808700	0	3203600	0	236400	1604700	470512	216200	0	0	0	13540112
Business	0	0	0	1819564	216782	0	168918	109400	239861	0	0	0	2554525
Federal Government	0	0	35500	120100	1821000	339100	0	0	14456	0	0	0	2330156
State and Local Government Current	0	0	928900	191900	384100	195600	484600	0	0	0	0	0	2185100
Rest of Word	1808092	10818	-43	0	166000	254025	212200	0	0	0	0	0	2451092
Private investment	0	0	0	0	950900	1529400	0	0	-891098	0	0	0	1589202
National Gross investment	0	0	0	0	0	0	-1127400	0	1279827	0	0	0	152427
State and local government gross investment	0	0	0	0	0	0	0	180800	170153	0	0	0	350953
TOTAL	26612245	7819518	964357	5335164	13540112	2554525	2330156	2185100	2451092	1589202	152427	350953	

Source: our elaboration

consumption expenditure incurred by Government (G), gross fixed capital formation (I) and exports (E). Domestic production is formalized by a nested constant return to scale technology. Assuming the Leontief production function, domestic output is the combination of intermediate goods (B) and Value Added (Y). The demand of B depends on total production (X) and prices of commodities (P); value added (Y) is affected by total production (X) and primary factors compensations (p_f). Then assuming a CES technology, the value added (Y) is generated by combining capital (K) and labour (L) that are perfectly mobile across activities. The elasticity of substitution is set equal to 0.4 for all productions, according to the estimation approach that focuses on long-run relations (Chirinkoa, 2011).

The primary factors' endowments correspond to the primary factors' demands in the production process and their markets are perfectly competitive. We do not consider any rigidity on wage formation and thus we assume that there is no unintentional unemployment.

Table 2
Fundamental relationship in CGE model

		Commodities	Primary Factors	Institutional Sectors			Capital Formation
				Private	Government	Rest of World	
Commodities		B(x,p)		C(rd,p)	G(rd,p)	E(e,p)	I(p)
Primary Factors		Y(x, p_f)					
Institutional Sectors	Private		$R^h(y)$	$Tr^h(r,a)$	$Tr^h(r,a)$	$Tr^h(r,a)$	
	Government	$Ta^g(x)$	$R^g(y)$	$Ta^g(r,a)$	$Tr^g(r,a)$	$Tr^g(r,a)$	
	Rest of World	M(x,e)	$R^{row}(y)$	$Tr^{row}(r,a)$	$Tr^{row}(r,a)$	(+/-)e	
Capital Formation				$S^h(rd)$	$S^g(rd)$	$S^{row}(rd)$	

The income generated by the production process is distributed among the Institutional Sectors (R^i) in the primary income distribution phase. Then the secondary income distribution refers to transfers (taxes) occurring among Institutional Sectors (Tr^i and Ta^i) which contribute to the formation of the disposable income. It can be allocated between final consumption (C^i and G) and savings (S^i) according to the inter-temporal utility function of each Institutional Sector.

The dynamic component in the model is given by the inter-temporal capital accumulation condition. We assume that any change in gross fixed capital formation affects the capital yearly growth rate (g) given

a constant rate of capital depreciation (δ).[4] We calculate the rate of capital depreciation that is consistent with the data in the SAM and the assumptions on the steady state interest rate γ and the steady state growth rate g. In our model, we set the nominal interest rate $\gamma = 5\%$ and the real exogenous growth rate $g = 2.4\%$. According to the rule for investment on a steady state, we calibrate the value of the depreciation rate on the SAM data.[5]

Following the logic of the Ramsey model, all the institutional sectors maximize the present value of their intertemporal utility function that depends on final consumption expenditure (C and G) and gross saving (S^i) subject to the lifetime budget constraint. The budget constrain for Households is verified when the total disposable income (Rd) is equal to the final consumption expenditures (C^h) and savings (S^h). The primary factor compensations (R^h) plus net transfers from Institutional Sectors (Tr^i), minus income taxes (Ta^g), determine consumers total endowments in every time period.

Government savings (or deficit) (S^g) result as the difference between total tax revenue (Ta^g), the sum of final consumption expenditures by Government (G) and transfers to other Institutional Sectors (Tr^i). We consider two macro-categories of taxes: direct income taxes [$Ta(r,a)$] and a set of indirect taxes (tax on products, value-added tax and payroll taxes) that we indicate in Table 2 with the same acronyms [$Ta(x)$]. The single period equilibrium requests that total gross fixed capital formation (I) becomes equal to gross savings by Institutional Sectors (S^i).

In order to solve the model for a finite number of periods, we approximate the infinite horizon equilibria with endogenous capital accumulation condition according to Lau (2002). Thus in order to obtain the terminal period equilibrium we set the terminal gross capital formation growth rate equal to the growth rate of aggregate output. Since there is a set of commodities, primary factors and Institutional sectors the model produces a disaggregate set of information on prices, output and incomes.

The optimization problem for all consumers is analytically synthetized as follow:

$$\max \sum_{t=0}^{T} \left(\frac{1}{1+\rho} \right)^t u[C_t] \tag{1}$$

subject to

$$C_t = x(K_t, L_t, M_t, Ta_t) - I_t - E_t \tag{2}$$

$$K_{t+1} = (1-\delta)K_t + I_t \tag{3}$$

That is to say, every Institutional Sector maximizes its inter temporal utility function which depends on consumption, under the constraint represented by two main conditions: i) total commodity output (X_t) is divided into personal consumption expenditures (C_t) and government current expenditures (G_t), gross fixed capital formation (I_t) and exports (E_t); ii) the capital stock in period *t+1* is equal to the capital stock in period *t* (K_t)[6] less depreciation (ΔK_t) plus gross fixed capital formation in period *t* (I_t).

The first order conditions deriving from this maximization problem are:

$$P_t = \left(\frac{1}{1+\rho}\right)^t \frac{\delta u(C_t)}{\delta C_t} \tag{4}$$

$$PK_t = (1-\delta)PK_{t+1} + P_t \frac{\delta x(K_t, L_t, M_t, Ta_t)}{\delta K_t} \tag{5}$$

Than the corresponding mixed complementarity problem can be formulated as a sequence of market clearing, zero profit and budget constraint conditions (Roson, 2003).

Market clearing conditions holds for all commodities and primary factors markets. These conditions posit that the value of excess demand is always non positive. That is to say that the total output of each commodity is equal to the total demand (for intermediate consumption and final demand) of each good only for a certain positive price determined by the solution of the problem. Similarly, market clearing conditions for primary factors allows the balance between total demand and total supply of factors at a certain positive price. Analytically, we can summarize the conditions as follow:

$$X_t \geq B_t, d(P_t, RA) + I_t + E_t, P_t \geq 0,\ P_t(X_t - B_t, d(P_t, RA) - I_t - E_t) = 0 \tag{7}$$

$$L_t \geq X_t \frac{\delta C(RK_t, PL_t, PM_t, Ta_t)}{\delta PL_t}, PL_t \geq 0,\ PL_t\left(L_t - X_t \frac{\delta C(RK_t, PL_t, PM_t, Ta_t}{\delta PL_t}\right) = 0 \tag{8}$$

$$K_t \geq X_t \frac{\delta C(RK_t, PL_t, PM_t, Ta_t)}{\delta RK_t},\ RK_t \geq 0,\ RK_t \left(K_t - X_t \frac{\delta C(RK_t, PL_t, PM_t, Ta_t)}{\delta RK_t} \right) = 0 \tag{9}$$

$$M_t \geq X_t \frac{\delta C(RK_t, PL_t, PM_t, Ta_t)}{\delta PM_t}, PM_t \geq 0, PM_t \left(K_t - X_t \frac{\delta C(RK_t, PL_t, PM_t, Ta_t)}{\delta PM_t} \right) = 0 \tag{10}$$

Zero profit conditions posits that total supply in each commodity market is determined by the perfect competitive market condition, that is to say, price equals average total cost (profit are zero). In a general equilibrium model, the price that clear the market (demand equals to supply) also equals average total costs for each commodity. Analytically, we can summarize the conditions as follow:

$$P_t \geq PK_{t+1}, I_t \geq 0, \quad I_t(P_t - PK_{t+1}) = 0 \tag{11}$$

$$PK_t \geq RK_t + (1-\delta)PK_{t+1}, K_t \geq 0,\ K_t(PK_t - RK_t - (1-\delta)PK_{t+1} = 0 \tag{12}$$

$$C(RK_t, PL_t, PM_t, Ta_t) \geq P_t, X_t \geq 0,\ X_t(C(RK_t, PL_t, PM_t, Ta_t) - P_t) = 0 \tag{13}$$

Income balance conditions derive from the budget constraint described above. Once the secondary income distribution is complete, the income of each consumer is used to demand goods and services or savings.

$$RA \geq PK_0 K_0 + \Sigma_{t=0}^{T}(PL_t L_t + PM_t M_t - Ta_t) - PK_{t+1}K_{t+1}, RA \geq 0 \tag{14}$$

	Parameters	
	t	time periods,
	T	terminal period,
	ρ	individual time-preference parameter,
	δ	capital depreciation rate,
	γ	interest rate
	σ	elasticity of substitution between labour and capital
	Functions	
	d	demand function,
	x	production function,
	u	utility,
	Variables	
	C_t	consumption in period t,

X_t total output in period t,
K_t capital in period t,
L_t labour in period t,
M_t imports in period t,
Ta_t all taxes payed by sectors in period t,
I_t investment in period t,
E_t exports in period t,
P_t price of output in period t,
PK_t price of capital in period t,
RK_t rental of capital in period t,
PL_t wage in period t,
PM_t price of imports in period t,
RA consumer's disposable income.

POLICY SCENARIOS FOR US HEALTH CARE SYSTEM

The federal Patient Protection and Affordable Care Act (PPACA - 23.03.2010) would allow anyone who earns less than 133% of the federal poverty level (about 29 thousand dollars per year for a family of four people) to be included in Medicaid program. This will result in an increase of health care services for 16 million people. According to OECD official statistics, the per capita current expenditure for individual and collective health care financed by Government in US is around 3850 U.S. dollars in 2010.[7]

Therefore, the total amount of resources needed to include 16 million people in the program is approximately 60 billion dollars per year (64 billion if we consider the per capita current expenditure of 2011). In ten years the total expenditure is around 600-640 billion dollars. The Federal Government can directly finance the increase in health care services and/or provide a set of transfers to Households tied to health care spending. In both cases, to avoid the increase in Federal government public deficit, the amplification of health care expenditure should be compensated with the cut in other public expenditure or new taxes on particular activities.

In order to provide a preliminary evaluation of the health care policy reform, we consider that the Government would finance the policy through an increase in taxes on pharmaceutical products (embodied in commodity 25.Chemical products) and Insurances carrier (commodity 43.Insurance carriers and related activities) according to the PPACA. For this purpose, to collect an amount of resources corresponding to 64 billion dollars, the incidence of taxes on total output for these two sectors[8] must increase by 215.62% moving from 1.15% (commodity 25) and 4.06% (commodity 43) respectively to 2.47% and

8.75%. The calculation are done on the basis of the SAM dataset. Then, to separate the effects on the economic system of the direct and indirect Federal Government action, we simulate two different policy scenarios:

- in the first scenario (S_fed) the Federal Government directly increases the demand for Medicaid by means of an expansion in Federal Government Health Services (commodity n.62);
- in the second scenario (S_priv) the Federal Government uses the tax revenue to provides new transfers to Households tied to increase the demand for private health care services (commodities 54.Ambulatory health care services and 55.Hospitals and nursing and residential care facilities)

Both scenarios attempt to replicate the aim of the PPACA that would intensify the admissibility for Medicaid to lower income people to improve the quality and efficiency of U.S. medical care services for all patients, including new people in Medicare and Medicaid programs. That is the reason for stimulating the commodity 62.Federal Government Health Services in the first scenario that directly refers to the health expenditure and thus can be considered as the most immediate policy instrument. In the second scenario we assume that the government contribute to the expansion of the private health care services (commodities 54.Ambulatory health care services and 55.Hospitals and nursing and residential care facilities) that can be driven by an increase in households demand in these sectors. In the model the consumer budget constraint is added with a condition that binds the additional transfers to household to be spent on demand for private health services.

The total amount of the policy is 64 billion dollars per year. The direct and indirect effects of this policy on total output and welfare are measured in a time period of 10 years (from 2014 to 2024) in order to capture the dynamic opportunities of the health care system reform.

THE DYNAMIC EFFECTS OF ECONOMIC HEALTH CARE POLICY

The simulations compare the baseline equilibrium (or benchmark equilibrium) without any Health care policy measure, and the aftershock equilibrium resulting from the health policy reform. The distance in every period (year) between the baseline trend path and the path generated after the simulations represents the impacts of the policy on the main macroeconomic variables in each period.

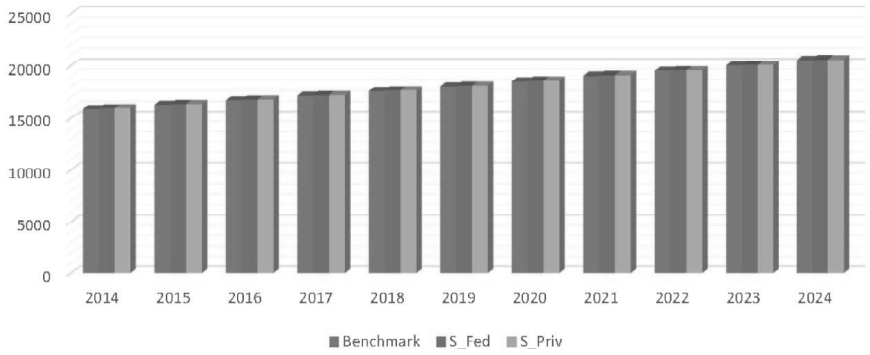

Figure 1: Effects on real GDP - billion U.S.

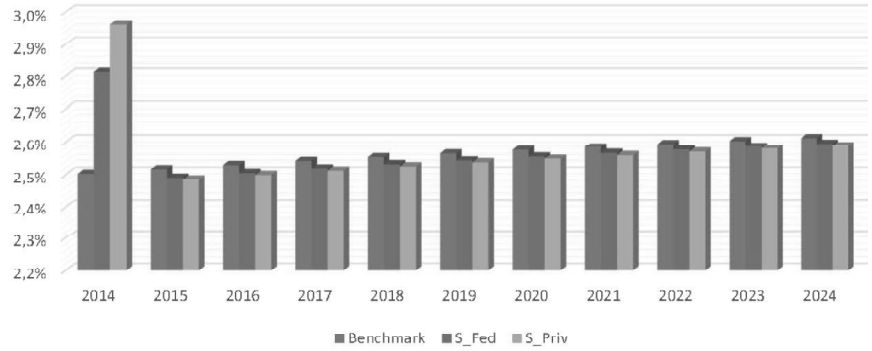

Figure 2: Real GDP growth rate from 2014 to 2024

The results of the simulations are discussed starting from the effects on Gross Domestic Production (GDP), value added by commodity, total output and employment in the time period of 10 years from 2014 to 2024. The health policy introduces two simultaneous shocks in the economic system. The first shock is represented by the introduction of a tax on specific commodities output (pharmaceutical products and insurance carrier). The second shock is related to the different channel used by Federal Government to increase the health care services demand. As described in the previous section, in S_fed scenario the Federal Government directly increases the demand for Medicaid trying to directly pursuit the target of increasing the health care coverage of people; differently in S_priv scenario the Federal Government makes transfers to Households tied to increase the demand for private health care services in order to indirectly improve the amount of health services for all patient.

The final effects on the variables reflect the direct and the indirect effects of these two shocks. In aggregate terms it is possible to observe that in both scenarios the real GDP after the policy is higher with respect to the benchmark, as shown in Figure 1. To be more precise, in Figure 2 is it possible to observe that immediately after the policy the GDP growth rate registers a positive shock, as a direct effect of both policies: in S_priv (+2.9%) and in S_fed (+2.8%). After this, the growth rate is still positive but lower than the benchmark trend. This does not affect the aggregate value of GDP that remains higher with respect to the benchmark, meaning that the policies implemented do not perturb the economic system rather stimulate growth. Looking at both figures, 1 and 2, it is also possible to notice that the distances from the benchmark are more significant in S_priv than in S_fed. This difference can be better observed in Table 15 where the results of both simulations are tested, also in the case of different values for the elasticity of substitution between labour and capital. In the simulations we assume that the elasticity of substitution between capital and labour is 0.4. To test the robustness of the results, we considered also further scenarios when sigma is respectively 0.3 and 0.5.

The meaning of this different impact of the policies can be explained by observing the disaggregate effects of the policies in terms of value added generation (tables 3 and 4) and total output (tables 5 and 6). The policy stimulates, directly and indirectly, the production of some commodities and depresses some others as a consequence of the double shock introduced in the economic system. The increase in taxation of pharmaceutical and insurance commodities and, on the other side, the stimulus of health care services (public and private) determine a composite effect on GDP that in aggregate terms tends to increase as previously discussed.

According to the steady state equilibrium (benchmark) path, the disaggregate value added by commodity, increases from 2014 to 2024. We can read the results of the policy scenarios in terms of discrepancies from this trend. Looking directly to the results expressed in percentage difference from benchmark, when Federal Government directly expands the demand for Medicaid (S_fed), we observe an higher increase in value added generation by almost all commodities with respect to the benchmark trend. Indeed from the Table 3 it is possible to observe a positive difference for many commodities. Some of them appear to be particularly affected by the policy and register a pick in the difference. This is the case of some manufactured commodities such as Chemical products, Food, Beverage and tobacco products, "Apparel

and leather and allied products" and other services, as Educational services, Insurance carrier and State and Local government enterprises.

This result is very interesting and in some way unexpected, especially for Chemical products and Insurance carrier that are the commodities burdened by the taxation. As described in the previous section, the incidence of taxes on total output for these two commodities increase by 215.62% and the direct effect of this manoeuvre is the reduction in these commodities output as showed in Table 5. However the stimulus given to the health care commodities, and indirectly to all the other commodities linked to them, ensured that the value added generated by the taxed commodity still keep growing. The reduction in total output for Chemical products and Insurance carrier might generate a reduction in tax revenue with respect to the projected amount. This effect is not considered in these simulations since the policy maker would introduce some adjusting manoeuvre only in a second time if strictly necessary, but we do not have information that this would really happen.

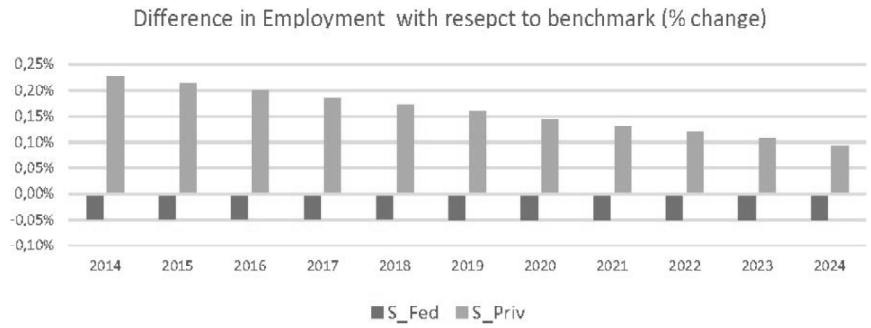

Figure 3: Effects on Employment - % changes

On the other hand the disaggregated effect on value added is more complex when the Federal Government provides new transfers to households allocated for increasing the demand for private health care services (S_priv). As shown in Table 4 there are some commodities whose value added increases more than the benchmark path and others that registers a lower rate of growth. The value added increases more than the benchmark path for Ambulatory health care services and Hospitals and nursing and residential care facilities that are directly affected by the policy. They indirectly influence other production processes and, since the differences in absolute terms are greater than the previous scenario, the final effect on GDP is higher in than in S_fed.

The other commodities that register a positive difference with respect to the benchmark especially refers to services, but we still register a positive change in value added generation for Insurance carrier and Chemical products.

For what regards the total output by commodity in Table 6, we observe a reduction in Construction, Wood products, Nonmetallic mineral products, Support activities for mining, Truck transportation and, as in the previous scenario, Chemical products and Insurance carrier. These latter commodities are the most significant since, as already discussed, even though they are burdened by the tax and the total output decreases with respect to the benchmark trend, they still contribute to the formation of GDP in positive terms.

In general both policies positively affect the economic growth, however, if we observe the GDP trend, it is interesting also to observe the results on employment. With reference to Figure 3, even if the trend in the 10 years period is similar to the benchmark, in S_priv we can observe a higher increase in employment rate with respect to the benchmark trend. In S_fed scenario the employment growth is negative in all years compared with the benchmark, as shown by the red bars. This diverging outcome for the employment depends on the different magnitude of the policy in terms of total output and demand of primary factors. Actually in the second scenario the commodities stimulated by the policy are more labour intensive and this would explain the different outcome.

All the results here discussed, are consistent when the elasticity of substitution between capital and labour changes from the estimated value for the US case (Chirinkoa, 2011) to a lower or higher value. Tables from 7 to 14 in the appendix provide all the results.

CONCLUSION

In advanced countries, particularly in the US, the health care system is facing a significant switch in terms of sustainability, social desirability and profitability in economic and employment terms. The economic sustainability of health care services is closely related to the amount of people to be taken care of and to the system for sharing the expenditure for the services provided, according to the actual welfare programs. When the economy is characterised by low growth rates, the economic and financial sustainability of public spending, contributes to the desirability of certain types of health care systems, along with other social and demographic variables such as changes in composition and growth of the population. This can be the case of the US economy

where the health care system can represent a strategic sector in terms of stimulating total output and employment.

The characteristics of the demand for health care services are similar to those of commodities with low elasticity, and allow for investigating the role of the health care output in the very same context of all the other commodities. Following this idea, the relevance of health care services can be studied also in terms of income and employment generation, overcoming the criticisms that generally emerge on the desirability of public or private health care expenditure and of universal coverage of the population. In other words, both the concern on the desirability of non-market health care services supply and their strong and rigid demand force to concentrate the economic models that treat the health care system both as an economic policy target but also as a policy instrument.

The supply of health care services is strongly connected with other production processes through the absorption of intermediate goods and it is able to stimulate, both directly and indirectly, a number of industries related with manufacturing and services. This means that financing the health care services supply might represent a powerful policy measure that can both increase the health care protection and stimulate growth through other production processes connected.

Therefore, even if the universality of the health care system coverage is a principle that puts a strong pressure on the public budget, it is possible to take advantage of its strong interaction within the economy to pursue a more complex policy target that includes also growth. This principle has inspired the federal Patient Protection and Affordable Care Act (PPACA - 23.03.2010), a huge measure of health policy meant to introduce a new perspective for health care expenditure.

This manoeuvre shows its effects along the whole multisectoral income circular flow and can be measured in the long run by means of a multisectoral dynamic CGE model. Through this general equilibrium scheme, the impact of the health policy has been quantified taking into account each single aspect of this complex action. In the first step a tax on output of specific commodities has been modelled and quantified, which allows for the collection of the financial resources needed to implement the manoeuvre. In this way the impasse of funding health care is explicitly faced up. Then, in a second step, two policy scenarios have been analysed, where the health care expenditure is expanded and redistributed between institutional sectors, without dampening the economic growth.

The multisectoral CGE model has identified the interdependencies between economic sectors and highlighted the policy scenario matching the best the results in terms of GDP and employment. These results reveal that health care supply plays a strategic key role in U.S. economy. Increasing the expenditure for funding Medicaid program encourages, however slightly, economic growth. Better effects in terms of employment and income generation are obtained when the financial resources are directly driven to the demand increase for private health care services. Indeed, the economic structure of the US economy, described by the SAM framework, specifically elaborated for this experiment, reveals a strong connection between the private health care services and the other production processes in the income generation.

Moreover some unexpected results on the value added generation by commodity are also observed. More specifically the production that are burdened by the taxation i.e. Chemical products and Insurance carrier, still contribute to the GDP formation more than others, even though their total output reduces. The reduction is anyhow very slight compared to the magnitude of the increased tax burden. Therefore, given these results, the combination of the taxation of pharmaceutical products and insurance carrier and the redistribution of Health care expenditure, seems to be an achievable policy when the main target of the policy maker is an enlargement of the health care protection not irrespective of economic growth.

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Notes

1. The health spending rose from 5.2 percent in 1960 to 16.2 percent in 2008. The expectations are for an increase of the share to more than 19 percent by 2019 (BEA, 2009).
2. The disaggregation is realized using the Input Output data provided by U.S. Bureau of Economic Analysis (BEA, 2009).
3. Following the Armington's hypothesis (1969), imported and domestically produced commodities are not perfect substitutes. This solves the problem that the same kind of good is found to be both exported and imported.
4. According to the literature on dynamic CGE, by "depreciation" we mean the "consumption of fixed capital" as stated by the SNA. The consumption of fixed capital refers to the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer

as a result of physical deterioration, normal obsolescence or normal accidental damage. "Consumption of fixed Capital" is used in the SNA to distinguish it from "depreciation of capital" as typically measured in business accounts (United Nation, 2008).

5. The value of the initial investment in the SAM for a Steady state growth path should be $I_0 = \frac{(\delta + g)VK_0}{\delta + \gamma}$ where I_0 is the value of Investment from SAM and VK_0 is the capital earnings in the base year (Capital in the SAM). Therefore, in general in each time period, we can write the relation between Investment and Capital Stock as $I_t = (\delta+g)\ K_t$.
6. The capital stock in period *t* is calibrated on the SAM data following (Paltsev, 2004).
7. The per capita current expenditure for individual and collective health care financed by Government is 3849.8 dollars in 2010. The per capita current expenditure financed by both Government and Private is 7923.1 dollars.
8. The incidence of tax on total output is calculated as the ratio between total indirect taxes and total output by commodity and can be considered as the average tax rate on production by commodity.

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Appendix: Table, Figures and Sensitivity Analysis

1 Farms	40 Information and data processing services
2 Forestry, fishing, and related activities	41 Federal Reserve banks, credit intermediation, and related activit
3 Oil and gas extraction	42 Securities, commodity contracts, and investments
4 Mining, except oil and gas	43 Insurance carriers and related activities
5 Support activities for mining	44 Funds, trusts, and other financial vehicles
6 Utilities	45 Real estate
7 Construction	46 Rental and leasing services and lessors of intangible assets
8 Wood products	47 Legal services
9 Nonmetallic mineral products	48 Computer systems design and related services
10 Primary metals	49 Miscellaneous professional, scientific, and technical services
11 Fabricated metal products	50 Management of companies and enterprises
12 Machinery	51 Administrative and support services
13 Computer and electronic products	52 Waste management and remediation services
14 Electrical equipment, appliances, and components	53 Educational services
15 Motor vehicles, bodies and trailers, and parts	54 Ambulatory health care services
16 Other transportation equipment	55 Hospitals and nursing and residential care facilities
17 Furniture and related products	56 Social assistance
18 Miscellaneous manufacturing	57 Performing arts, spectator sports, museums, and related activitie
19 Food and beverage and tobacco products	58 Amusements, gambling, and recreation industries
20 Textile mills and textile product mills	59 Accommodation
21 Apparel and leather and allied products	60 Food services and drinking places
22 Paper products	61 Other services, except government
23 Printing and related support activities	62 Federal general government
24 Petroleum and coal products	63 Federal government enterprises
25 Chemical products	64 State and local general government
26 Plastics and rubber products	65 State and local government enterprises
27 Wholesale trade	66 Scrap, used and secondhand goods
28 Retail trade	67 Noncomparable imports and rest-of-the-world adjustment
29 Air transportation	VA1 Compensation of employees
30 Rail transportation	VA2 Taxes on production and imports, less subsidies
31 Water transportation	VA3 Gross operating surplus
32 Truck transportation	I Households and istitutions
33 Transit and ground passenger transportation	II Business
34 Pipeline transportation	III Federal Government
35 Other transportation and support activities	IV State and Local Government Current
36 Warehousing and storage	V Rest of Word
37 Publishing industries (includes software)	S1 Private investment
38 Motion picture and sound recording industries	S2 National Gross investment
39 Broadcasting and telecommunications	S3 State and local government gross investment

Figure 4: I-O commodities, Primary factors, Institutional Sectors and Capital Formation classification

Table 3
Value Added by commodity: % change from benchmark - from 2014 to 2024

sigma = 0.4	Scenario S_FED										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,02	0,02	0,03	0,04	0,04	0,05	0,06	0,06	0,07	0,07	0,08
2 Forestry, fishing, related activities	0,27	0,26	0,26	0,26	0,25	0,25	0,24	0,24	0,24	0,24	0,23
3 Oil and gas extraction	1,16	1,11	1,07	1,03	1,00	0,96	0,92	0,89	0,86	0,83	0,80
4 Mining, except oil and gas	0,35	0,34	0,33	0,32	0,31	0,30	0,29	0,28	0,27	0,26	0,25
5 Support activities for mining	0,03	0,03	0,03	0,02	0,02	0,01	0,01	0,01	0,00	0,00	-0,00
6 Utilities	0,73	0,71	0,69	0,67	0,65	0,63	0,61	0,60	0,58	0,57	0,55
7 Construction	0,00	0,00	0,00	0,00	0,00	0,00	-0,00	-0,00	-0,00	-0,00	-0,00
8 Wood products	0,14	0,14	0,14	0,13	0,13	0,13	0,13	0,13	0,12	0,12	0,12
9 Nonmetallic mineral products	0,17	0,16	0,16	0,16	0,15	0,15	0,15	0,15	0,14	0,14	0,14
10 Primary metals	0,32	0,32	0,31	0,31	0,30	0,29	0,29	0,28	0,28	0,27	0,27
11 Fabricated metal products	0,16	0,15	0,15	0,15	0,15	0,15	0,14	0,14	0,14	0,14	0,14
12 Machinery	0,21	0,21	0,20	0,20	0,20	0,19	0,19	0,19	0,19	0,18	0,18
13 Computer & electronic products	0,28	0,27	0,27	0,26	0,26	0,26	0,25	0,25	0,25	0,24	0,24
14 Electrical equipment	0,25	0,25	0,25	0,24	0,24	0,24	0,24	0,23	0,23	0,23	0,23
15 Motor vehicles, bodies & trailers	0,31	0,31	0,30	0,30	0,29	0,29	0,29	0,28	0,28	0,28	0,27
16 Other transportation equipment	0,24	0,24	0,24	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,22
17 Furniture and related products	0,19	0,19	0,19	0,18	0,18	0,18	0,18	0,18	0,18	0,17	0,17
18 Miscellaneous manufacturing	0,25	0,25	0,25	0,25	0,24	0,24	0,24	0,24	0,23	0,23	0,23
19 Food, beverage, tobacco products	0,65	0,63	0,62	0,60	0,58	0,57	0,55	0,54	0,53	0,51	0,50
20 Textile mills & textile product mills	0,21	0,20	0,20	0,19	0,18	0,18	0,17	0,17	0,16	0,16	0,15
21 Apparel & leather & allied products	0,64	0,63	0,62	0,61	0,60	0,60	0,59	0,58	0,58	0,57	0,56
22 Paper products	0,18	0,18	0,18	0,17	0,17	0,16	0,16	0,16	0,15	0,15	0,15
23 Printing & related support activities	-0,20	-0,20	-0,20	-0,20	-0,21	-0,21	-0,21	-0,21	-0,21	-0,21	-0,21
24 Petroleum and coal products	0,41	0,40	0,39	0,38	0,37	0,37	0,36	0,35	0,34	0,34	0,33
25 Chemical products	4,91	4,62	4,33	4,06	3,80	3,56	3,33	3,10	2,89	2,69	2,50
26 Plastics and rubber products	0,08	0,07	0,07	0,06	0,06	0,06	0,05	0,05	0,04	0,04	0,04
27 Wholesale trade	0,28	0,27	0,27	0,27	0,26	0,26	0,26	0,26	0,25	0,25	0,25
28 Retail trade	0,28	0,28	0,28	0,27	0,27	0,27	0,27	0,27	0,27	0,26	0,26
29 Air transportation	0,77	0,75	0,73	0,71	0,69	0,67	0,66	0,64	0,62	0,61	0,60
30 Rail transportation	0,05	0,05	0,05	0,05	0,06	0,06	0,06	0,06	0,06	0,06	0,07
31 Water transportation	0,23	0,22	0,22	0,21	0,21	0,20	0,20	0,20	0,19	0,19	0,19
32 Truck transportation	0,04	0,04	0,04	0,04	0,04	0,03	0,03	0,03	0,03	0,03	0,02
33 Transit & passenger transportation	0,16	0,16	0,16	0,16	0,16	0,16	0,16	0,16	0,15	0,15	0,15
34 Pipeline transportation	0,63	0,61	0,59	0,58	0,56	0,55	0,53	0,52	0,51	0,49	0,48
35 Other transportation & support	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,16	0,16	0,16	0,16
36 Warehousing and storage	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,13
37 Publishing industries	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,10	0,10	0,10
38 Motion picture & sound recording	0,38	0,38	0,37	0,37	0,36	0,36	0,35	0,35	0,34	0,34	0,34
39 Broadcasting & telecommunications	0,51	0,50	0,49	0,47	0,46	0,45	0,44	0,43	0,42	0,42	0,41
40 Information & data processing	0,24	0,23	0,23	0,22	0,22	0,21	0,21	0,21	0,20	0,20	0,20
41 Federal Reserve banks, credit	0,12	0,12	0,12	0,11	0,11	0,11	0,10	0,10	0,10	0,10	0,09
42 Securities, contracts, investments	-0,09	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10
43 Insurance carriers & related	5,35	4,85	4,37	3,92	3,49	3,07	2,68	2,31	1,95	1,61	1,28
44 Funds, trusts, financial vehicles	0,09	0,08	0,08	0,07	0,07	0,06	0,06	0,06	0,05	0,05	0,05
45 Real estate	0,88	0,85	0,82	0,80	0,77	0,74	0,72	0,69	0,67	0,65	0,63
46 Rental and leasing services	0,35	0,34	0,32	0,31	0,30	0,29	0,28	0,27	0,26	0,25	0,24
47 Legal services	0,10	0,10	0,09	0,09	0,08	0,08	0,08	0,07	0,07	0,07	0,06
48 Computer systems design & related	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
49 Professional, scientific services	0,02	0,02	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
50 Management of companies & enterprises	-0,01	-0,01	-0,00	-0,00	-0,00	0,00	0,00	0,00	0,01	0,01	0,01
51 Administrative and support services	-0,00	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
52 Waste management & remediation	0,17	0,17	0,16	0,16	0,15	0,15	0,15	0,14	0,14	0,14	0,14
53 Educational services	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,29	0,29	0,29	0,29
54 Ambulatory health care services	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,01	-0,01	-0,01	-0,01
55 Hospitals, nursing, residential care	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
56 Social assistance	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
57 Performing arts, sports, museums	0,21	0,20	0,20	0,19	0,19	0,19	0,18	0,18	0,18	0,17	0,17
58 Amusements, gambling, recreation	0,26	0,25	0,25	0,25	0,24	0,24	0,23	0,23	0,23	0,23	0,22
59 Accommodation	0,16	0,15	0,15	0,15	0,15	0,14	0,14	0,14	0,14	0,14	0,13
60 Food services and drinking places	0,25	0,25	0,24	0,24	0,24	0,23	0,23	0,23	0,23	0,22	0,22
61 Other services, except government	0,21	0,21	0,21	0,21	0,20	0,20	0,20	0,20	0,20	0,20	0,20
62 Federal general government	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
63 Federal government enterprises	0,21	0,21	0,20	0,20	0,19	0,18	0,18	0,18	0,17	0,17	0,16
64 State and local general government	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
65 State & local government enterprises	0,08	0,09	0,10	0,10	0,11	0,12	0,13	0,13	0,14	0,15	0,15
66 Scrap, used and secondhand goods	2,27	2,26	2,25	2,24	2,23	2,22	2,22	2,21	2,21	2,21	2,20
67 Noncomparable imports & RoW adjustment	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,13

Table 4
Value Added by commodity: % changes from benchmark - from 2014 to 2024

sigma = 0.4	Scenario S_PRIV										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,33	0,32	0,31	0,31	0,30	0,29	0,29	0,28	0,28	0,27	0,27
2 Forestry, fishing, related activities	0,04	0,04	0,04	0,04	0,03	0,03	0,03	0,03	0,02	0,02	0,02
3 Oil and gas extraction	0,07	0,07	0,06	0,06	0,06	0,05	0,05	0,05	0,04	0,04	0,03
4 Mining, except oil and gas	-0,43	-0,43	-0,44	-0,44	-0,44	-0,45	-0,45	-0,45	-0,46	-0,46	-0,47
5 Support activities for mining	-3,07	-3,08	-3,08	-3,09	-3,09	-3,10	-3,11	-3,12	-3,13	-3,15	-3,16
6 Utilities	0,32	0,32	0,31	0,31	0,30	0,30	0,30	0,29	0,29	0,28	0,27
7 Construction	-2,73	-2,73	-2,73	-2,73	-2,73	-2,73	-2,73	-2,74	-2,74	-2,75	-2,75
8 Wood products	-1,19	-1,20	-1,20	-1,20	-1,20	-1,20	-1,21	-1,21	-1,21	-1,22	-1,22
9 Nonmetallic mineral products	-1,22	-1,22	-1,22	-1,22	-1,22	-1,23	-1,23	-1,23	-1,23	-1,24	-1,24
10 Primary metals	-0,39	-0,39	-0,39	-0,39	-0,39	-0,39	-0,39	-0,39	-0,39	-0,39	-0,40
11 Fabricated metal products	-0,87	-0,87	-0,87	-0,87	-0,87	-0,88	-0,88	-0,88	-0,88	-0,89	-0,89
12 Machinery	-1,40	-1,40	-1,39	-1,39	-1,39	-1,39	-1,39	-1,39	-1,39	-1,39	-1,39
13 Computer & electronic products	-0,99	-0,99	-0,99	-0,99	-0,99	-1,00	-1,00	-1,00	-1,00	-1,01	-1,01
14 Electrical equipment	-0,74	-0,74	-0,74	-0,74	-0,74	-0,74	-0,74	-0,75	-0,75	-0,75	-0,75
15 Motor vehicles, bodies & trailers	-0,52	-0,52	-0,52	-0,52	-0,52	-0,51	-0,51	-0,51	-0,51	-0,51	-0,51
16 Other transportation equipment	-0,63	-0,63	-0,63	-0,63	-0,63	-0,63	-0,64	-0,64	-0,64	-0,64	-0,65
17 Furniture and related products	-1,01	-1,00	-1,00	-0,99	-0,99	-0,99	-0,99	-0,99	-0,98	-0,98	-0,98
18 Miscellaneous manufacturing	-0,02	-0,02	-0,02	-0,03	-0,03	-0,04	-0,04	-0,05	-0,05	-0,06	-0,06
19 Food, beverage, tobacco products	0,48	0,48	0,48	0,48	0,47	0,47	0,47	0,47	0,47	0,46	0,46
20 Textile mills & textile product mills	0,14	0,14	0,14	0,14	0,14	0,15	0,15	0,15	0,15	0,15	0,15
21 Apparel & leather & allied products	1,06	1,07	1,07	1,08	1,08	1,09	1,09	1,10	1,10	1,11	1,12
22 Paper products	0,23	0,22	0,22	0,21	0,21	0,20	0,20	0,19	0,19	0,18	0,18
23 Printing & related support activities	-0,05	-0,06	-0,07	-0,08	-0,08	-0,09	-0,10	-0,11	-0,12	-0,12	-0,13
24 Petroleum and coal products	0,19	0,19	0,18	0,17	0,16	0,16	0,15	0,14	0,13	0,12	0,12
25 Chemical products	4,77	4,48	4,21	3,95	3,70	3,47	3,24	3,03	2,82	2,63	2,45
26 Plastics and rubber products	-0,17	-0,18	-0,18	-0,18	-0,19	-0,19	-0,19	-0,20	-0,20	-0,20	-0,21
27 Wholesale trade	-0,19	-0,19	-0,19	-0,18	-0,18	-0,18	-0,18	-0,18	-0,18	-0,18	-0,18
28 Retail trade	-0,02	-0,01	-0,00	0,00	0,01	0,02	0,02	0,03	0,03	0,04	0,04
29 Air transportation	0,33	0,33	0,34	0,34	0,34	0,34	0,34	0,35	0,35	0,35	0,35
30 Rail transportation	-0,02	-0,03	-0,03	-0,04	-0,04	-0,05	-0,05	-0,05	-0,06	-0,06	-0,07
31 Water transportation	0,19	0,19	0,18	0,17	0,16	0,15	0,15	0,14	0,13	0,12	0,12
32 Truck transportation	-0,34	-0,34	-0,34	-0,34	-0,34	-0,35	-0,35	-0,35	-0,35	-0,35	-0,36
33 Transit & passenger transportation	0,33	0,33	0,32	0,32	0,32	0,32	0,31	0,31	0,31	0,31	0,31
34 Pipeline transportation	0,30	0,29	0,29	0,28	0,28	0,27	0,27	0,26	0,25	0,25	0,24
35 Other transportation & support	0,07	0,07	0,07	0,07	0,07	0,06	0,06	0,06	0,06	0,06	0,06
36 Warehousing and storage	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,02	0,01	0,01	0,01
37 Publishing industries	-1,12	-1,12	-1,12	-1,12	-1,12	-1,13	-1,13	-1,13	-1,14	-1,14	-1,15
38 Motion picture & sound recording	0,40	0,39	0,39	0,38	0,38	0,37	0,36	0,36	0,35	0,35	0,34
39 Broadcasting & telecommunications	0,29	0,28	0,28	0,27	0,26	0,25	0,24	0,23	0,22	0,22	0,21
40 Information & data processing	0,36	0,35	0,34	0,33	0,32	0,31	0,30	0,29	0,28	0,27	0,27
41 Federal Reserve banks, credit	0,13	0,11	0,10	0,09	0,08	0,07	0,06	0,05	0,04	0,03	0,02
42 Securities, contracts, investments	-0,09	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10
43 Insurance carriers & related	5,13	4,65	4,19	3,74	3,32	2,92	2,54	2,17	1,82	1,49	1,17
44 Funds, trusts, financial vehicles	0,05	0,05	0,05	0,05	0,05	0,05	0,04	0,04	0,04	0,04	0,04
45 Real estate	0,39	0,37	0,35	0,34	0,32	0,30	0,28	0,26	0,24	0,22	0,20
46 Rental and leasing services	-0,03	-0,04	-0,05	-0,05	-0,06	-0,07	-0,08	-0,08	-0,09	-0,10	-0,11
47 Legal services	0,00	-0,00	-0,01	-0,02	-0,02	-0,03	-0,04	-0,04	-0,05	-0,06	-0,06
48 Computer systems design & related	-1,90	-1,89	-1,89	-1,89	-1,89	-1,90	-1,90	-1,90	-1,91	-1,91	-1,92
49 Professional, scientific services	-0,18	-0,19	-0,20	-0,21	-0,22	-0,23	-0,24	-0,24	-0,25	-0,26	-0,27
50 Management of companies & enterprises	-0,04	-0,04	-0,04	-0,04	-0,04	-0,05	-0,05	-0,05	-0,05	-0,06	-0,06
51 Administrative and support services	0,16	0,15	0,14	0,13	0,12	0,11	0,10	0,09	0,08	0,07	0,06
52 Waste management & remediation	0,40	0,39	0,38	0,37	0,35	0,34	0,33	0,32	0,31	0,30	0,29
53 Educational services	0,28	0,30	0,31	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39
54 Ambulatory health care services	1,90	1,86	1,82	1,79	1,75	1,72	1,69	1,65	1,62	1,59	1,56
55 Hospitals, nursing, residential care	1,94	1,90	1,87	1,84	1,80	1,77	1,75	1,72	1,69	1,66	1,64
56 Social assistance	0,15	0,16	0,17	0,18	0,19	0,20	0,21	0,22	0,23	0,24	0,25
57 Performing arts, sports, museums	0,15	0,15	0,15	0,14	0,14	0,14	0,14	0,13	0,13	0,13	0,13
58 Amusements, gambling, recreation	0,19	0,20	0,20	0,21	0,21	0,21	0,22	0,22	0,23	0,23	0,23
59 Accommodation	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,11
60 Food services and drinking places	0,22	0,23	0,23	0,23	0,24	0,24	0,24	0,24	0,25	0,25	0,25
61 Other services, except government	0,18	0,19	0,19	0,19	0,19	0,19	0,20	0,20	0,20	0,20	0,20
62 Federal general government	2,53	2,47	2,41	2,35	2,30	2,24	2,19	2,13	2,08	2,03	1,98
63 Federal government enterprises	0,19	0,19	0,18	0,18	0,18	0,18	0,17	0,17	0,17	0,17	0,16
64 State and local general government	2,47	2,41	2,36	2,30	2,25	2,20	2,15	2,10	2,05	2,01	1,96
65 State & local government enterprises	0,40	0,40	0,39	0,39	0,39	0,39	0,39	0,39	0,39	0,39	0,39
66 Scrap, used and secondhand goods	21,94	21,92	21,91	21,91	21,93	21,95	21,99	22,03	22,09	22,15	22,22
67 Noncomparable imports & RoW adjustment	0,38	0,38	0,37	0,37	0,36	0,36	0,36	0,35	0,35	0,35	0,34

Table 5
Total Output: % change from benchmark - from 2014 to 2024

sigma = 0.4	Scenario S_FED										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,23
2 Forestry, fishing, related activities	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23
3 Oil and gas extraction	0,15	0,15	0,15	0,16	0,16	0,17	0,17	0,18	0,18	0,18	0,19
4 Mining, except oil and gas	0,08	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,09	0,10	0,10
5 Support activities for mining	-0,06	-0,06	-0,06	-0,06	-0,06	-0,07	-0,07	-0,07	-0,07	-0,08	-0,08
6 Utilities	0,24	0,25	0,25	0,26	0,27	0,27	0,28	0,29	0,29	0,30	0,31
7 Construction	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
8 Wood products	0,08	0,08	0,09	0,09	0,09	0,09	0,10	0,10	0,10	0,11	0,11
9 Nonmetallic mineral products	0,09	0,09	0,10	0,10	0,10	0,11	0,11	0,11	0,11	0,12	0,12
10 Primary metals	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24
11 Fabricated metal products	0,11	0,11	0,11	0,12	0,12	0,12	0,13	0,13	0,13	0,14	0,14
12 Machinery	0,13	0,13	0,14	0,14	0,15	0,15	0,16	0,16	0,16	0,17	0,17
13 Computer & electronic products	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,23	0,23	0,24
14 Electrical equipment	0,18	0,19	0,19	0,20	0,20	0,21	0,22	0,22	0,23	0,23	0,24
15 Motor vehicles, bodies & trailers	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,26	0,26	0,27	0,28
16 Other transportation equipment	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,26	0,26
17 Furniture and related products	0,15	0,15	0,15	0,16	0,16	0,17	0,17	0,18	0,18	0,19	0,19
18 Miscellaneous manufacturing	0,20	0,20	0,21	0,21	0,22	0,23	0,23	0,24	0,25	0,25	0,26
19 Food, beverage, tobacco products	0,24	0,25	0,26	0,26	0,27	0,28	0,28	0,29	0,30	0,31	0,31
20 Textile mills & textile product mills	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08
21 Apparel & leather & allied products	0,45	0,46	0,48	0,49	0,50	0,52	0,53	0,54	0,56	0,58	0,59
22 Paper products	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,11	0,12	0,12	0,12
23 Printing & related support activities	-0,22	-0,23	-0,24	-0,24	-0,25	-0,26	-0,27	-0,27	-0,28	-0,29	-0,30
24 Petroleum and coal products	0,20	0,21	0,22	0,22	0,23	0,23	0,24	0,25	0,25	0,26	0,27
25 Chemical products	-1,21	-1,24	-1,28	-1,32	-1,35	-1,39	-1,43	-1,47	-1,51	-1,55	-1,60
26 Plastics and rubber products	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,04	-0,04
27 Wholesale trade	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22
28 Retail trade	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,26	0,26
29 Air transportation	0,27	0,27	0,28	0,29	0,29	0,30	0,31	0,32	0,33	0,34	0,35
30 Rail transportation	0,10	0,10	0,11	0,11	0,11	0,11	0,12	0,12	0,12	0,13	0,13
31 Water transportation	0,13	0,14	0,14	0,14	0,15	0,15	0,15	0,16	0,16	0,16	0,17
32 Truck transportation	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00
33 Transit & passenger transportation	0,15	0,16	0,16	0,17	0,17	0,17	0,18	0,18	0,19	0,19	0,20
34 Pipeline transportation	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,25
35 Other transportation & support	0,15	0,15	0,16	0,16	0,17	0,17	0,17	0,18	0,18	0,19	0,19
36 Warehousing and storage	0,13	0,13	0,13	0,14	0,14	0,14	0,15	0,15	0,16	0,16	0,17
37 Publishing industries	0,09	0,09	0,09	0,10	0,10	0,10	0,11	0,11	0,11	0,11	0,12
38 Motion picture & sound recording	0,26	0,27	0,28	0,28	0,29	0,30	0,31	0,32	0,32	0,33	0,34
39 Broadcasting & telecommunications	0,24	0,25	0,25	0,26	0,27	0,27	0,28	0,29	0,30	0,30	0,31
40 Information & data processing	0,15	0,15	0,15	0,16	0,16	0,17	0,17	0,17	0,18	0,18	0,19
41 Federal Reserve banks, credit	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07
42 Securities, contracts, investments	-0,11	-0,11	-0,11	-0,12	-0,12	-0,12	-0,13	-0,13	-0,14	-0,14	-0,14
43 Insurance carriers & related	-5,06	-5,21	-5,35	-5,50	-5,66	-5,82	-5,98	-6,15	-6,32	-6,50	-6,68
44 Funds, trusts, financial vehicles	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,02	-0,02	-0,02
45 Real estate	0,20	0,21	0,21	0,22	0,22	0,23	0,23	0,24	0,25	0,25	0,26
46 Rental and leasing services	0,07	0,08	0,08	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,09
47 Legal services	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
48 Computer systems design & related	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
49 Professional, scientific services	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
50 Management of companies & enterprises	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,04	0,04
51 Administrative and support services	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
52 Waste management & remediation	0,09	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,10	0,11	0,11
53 Educational services	0,30	0,31	0,31	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39
54 Ambulatory health care services	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,02
55 Hospitals, nursing, residencial care	0,05	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,07
56 Social assistance	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,23
57 Performing arts, sports, museums	0,10	0,10	0,11	0,11	0,11	0,11	0,12	0,12	0,12	0,12	0,13
58 Amusements, gambling, recreation	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20
59 Accommodation	0,09	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,11	0,11
60 Food services and drinking places	0,16	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21
61 Other services, except government	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23
62 Federal general government	0,17	0,18	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22
63 Federal government enterprises	0,11	0,11	0,11	0,12	0,12	0,12	0,13	0,13	0,13	0,14	0,14
64 State and local general government	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22
65 State & local government enterprises	0,28	0,28	0,29	0,30	0,31	0,31	0,32	0,33	0,34	0,35	0,36
66 Scrap, used and secondhand goods	2,21	2,26	2,32	2,38	2,45	2,51	2,58	2,65	2,72	2,79	2,87
67 Noncomparable imports & RoW adjustment	0,13	0,14	0,14	0,14	0,15	0,15	0,16	0,16	0,16	0,17	0,17

Table 6
Total Output: % change from benchmark - from 2014 to 2024

sigma = 0.4	Scenario 5_PRIV										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,33	0,33	0,33	0,34	0,34	0,34	0,35	0,35	0,35	0,36	0,36
2 Forestry, fishing, related activities	0,04	0,04	0,04	0,04	0,04	0,03	0,03	0,03	0,03	0,03	0,03
3 Oil and gas extraction	0,13	0,13	0,12	0,12	0,11	0,11	0,10	0,09	0,08	0,08	0,07
4 Mining, except oil and gas	-0,42	-0,44	-0,46	-0,48	-0,49	-0,51	-0,53	-0,55	-0,58	-0,60	-0,62
5 Support activities for mining	-3,07	-3,16	-3,26	-3,35	-3,46	-3,56	-3,67	-3,79	-3,91	-4,03	-4,17
6 Utilities	0,34	0,34	0,34	0,34	0,35	0,35	0,35	0,35	0,35	0,35	0,35
7 Construction	-2,73	-2,81	-2,88	-2,96	-3,04	-3,13	-3,22	-3,31	-3,41	-3,51	-3,62
8 Wood products	-1,20	-1,23	-1,27	-1,30	-1,34	-1,38	-1,43	-1,47	-1,52	-1,56	-1,61
9 Nonmetallic mineral products	-1,23	-1,26	-1,29	-1,33	-1,37	-1,41	-1,45	-1,49	-1,54	-1,59	-1,64
10 Primary metals	-0,39	-0,40	-0,41	-0,42	-0,43	-0,45	-0,46	-0,48	-0,49	-0,51	-0,52
11 Fabricated metal products	-0,87	-0,90	-0,92	-0,95	-0,98	-1,01	-1,04	-1,07	-1,10	-1,14	-1,17
12 Machinery	-1,40	-1,42	-1,47	-1,51	-1,55	-1,59	-1,64	-1,68	-1,73	-1,78	-1,83
13 Computer & electronic products	-0,99	-1,01	-1,04	-1,07	-1,11	-1,14	-1,17	-1,21	-1,25	-1,29	-1,33
14 Electrical equipment	-0,74	-0,76	-0,78	-0,80	-0,83	-0,85	-0,88	-0,90	-0,93	-0,96	-0,99
15 Motor vehicles, bodies & trailers	-0,54	-0,54	-0,55	-0,56	-0,57	-0,59	-0,60	-0,62	-0,63	-0,65	-0,67
16 Other transportation equipment	-0,63	-0,65	-0,67	-0,69	-0,71	-0,73	-0,75	-0,77	-0,80	-0,83	-0,85
17 Furniture and related products	-1,00	-1,03	-1,05	-1,08	-1,11	-1,13	-1,16	-1,19	-1,23	-1,26	-1,30
18 Miscellaneous manufacturing	-0,01	-0,02	-0,02	-0,03	-0,04	-0,04	-0,05	-0,06	-0,06	-0,07	-0,08
19 Food, beverage, tobacco products	0,48	0,49	0,50	0,51	0,52	0,53	0,54	0,55	0,56	0,58	0,59
20 Textile mills & textile product mills	0,13	0,14	0,14	0,15	0,15	0,16	0,17	0,17	0,18	0,19	0,19
21 Apparel & leather & allied products	1,08	1,11	1,15	1,18	1,22	1,26	1,30	1,34	1,38	1,43	1,48
22 Paper products	0,22	0,22	0,22	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23
23 Printing & related support activities	-0,06	-0,07	-0,08	-0,09	-0,10	-0,11	-0,12	-0,14	-0,15	-0,16	-0,18
24 Petroleum and coal products	0,21	0,20	0,20	0,19	0,19	0,19	0,18	0,18	0,17	0,16	0,16
25 Chemical products	-0,99	-1,02	-1,06	-1,09	-1,13	-1,17	-1,21	-1,25	-1,29	-1,33	-1,38
26 Plastics and rubber products	-0,19	-0,20	-0,20	-0,21	-0,22	-0,23	-0,24	-0,25	-0,27	-0,28	-0,29
27 Wholesale trade	0,22	0,22	0,23	0,23	0,24	0,24	0,25	0,26	0,27	0,27	0,28
28 Retail trade	-0,06	-0,05	-0,05	-0,04	-0,04	-0,03	-0,02	-0,02	-0,01	-0,00	0,01
29 Air transportation	0,34	0,35	0,36	0,37	0,38	0,40	0,41	0,42	0,43	0,44	0,46
30 Rail transportation	-0,02	-0,03	-0,03	-0,04	-0,04	-0,05	-0,06	-0,06	-0,07	-0,08	-0,08
31 Water transportation	0,18	0,18	0,18	0,17	0,17	0,16	0,16	0,15	0,15	0,14	0,14
32 Truck transportation	0,35	0,36	0,37	0,38	0,39	0,41	0,42	0,43	0,45	0,46	0,48
33 Transit & passenger transportation	0,33	0,34	0,34	0,35	0,36	0,36	0,37	0,38	0,39	0,39	0,40
34 Pipeline transportation	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28
35 Other transportation & support	0,06	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07
36 Warehousing and storage	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,02	0,01	0,01	0,01
37 Publishing industries	-1,12	-1,15	-1,18	-1,22	-1,26	-1,29	-1,33	-1,38	-1,42	-1,46	-1,51
38 Motion picture & sound recording	0,40	0,40	0,41	0,41	0,43	0,43	0,42	0,42	0,42	0,44	0,44
39 Broadcasting & telecommunications	0,30	0,30	0,30	0,29	0,29	0,29	0,28	0,28	0,28	0,27	0,27
40 Information & data processing	0,36	0,36	0,36	0,36	0,36	0,36	0,35	0,35	0,35	0,35	0,35
41 Federal Reserve banks, credit	0,12	0,11	0,10	0,09	0,08	0,07	0,06	0,05	0,04	0,03	0,01
42 Securities, contracts, investments	-0,10	-0,11	-0,11	-0,11	-0,12	-0,12	-0,12	-0,13	-0,13	-0,13	-0,14
43 Insurance carriers & related	4,85	5,00	5,15	5,30	5,45	5,62	5,79	5,96	6,13	6,31	6,49
44 Funds, trusts, financial vehicles	0,05	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04
45 Real estate	0,40	0,39	0,38	0,36	0,35	0,33	0,32	0,30	0,28	0,26	0,24
46 Rental and leasing services	-0,04	-0,05	-0,06	-0,07	-0,08	-0,09	-0,11	-0,12	-0,13	-0,15	-0,16
47 Legal services	-0,00	-0,01	-0,02	-0,03	-0,03	-0,04	-0,05	-0,06	-0,07	-0,08	-0,09
48 Computer systems design & related	1,90	1,95	2,00	2,06	2,11	2,18	2,24	2,31	2,37	2,45	2,52
49 Professional, scientific services	-0,18	-0,20	-0,21	-0,23	-0,25	-0,26	-0,28	-0,30	-0,32	-0,34	-0,36
50 Management of companies & enterprises	-0,04	-0,05	-0,05	-0,05	-0,06	-0,06	-0,07	-0,07	-0,07	-0,08	-0,08
51 Administrative and support services	0,15	0,15	0,14	0,13	0,13	0,12	0,11	0,10	0,10	0,09	0,08
52 Waste management & remediation	0,38	0,38	0,38	0,38	0,37	0,37	0,37	0,37	0,36	0,36	0,36
53 Educational services	0,28	0,30	0,32	0,34	0,36	0,38	0,41	0,43	0,46	0,48	0,51
54 Ambulatory health care services	1,89	1,91	1,92	1,93	1,95	1,97	1,98	2,00	2,02	2,03	2,05
55 Hospitals, nursing, residential care	1,93	1,94	1,96	1,98	2,00	2,03	2,05	2,07	2,09	2,12	2,15
56 Social assistance	0,15	0,16	0,18	0,19	0,21	0,23	0,24	0,26	0,28	0,30	0,32
57 Performing arts, sports, museums	0,12	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,14	0,14	0,14
58 Amusements, gambling, recreation	0,17	0,18	0,19	0,20	0,21	0,22	0,23	0,24	0,25	0,26	0,28
59 Accommodation	0,06	0,06	0,07	0,07	0,08	0,08	0,09	0,09	0,09	0,10	0,10
60 Food services and drinking places	0,20	0,21	0,22	0,23	0,24	0,25	0,26	0,27	0,28	0,29	0,30
61 Other services, except government	0,17	0,18	0,19	0,20	0,20	0,21	0,22	0,23	0,24	0,25	0,26
62 Federal general government	2,53	2,54	2,55	2,56	2,56	2,57	2,58	2,59	2,60	2,60	2,61
63 Federal government enterprises	0,20	0,20	0,21	0,21	0,21	0,21	0,22	0,22	0,22	0,22	0,23
64 State and local general government	2,47	2,48	2,49	2,50	2,51	2,52	2,54	2,55	2,56	2,57	2,58
65 State & local government enterprises	0,41	0,42	0,43	0,44	0,45	0,46	0,48	0,49	0,50	0,52	0,53
66 Scrap, used and secondhand goods	21,94	22,57	23,22	23,90	24,60	25,33	26,09	26,88	27,71	28,56	29,45
b/ Noncomparable imports & ROW adjustment	0,38	0,39	0,39	0,40	0,41	0,41	0,42	0,43	0,44	0,45	0,45

Table 7
Value Added by commodity: % change from benchmark - from 2014 to 2024

sigma = 0.3	Scenario S_FED									
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,01	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,08
2 Forestry, fishing, related activities	0,30	0,29	0,29	0,28	0,28	0,27	0,27	0,27	0,26	0,26	0,26
3 Oil and gas extraction	1,30	1,25	1,20	1,16	1,11	1,07	1,03	0,99	0,96	0,92	0,89
4 Mining, except oil and gas	0,43	0,41	0,40	0,39	0,37	0,36	0,35	0,33	0,32	0,31	0,30
5 Support activities for mining	0,04	0,04	0,03	0,03	0,03	0,02	0,02	0,01	0,01	0,01	0,00
6 Utilities	0,85	0,82	0,80	0,77	0,75	0,73	0,71	0,69	0,67	0,65	0,63
7 Construction	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
8 Wood products	0,15	0,15	0,15	0,14	0,14	0,14	0,14	0,13	0,13	0,13	0,13
9 Nonmetallic mineral products	0,18	0,18	0,17	0,17	0,17	0,16	0,16	0,16	0,15	0,15	0,15
10 Primary metals	0,35	0,34	0,34	0,33	0,32	0,32	0,31	0,30	0,30	0,29	0,29
11 Fabricated metal products	0,17	0,17	0,16	0,16	0,16	0,16	0,16	0,15	0,15	0,15	0,15
12 Machinery	0,21	0,21	0,21	0,20	0,20	0,20	0,19	0,19	0,19	0,19	0,18
13 Computer & electronic products	0,28	0,28	0,27	0,27	0,27	0,26	0,26	0,25	0,25	0,25	0,24
14 Electrical equipment	0,27	0,26	0,26	0,26	0,25	0,25	0,25	0,24	0,24	0,24	0,24
15 Motor vehicles, bodies & trailers	0,32	0,32	0,31	0,31	0,30	0,30	0,30	0,29	0,29	0,29	0,28
16 Other transportation equipment	0,25	0,25	0,24	0,24	0,24	0,24	0,24	0,24	0,23	0,23	0,23
17 Furniture and related products	0,19	0,19	0,19	0,19	0,19	0,19	0,18	0,18	0,18	0,18	0,18
18 Miscellaneous manufacturing	0,27	0,26	0,26	0,26	0,26	0,25	0,25	0,25	0,25	0,24	0,24
19 Food, beverage, tobacco products	0,74	0,72	0,70	0,68	0,66	0,64	0,63	0,61	0,59	0,58	0,57
20 Textile mills & textile product mills	0,24	0,23	0,22	0,21	0,21	0,20	0,20	0,19	0,18	0,18	0,17
21 Apparel & leather & allied products	0,66	0,65	0,64	0,63	0,62	0,61	0,61	0,60	0,59	0,59	0,58
22 Paper products	0,21	0,21	0,20	0,20	0,20	0,19	0,19	0,18	0,18	0,18	0,17
23 Printing & related support activities	-0,18	-0,18	-0,18	-0,18	-0,19	-0,19	-0,19	-0,19	-0,19	-0,19	-0,19
24 Petroleum and coal products	0,46	0,44	0,43	0,42	0,41	0,40	0,39	0,38	0,38	0,37	0,36
25 Chemical products	4,97	4,66	4,38	4,10	3,84	3,59	3,35	3,13	2,91	2,71	2,52
26 Plastics and rubber products	0,10	0,10	0,09	0,09	0,08	0,08	0,07	0,07	0,06	0,06	0,06
27 Wholesale trade	0,33	0,32	0,32	0,31	0,31	0,30	0,30	0,30	0,29	0,29	0,28
28 Retail trade	0,32	0,32	0,31	0,31	0,31	0,30	0,30	0,30	0,30	0,29	0,29
29 Air transportation	0,84	0,82	0,80	0,77	0,75	0,73	0,72	0,70	0,68	0,66	0,65
30 Rail transportation	0,05	0,06	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,07	0,07
31 Water transportation	0,28	0,27	0,27	0,26	0,26	0,25	0,25	0,24	0,24	0,23	0,23
32 Truck transportation	0,06	0,06	0,06	0,06	0,05	0,05	0,05	0,05	0,05	0,04	0,04
33 Transit & passenger transportation	0,18	0,18	0,18	0,18	0,18	0,18	0,18	0,17	0,17	0,17	0,17
34 Pipeline transportation	0,73	0,71	0,69	0,67	0,65	0,63	0,61	0,60	0,58	0,57	0,55
35 Other transportation & support	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,18	0,18	0,18
36 Warehousing and storage	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14
37 Publishing industries	0,13	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,11	0,11
38 Motion picture & sound recording	0,43	0,42	0,42	0,41	0,41	0,40	0,39	0,39	0,38	0,38	0,37
39 Broadcasting & telecommunications	0,59	0,58	0,56	0,55	0,53	0,52	0,51	0,50	0,49	0,47	0,46
40 Information & data processing	0,27	0,27	0,26	0,26	0,25	0,25	0,25	0,24	0,24	0,23	0,23
41 Federal Reserve banks, credit	0,16	0,16	0,15	0,15	0,14	0,14	0,14	0,13	0,13	0,13	0,13
42 Securities, contracts, investments	-0,07	-0,08	-0,08	-0,08	-0,08	-0,08	-0,08	-0,08	-0,08	-0,08	-0,08
43 Insurance carriers & related	5,44	4,93	4,44	3,98	3,54	3,12	2,72	2,34	1,98	1,64	1,31
44 Funds, trusts, financial vehicles	0,13	0,12	0,12	0,11	0,11	0,10	0,10	0,10	0,09	0,09	0,08
45 Real estate	1,07	1,03	0,99	0,96	0,92	0,89	0,86	0,83	0,80	0,77	0,75
46 Rental and leasing services	0,43	0,41	0,40	0,38	0,37	0,36	0,34	0,33	0,32	0,31	0,30
47 Legal services	0,14	0,13	0,13	0,12	0,12	0,12	0,11	0,11	0,10	0,10	0,10
48 Computer systems design & related	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00
49 Professional, scientific services	0,04	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,02	0,02
50 Management of companies & enterprises	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02
51 Administrative and support services	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
52 Waste management & remediation	0,20	0,20	0,19	0,19	0,19	0,18	0,18	0,17	0,17	0,17	0,16
53 Educational services	0,29	0,29	0,30	0,30	0,30	0,30	0,30	0,30	0,30	0,30	0,30
54 Ambulatory health care services	0,02	0,02	0,02	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
55 Hospitals, nursing, residential care	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,07	0,07
56 Social assistance	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19
57 Performing arts, sports, museums	0,25	0,24	0,24	0,23	0,23	0,22	0,22	0,21	0,21	0,21	0,20
58 Amusements, gambling, recreation	0,30	0,29	0,29	0,28	0,28	0,27	0,27	0,27	0,26	0,26	0,25
59 Accommodation	0,19	0,18	0,18	0,18	0,17	0,17	0,17	0,17	0,16	0,16	0,16
60 Food services and drinking places	0,29	0,28	0,28	0,27	0,27	0,27	0,26	0,26	0,26	0,25	0,25
61 Other services, except government	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,22	0,22	0,22	0,22
62 Federal general government	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,18
63 Federal government enterprises	0,25	0,25	0,24	0,23	0,22	0,22	0,21	0,21	0,20	0,20	0,19
64 State and local general government	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,19	0,18
65 State & local government enterprises	0,06	0,07	0,08	0,09	0,10	0,11	0,12	0,13	0,14	0,14	0,15
66 Scrap, used and secondhand goods	2,51	2,49	2,48	2,47	2,46	2,45	2,45	2,44	2,44	2,43	2,43
67 Noncomparable imports & RoW adjustment	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14

Table 8
Value Added by commodity: % changes from benchmark - from 2014 to 2024

sigma = 0.3	Scenario S_PRIV									
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,34	0,33	0,32	0,32	0,31	0,30	0,29	0,29	0,28	0,28	0,27
2 Forestry, fishing, related activities	0,05	0,05	0,05	0,04	0,04	0,04	0,04	0,04	0,03	0,03	0,03
3 Oil and gas extraction	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,06	0,06	0,05	0,04
4 Mining, except oil and gas	-0,41	-0,41	-0,42	-0,42	-0,42	-0,42	-0,43	-0,43	-0,43	-0,44	-0,44
5 Support activities for mining	-2,95	-2,96	-2,96	-2,97	-2,97	-2,98	-2,99	-3,00	-3,02	-3,03	-3,05
6 Utilities	0,33	0,33	0,32	0,32	0,31	0,31	0,31	0,30	0,29	0,29	0,28
7 Construction	-2,65	-2,65	-2,64	-2,64	-2,64	-2,64	-2,64	-2,64	-2,65	-2,65	-2,66
8 Wood products	-1,16	-1,15	-1,15	-1,15	-1,16	-1,16	-1,16	-1,16	-1,17	-1,17	-1,18
9 Nonmetallic mineral products	-1,19	-1,18	-1,18	-1,18	-1,18	-1,18	-1,18	-1,19	-1,19	-1,19	-1,20
10 Primary metals	-0,38	-0,38	-0,38	-0,37	-0,37	-0,37	-0,37	-0,37	-0,37	-0,37	-0,37
11 Fabricated metal products	-0,84	-0,84	-0,84	-0,84	-0,84	-0,84	-0,84	-0,85	-0,85	-0,85	-0,85
12 Machinery	-1,36	-1,35	-1,35	-1,34	-1,34	-1,34	-1,34	-1,34	-1,34	-1,34	-1,34
13 Computer & electronic products	-0,95	-0,95	-0,95	-0,95	-0,95	-0,95	-0,95	-0,96	-0,96	-0,97	-0,97
14 Electrical equipment	-0,72	-0,72	-0,71	-0,71	-0,71	-0,71	-0,71	-0,71	-0,72	-0,72	-0,72
15 Motor vehicles, bodies & trailers	-0,51	-0,51	-0,50	-0,50	-0,50	-0,49	-0,49	-0,49	-0,49	-0,49	-0,48
16 Other transportation equipment	-0,61	-0,61	-0,61	-0,61	-0,61	-0,61	-0,61	-0,61	-0,61	-0,61	-0,62
17 Furniture and related products	-0,98	-0,97	-0,97	-0,96	-0,96	-0,96	-0,95	-0,95	-0,95	-0,95	-0,95
18 Miscellaneous manufacturing	-0,00	-0,01	-0,01	-0,02	-0,02	-0,02	-0,03	-0,03	-0,04	-0,04	-0,04
19 Food, beverage, tobacco products	0,48	0,48	0,48	0,48	0,47	0,47	0,47	0,47	0,47	0,46	0,46
20 Textile mills & textile product mills	0,13	0,13	0,13	0,14	0,14	0,14	0,14	0,14	0,15	0,15	0,15
21 Apparel & leather & allied products	1,04	1,04	1,05	1,05	1,06	1,06	1,07	1,07	1,08	1,08	1,09
22 Paper products	0,23	0,22	0,22	0,21	0,21	0,21	0,20	0,20	0,19	0,19	0,18
23 Printing & related support activities	-0,05	-0,06	-0,06	-0,07	-0,08	-0,09	-0,09	-0,10	-0,11	-0,11	-0,12
24 Petroleum and coal products	0,21	0,20	0,20	0,19	0,18	0,17	0,16	0,15	0,14	0,14	0,13
25 Chemical products	4,75	4,47	4,19	3,93	3,68	3,44	3,22	3,00	2,80	2,60	2,42
26 Plastics and rubber products	-0,17	-0,17	-0,17	-0,17	-0,18	-0,18	-0,18	-0,19	-0,19	-0,19	-0,20
27 Wholesale trade	-0,18	-0,18	-0,18	-0,17	-0,17	-0,17	-0,17	-0,17	-0,17	-0,17	-0,17
28 Retail trade	-0,03	-0,02	-0,01	-0,00	0,00	0,01	0,02	0,03	0,03	0,04	0,05
29 Air transportation	0,32	0,33	0,33	0,34	0,34	0,34	0,34	0,35	0,35	0,35	0,35
30 Rail transportation	-0,01	-0,02	-0,02	-0,03	-0,03	-0,04	-0,04	-0,04	-0,05	-0,05	-0,06
31 Water transportation	0,21	0,20	0,19	0,19	0,18	0,17	0,16	0,15	0,14	0,13	0,13
32 Truck transportation	-0,33	-0,33	-0,33	-0,33	-0,33	-0,33	-0,33	-0,34	-0,34	-0,34	-0,34
33 Transit & passenger transportation	0,32	0,32	0,32	0,32	0,31	0,31	0,31	0,31	0,31	0,31	0,31
34 Pipeline transportation	0,31	0,30	0,30	0,29	0,29	0,28	0,28	0,27	0,26	0,26	0,25
35 Other transportation & support	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07
36 Warehousing and storage	0,03	0,03	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,02	0,02
37 Publishing industries	-1,08	-1,08	-1,08	-1,08	-1,08	-1,08	-1,08	-1,09	-1,09	-1,10	-1,10
38 Motion picture & sound recording	0,41	0,40	0,40	0,39	0,38	0,38	0,37	0,37	0,36	0,35	0,35
39 Broadcasting & telecommunications	0,31	0,30	0,29	0,29	0,28	0,27	0,26	0,25	0,24	0,23	0,22
40 Information & data processing	0,37	0,36	0,35	0,34	0,33	0,32	0,31	0,30	0,29	0,28	0,27
41 Federal Reserve banks, credit	0,15	0,14	0,13	0,11	0,10	0,09	0,08	0,06	0,05	0,04	0,03
42 Securities, contracts, investments	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,10	-0,09
43 Insurance carriers & related	5,12	4,63	4,16	3,71	3,29	2,88	2,50	2,13	1,78	1,44	1,13
44 Funds, trusts, financial vehicles	0,06	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,04	0,04	0,04
45 Real estate	0,44	0,42	0,40	0,38	0,36	0,33	0,31	0,29	0,27	0,24	0,22
46 Rental and leasing services	-0,01	-0,02	-0,03	-0,03	-0,04	-0,05	-0,06	-0,07	-0,08	-0,08	-0,09
47 Legal services	0,01	0,01	0,00	-0,01	-0,01	-0,02	-0,03	-0,03	-0,04	-0,05	-0,05
48 Computer systems design & related	-1,85	-1,84	-1,84	-1,84	-1,84	-1,84	-1,84	-1,84	-1,84	-1,85	-1,85
49 Professional, scientific services	-0,17	-0,17	-0,18	-0,19	-0,20	-0,21	-0,22	-0,23	-0,23	-0,24	-0,25
50 Management of companies & enterprises	-0,04	-0,04	-0,04	-0,04	-0,04	-0,04	-0,04	-0,04	-0,05	-0,05	-0,05
51 Administrative and support services	0,16	0,15	0,14	0,14	0,13	0,12	0,11	0,10	0,09	0,08	0,07
52 Waste management & remediation	0,41	0,40	0,39	0,38	0,36	0,35	0,34	0,33	0,32	0,31	0,29
53 Educational services	0,25	0,26	0,27	0,29	0,30	0,32	0,33	0,34	0,36	0,37	0,38
54 Ambulatory health care services	1,87	1,84	1,80	1,77	1,73	1,70	1,67	1,64	1,61	1,58	1,55
55 Hospitals, nursing, residencial care	1,90	1,87	1,84	1,81	1,78	1,75	1,72	1,70	1,67	1,65	1,62
56 Social assistance	0,12	0,13	0,14	0,16	0,17	0,18	0,19	0,20	0,22	0,23	0,24
57 Performing arts, sports, museums	0,15	0,15	0,15	0,14	0,14	0,14	0,14	0,14	0,14	0,13	0,13
58 Amusements, gambling, recreation	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,23
59 Accommodation	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,10	0,11	0,11	0,11
60 Food services and drinking places	0,21	0,21	0,22	0,22	0,23	0,23	0,24	0,24	0,24	0,25	0,25
61 Other services, except government	0,17	0,18	0,18	0,18	0,19	0,19	0,19	0,20	0,20	0,20	0,20
62 Federal general government	2,54	2,48	2,42	2,36	2,30	2,24	2,19	2,13	2,08	2,03	1,98
63 Federal government enterprises	0,18	0,18	0,18	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
64 State and local general government	2,47	2,41	2,35	2,30	2,25	2,19	2,14	2,09	2,04	2,00	1,95
65 State & local government enterprises	0,39	0,39	0,39	0,39	0,38	0,38	0,38	0,38	0,38	0,39	0,39
66 Scrap, used and secondhand goods	21,60	21,57	21,55	21,55	21,55	21,58	21,61	21,65	21,71	21,78	21,86
67 Noncomparable imports & RoW adjustment	0,38	0,37	0,37	0,36	0,36	0,36	0,35	0,35	0,35	0,34	0,34

Table 9
Total Output: % change from benchmark - from 2014 to 2024

sigma = 0.3	Scenario S_FED										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,25	0,26
2 Forestry, fishing, related activities	0,19	0,20	0,20	0,21	0,22	0,22	0,23	0,23	0,24	0,25	0,25
3 Oil and gas extraction	0,16	0,17	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21
4 Mining, except oil and gas	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,12
5 Support activities for mining	-0,07	-0,07	-0,07	-0,07	-0,07	-0,08	-0,08	-0,08	-0,08	-0,09	-0,09
6 Utilities	0,26	0,27	0,27	0,28	0,29	0,30	0,30	0,31	0,32	0,33	0,34
7 Construction	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02
8 Wood products	0,09	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,11	0,11
9 Nonmetallic mineral products	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,12	0,12	0,12	0,13
10 Primary metals	0,19	0,19	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25
11 Fabricated metal products	0,11	0,12	0,12	0,12	0,13	0,13	0,13	0,14	0,14	0,15	0,15
12 Machinery	0,13	0,13	0,14	0,14	0,14	0,15	0,15	0,16	0,16	0,17	0,17
13 Computer & electronic products	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24
14 Electrical equipment	0,19	0,19	0,20	0,20	0,21	0,22	0,22	0,23	0,23	0,24	0,25
15 Motor vehicles, bodies & trailers	0,22	0,22	0,23	0,23	0,24	0,25	0,25	0,26	0,27	0,28	0,28
16 Other transportation equipment	0,20	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,26	0,26	0,27
17 Furniture and related products	0,15	0,15	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,19	0,19
18 Miscellaneous manufacturing	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,26	0,26	0,27
19 Food, beverage, tobacco products	0,26	0,27	0,28	0,28	0,29	0,30	0,31	0,32	0,32	0,33	0,34
20 Textile mills & textile product mills	0,07	0,08	0,08	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,10
21 Apparel & leather & allied products	0,46	0,47	0,48	0,50	0,51	0,52	0,54	0,55	0,57	0,59	0,60
22 Paper products	0,11	0,12	0,12	0,12	0,13	0,13	0,13	0,14	0,14	0,14	0,15
23 Printing & related support activities	-0,21	-0,21	-0,22	-0,22	-0,23	-0,24	-0,24	-0,25	-0,26	-0,27	-0,27
24 Petroleum and coal products	0,22	0,23	0,23	0,24	0,24	0,25	0,26	0,26	0,27	0,28	0,28
25 Chemical products	-1,19	-1,23	-1,26	-1,30	-1,33	-1,37	-1,41	-1,45	-1,49	-1,53	-1,57
26 Plastics and rubber products	-0,01	-0,01	-0,01	-0,01	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02
27 Wholesale trade	0,18	0,19	0,19	0,20	0,20	0,21	0,22	0,22	0,23	0,23	0,24
28 Retail trade	0,22	0,22	0,23	0,24	0,24	0,25	0,26	0,26	0,27	0,28	0,29
29 Air transportation	0,28	0,29	0,30	0,30	0,31	0,32	0,33	0,34	0,35	0,36	0,37
30 Rail transportation	0,12	0,12	0,12	0,13	0,13	0,13	0,14	0,14	0,14	0,15	0,15
31 Water transportation	0,16	0,16	0,17	0,17	0,18	0,18	0,18	0,19	0,19	0,20	0,20
32 Truck transportation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
33 Transit & passenger transportation	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22
34 Pipeline transportation	0,22	0,22	0,23	0,23	0,24	0,25	0,25	0,26	0,26	0,27	0,28
35 Other transportation & support	0,17	0,17	0,18	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,22
36 Warehousing and storage	0,14	0,15	0,15	0,15	0,16	0,16	0,17	0,17	0,18	0,18	0,19
37 Publishing industries	0,10	0,10	0,10	0,11	0,11	0,11	0,11	0,12	0,12	0,12	0,13
38 Motion picture & sound recording	0,29	0,29	0,30	0,31	0,32	0,33	0,33	0,34	0,35	0,36	0,37
39 Broadcasting & telecommunications	0,26	0,27	0,28	0,28	0,29	0,30	0,31	0,31	0,32	0,33	0,34
40 Information & data processing	0,17	0,17	0,18	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21
41 Federal Reserve banks, credit	0,08	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,09	0,10	0,10
42 Securities, contracts, investments	-0,09	-0,09	-0,09	-0,10	-0,10	-0,10	-0,11	-0,11	-0,11	-0,12	-0,12
43 Insurance carriers & related	5,04	5,18	5,33	5,48	5,63	5,79	5,95	6,12	6,29	6,47	6,65
44 Funds, trusts, financial vehicles	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
45 Real estate	0,23	0,24	0,24	0,25	0,26	0,26	0,27	0,27	0,28	0,29	0,30
46 Rental and leasing services	0,09	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,11	0,12	0,12
47 Legal services	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,04
48 Computer systems design & related	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00
49 Professional, scientific services	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
50 Management of companies & enterprises	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,06	0,06	0,06
51 Administrative and support services	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
52 Waste management & remediation	0,11	0,11	0,11	0,12	0,12	0,12	0,12	0,13	0,13	0,13	0,14
53 Educational services	0,32	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39	0,40	0,41
54 Ambulatory health care services	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
55 Hospitals, nursing, residential care	0,07	0,07	0,07	0,08	0,08	0,08	0,08	0,08	0,09	0,09	0,09
56 Social assistance	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25
57 Performing arts, sports, museums	0,12	0,12	0,13	0,13	0,13	0,14	0,14	0,14	0,15	0,15	0,15
58 Amusements, gambling, recreation	0,18	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,22	0,22	0,23
59 Accommodation	0,10	0,11	0,11	0,11	0,12	0,12	0,12	0,12	0,13	0,13	0,14
60 Food services and drinking places	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,23	0,23	0,24
61 Other services, except government	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,23	0,24	0,25	0,25
62 Federal general government	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,23	0,24	0,24
63 Federal government enterprises	0,13	0,13	0,13	0,14	0,14	0,14	0,15	0,15	0,15	0,16	0,16
64 State and local general government	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24
65 State & local government enterprises	0,30	0,30	0,31	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39
66 Scrap, used and secondhand goods	2,44	2,50	2,57	2,64	2,70	2,78	2,85	2,93	3,01	3,09	3,18
67 Noncomparable imports & ROW adjustment	0,14	0,15	0,15	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,19

Table 10
Total Output: % change from benchmark - from 2014 to 2024

sigma = 0.3	Scenario S_PRIV										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,34	0,34	0,34	0,35	0,35	0,35	0,35	0,36	0,36	0,36	0,37
2 Forestry, fishing, related activities	0,05	0,05	0,05	0,05	0,05	0,04	0,04	0,04	0,04	0,04	0,03
3 Oil and gas extraction	0,15	0,15	0,14	0,13	0,13	0,12	0,11	0,11	0,10	0,09	0,08
4 Mining, except oil and gas	-0,40	-0,42	-0,43	-0,45	-0,47	-0,49	-0,51	-0,53	-0,55	-0,57	-0,59
5 Support activities for mining	-2,95	-3,04	-3,13	-3,22	-3,32	-3,42	-3,53	-3,65	-3,76	-3,89	-4,02
6 Utilities	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36
7 Construction	-2,65	-2,72	-2,79	-2,87	-2,94	-3,03	-3,11	-3,20	-3,29	-3,39	-3,49
8 Wood products	-1,16	-1,19	-1,22	-1,26	-1,29	-1,33	-1,37	-1,41	-1,46	-1,50	-1,55
9 Nonmetallic mineral products	-1,19	-1,22	-1,25	-1,29	-1,32	-1,36	-1,40	-1,44	-1,48	-1,53	-1,58
10 Primary metals	-0,37	-0,38	-0,39	-0,40	-0,42	-0,43	-0,44	-0,45	-0,47	-0,48	-0,49
11 Fabricated metal products	-0,84	-0,87	-0,89	-0,92	-0,94	-0,97	-1,00	-1,03	-1,06	-1,09	-1,13
12 Machinery	-1,35	-1,39	-1,42	-1,46	-1,50	-1,54	-1,58	-1,62	-1,67	-1,72	-1,77
13 Computer & electronic products	-0,95	-0,97	-1,00	-1,03	-1,06	-1,09	-1,12	-1,16	-1,20	-1,23	-1,27
14 Electrical equipment	-0,71	-0,73	-0,75	-0,77	-0,79	-0,82	-0,84	-0,87	-0,89	-0,92	-0,95
15 Motor vehicles, bodies & trailers	-0,51	-0,52	-0,53	-0,54	-0,55	-0,56	-0,58	-0,59	-0,61	-0,62	-0,64
16 Other transportation equipment	-0,61	-0,62	-0,64	-0,66	-0,68	-0,70	-0,72	-0,74	-0,76	-0,79	-0,81
17 Furniture and related products	-0,98	-1,00	-1,02	-1,05	-1,07	-1,10	-1,12	-1,15	-1,18	-1,22	-1,25
18 Miscellaneous manufacturing	-0,00	-0,01	-0,01	-0,02	-0,02	-0,03	-0,03	-0,04	-0,04	-0,05	-0,06
19 Food, beverage, tobacco products	0,48	0,49	0,50	0,51	0,52	0,53	0,54	0,55	0,56	0,57	0,59
20 Textile mills & textile product mills	0,12	0,13	0,13	0,14	0,15	0,15	0,16	0,17	0,17	0,18	0,19
21 Apparel & leather & allied products	1,05	1,08	1,12	1,15	1,19	1,23	1,27	1,31	1,35	1,40	1,44
22 Paper products	0,22	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,24	0,24
23 Printing & related support activities	0,05	0,06	0,07	0,08	0,09	0,10	0,12	0,13	0,14	0,15	0,16
24 Petroleum and coal products	0,23	0,22	0,22	0,21	0,21	0,20	0,20	0,19	0,18	0,18	0,17
25 Chemical products	-0,98	-1,02	-1,05	-1,09	-1,13	-1,16	-1,20	-1,24	-1,29	-1,33	-1,37
26 Plastics and rubber products	-0,18	-0,19	-0,20	-0,21	-0,21	-0,22	-0,23	-0,24	-0,25	-0,26	-0,27
27 Wholesale trade	-0,21	-0,21	-0,22	-0,22	-0,23	-0,23	-0,24	-0,24	-0,25	-0,26	-0,26
28 Retail trade	0,07	0,07	0,06	0,06	0,05	0,04	0,03	0,02	0,01	0,00	0,01
29 Air transportation	0,34	0,35	0,36	0,37	0,38	0,39	0,40	0,42	0,43	0,44	0,45
30 Rail transportation	-0,01	-0,02	-0,02	-0,03	-0,03	-0,04	-0,04	-0,05	-0,06	-0,06	-0,07
31 Water transportation	0,20	0,20	0,19	0,19	0,18	0,18	0,17	0,17	0,16	0,16	0,15
32 Truck transportation	-0,34	-0,35	-0,36	-0,37	-0,38	-0,39	-0,40	-0,42	-0,43	-0,45	-0,46
33 Transit & passenger transportation	0,32	0,33	0,34	0,34	0,35	0,36	0,37	0,37	0,38	0,39	0,40
34 Pipeline transportation	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29
35 Other transportation & support	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,08
36 Warehousing and storage	0,03	0,03	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,02	0,02
37 Publishing industries	-1,08	-1,11	-1,14	-1,17	-1,21	-1,24	-1,28	-1,32	-1,36	-1,41	-1,45
38 Motion picture & sound recording	0,41	0,41	0,42	0,42	0,43	0,43	0,43	0,44	0,44	0,45	0,45
39 Broadcasting & telecommunications	0,33	0,32	0,32	0,31	0,31	0,31	0,30	0,30	0,29	0,29	0,28
40 Information & data processing	0,37	0,37	0,37	0,37	0,37	0,37	0,36	0,36	0,36	0,36	0,36
41 Federal Reserve banks, credit	0,15	0,14	0,13	0,12	0,11	0,09	0,08	0,07	0,06	0,04	0,03
42 Securities, contracts, investments	-0,11	-0,11	-0,11	-0,12	-0,12	-0,12	-0,12	-0,13	-0,13	-0,13	-0,13
43 Insurance carriers & related	-4,84	-4,98	-5,13	-5,29	-5,44	-5,60	-5,77	-5,94	-6,12	-6,30	-6,48
44 Funds, trusts, financial vehicles	0,05	0,05	0,05	0,05	0,04	0,04	0,04	0,04	0,04	0,04	0,04
45 Real estate	0,46	0,45	0,43	0,41	0,40	0,38	0,36	0,34	0,31	0,29	0,27
46 Rental and leasing services	-0,01	-0,02	-0,04	-0,05	-0,06	-0,07	-0,08	-0,10	-0,11	-0,13	-0,14
47 Legal services	0,01	0,00	-0,00	-0,01	-0,02	-0,03	-0,04	-0,05	-0,06	-0,07	-0,08
48 Computer systems design & related	-1,85	-1,90	-1,94	-2,00	-2,05	-2,11	-2,17	-2,23	-2,29	-2,36	-2,43
49 Professional, scientific services	-0,17	-0,18	-0,20	-0,21	-0,23	-0,24	-0,26	-0,28	-0,29	-0,31	-0,33
50 Management of companies & enterprises	-0,05	-0,05	-0,05	-0,05	-0,06	-0,06	-0,06	-0,06	-0,07	-0,07	-0,07
51 Administrative and support services	0,16	0,15	0,15	0,14	0,14	0,13	0,13	0,12	0,11	0,10	0,09
52 Waste management & remediation	0,39	0,39	0,39	0,39	0,38	0,38	0,38	0,38	0,37	0,37	0,37
53 Educational services	0,24	0,26	0,28	0,31	0,33	0,36	0,38	0,41	0,44	0,47	0,50
54 Ambulatory health care services	1,87	1,88	1,90	1,91	1,93	1,94	1,96	1,98	2,00	2,02	2,04
55 Hospitals, nursing, residential care	1,89	1,91	1,93	1,95	1,97	2,00	2,02	2,04	2,07	2,10	2,12
56 Social assistance	0,12	0,13	0,15	0,17	0,18	0,20	0,22	0,24	0,26	0,29	0,31
57 Performing arts, sports, museums	0,12	0,12	0,13	0,13	0,13	0,13	0,13	0,14	0,14	0,14	0,14
58 Amusements, gambling, recreation	0,15	0,16	0,17	0,18	0,20	0,21	0,22	0,23	0,24	0,26	0,27
59 Accommodation	0,05	0,05	0,06	0,06	0,07	0,07	0,08	0,09	0,09	0,10	0,10
60 Food services and drinking places	0,18	0,19	0,20	0,21	0,22	0,24	0,25	0,26	0,27	0,29	0,30
61 Other services, except government	0,16	0,17	0,18	0,19	0,20	0,20	0,21	0,22	0,24	0,25	0,26
62 Federal general government	2,54	2,55	2,56	2,56	2,57	2,58	2,58	2,59	2,59	2,60	2,60
63 Federal government enterprises	0,20	0,20	0,20	0,21	0,21	0,21	0,22	0,22	0,22	0,23	0,23
64 State and local general government	2,47	2,48	2,49	2,50	2,51	2,52	2,53	2,54	2,55	2,56	2,57
65 State & local government enterprises	0,40	0,41	0,42	0,43	0,45	0,46	0,47	0,49	0,50	0,51	0,53
66 Scrap, used and secondhand goods	21,60	22,21	22,85	23,52	24,21	24,94	25,69	26,47	27,29	28,14	29,02
67 Noncomparable imports & ROW adjustment	0,38	0,38	0,39	0,40	0,40	0,41	0,42	0,43	0,43	0,44	0,45

Table 11
Value Added by commodity: % change from benchmark - from 2014 to 2024

sigma = 0.5	Scenario S_FED										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,06	0,06	0,07
2 Forestry, fishing, related activities	0,24	0,24	0,24	0,23	0,23	0,23	0,22	0,22	0,22	0,21	0,21
3 Oil and gas extraction	1,06	1,02	0,98	0,94	0,91	0,88	0,85	0,81	0,79	0,76	0,73
4 Mining, except oil and gas	0,30	0,29	0,28	0,27	0,26	0,25	0,24	0,24	0,23	0,22	0,21
5 Support activities for mining	0,03	0,02	0,02	0,02	0,02	0,01	0,01	0,01	0,00	0,00	-0,00
6 Utilities	0,64	0,62	0,60	0,59	0,57	0,56	0,54	0,53	0,52	0,50	0,49
7 Construction	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
8 Wood products	0,13	0,13	0,13	0,13	0,12	0,12	0,12	0,12	0,12	0,11	0,11
9 Nonmetallic mineral products	0,15	0,15	0,15	0,15	0,14	0,14	0,14	0,14	0,13	0,13	0,13
10 Primary metals	0,30	0,30	0,29	0,29	0,28	0,28	0,27	0,27	0,26	0,26	0,25
11 Fabricated metal products	0,15	0,14	0,14	0,14	0,14	0,14	0,14	0,13	0,13	0,13	0,13
12 Machinery	0,20	0,20	0,20	0,20	0,19	0,19	0,19	0,19	0,18	0,18	0,18
13 Computer & electronic products	0,27	0,26	0,26	0,26	0,25	0,25	0,25	0,24	0,24	0,24	0,24
14 Electrical equipment	0,24	0,24	0,24	0,24	0,23	0,23	0,23	0,23	0,22	0,22	0,22
15 Motor vehicles, bodies & trailers	0,30	0,30	0,29	0,29	0,28	0,28	0,28	0,27	0,27	0,27	0,27
16 Other transportation equipment	0,23	0,23	0,23	0,23	0,23	0,22	0,22	0,22	0,22	0,22	0,22
17 Furniture and related products	0,18	0,18	0,18	0,18	0,18	0,18	0,17	0,17	0,17	0,17	0,17
18 Miscellaneous manufacturing	0,24	0,24	0,23	0,23	0,23	0,23	0,23	0,22	0,22	0,22	0,22
19 Food, beverage, tobacco products	0,58	0,57	0,55	0,54	0,53	0,51	0,50	0,49	0,48	0,46	0,45
20 Textile mills & textile product mills	0,19	0,18	0,18	0,17	0,16	0,16	0,15	0,15	0,14	0,14	0,13
21 Apparel & leather & allied products	0,62	0,61	0,60	0,60	0,59	0,58	0,58	0,57	0,56	0,56	0,55
22 Paper products	0,16	0,15	0,15	0,15	0,14	0,14	0,14	0,13	0,13	0,13	0,13
23 Printing & related support activities	-0,22	-0,22	-0,22	-0,22	-0,22	-0,22	-0,23	-0,23	-0,23	-0,23	-0,23
24 Petroleum and coal products	0,38	0,37	0,36	0,35	0,34	0,34	0,33	0,32	0,32	0,31	0,30
25 Chemical products	4,87	4,58	4,30	4,03	3,77	3,53	3,30	3,08	2,87	2,67	2,48
26 Plastics and rubber products	0,06	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,03	0,02	0,02
27 Wholesale trade	0,24	0,24	0,24	0,23	0,23	0,23	0,23	0,23	0,22	0,22	0,22
28 Retail trade	0,25	0,25	0,25	0,25	0,25	0,24	0,24	0,24	0,24	0,24	0,24
29 Air transportation	0,71	0,70	0,68	0,66	0,64	0,63	0,61	0,60	0,58	0,57	0,56
30 Rail transportation	0,04	0,04	0,04	0,04	0,05	0,05	0,05	0,05	0,05	0,05	0,05
31 Water transportation	0,18	0,18	0,18	0,17	0,17	0,17	0,16	0,16	0,16	0,15	0,15
32 Truck transportation	0,02	0,02	0,02	0,02	0,02	0,02	0,01	0,01	0,01	0,01	0,01
33 Transit & passenger transportation	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,13
34 Pipeline transportation	0,55	0,54	0,53	0,51	0,50	0,49	0,47	0,46	0,45	0,44	0,43
35 Other transportation & support	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,14	0,14	0,14
36 Warehousing and storage	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11
37 Publishing industries	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,09	0,09	0,09
38 Motion picture & sound recording	0,35	0,34	0,34	0,33	0,33	0,32	0,32	0,31	0,31	0,31	0,30
39 Broadcasting & telecommunications	0,45	0,44	0,43	0,42	0,41	0,40	0,39	0,38	0,38	0,37	0,36
40 Information & data processing	0,20	0,20	0,20	0,19	0,19	0,19	0,18	0,18	0,18	0,17	0,17
41 Federal Reserve banks, credit	0,09	0,09	0,09	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07
42 Securities, contracts, investments	-0,11	-0,12	-0,12	-0,12	-0,12	-0,12	-0,12	-0,12	-0,12	-0,12	-0,12
43 Insurance carriers & related	5,29	4,79	4,32	3,87	3,45	3,04	2,65	2,28	1,92	1,58	1,26
44 Funds, trusts, financial vehicles	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,03	0,02	0,02	0,02
45 Real estate	0,75	0,73	0,70	0,68	0,66	0,63	0,61	0,59	0,57	0,55	0,54
46 Rental and leasing services	0,29	0,28	0,27	0,26	0,25	0,24	0,23	0,22	0,22	0,21	0,20
47 Legal services	0,07	0,06	0,06	0,06	0,05	0,05	0,05	0,05	0,04	0,04	0,04
48 Computer systems design & related	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
49 Professional, scientific services	0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,01	-0,01	-0,01	-0,01	-0,01
50 Management of companies & enterprises	-0,02	-0,02	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,00
51 Administrative and support services	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02
52 Waste management & remediation	0,14	0,14	0,13	0,13	0,13	0,12	0,12	0,12	0,12	0,11	0,11
53 Educational services	0,26	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27
54 Ambulatory health care services	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,03
55 Hospitals, nursing, residential care	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,04	0,04
56 Social assistance	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
57 Performing arts, sports, museums	0,17	0,17	0,17	0,16	0,16	0,16	0,15	0,15	0,15	0,14	0,14
58 Amusements, gambling, recreation	0,23	0,22	0,22	0,21	0,21	0,21	0,21	0,20	0,20	0,20	0,19
59 Accommodation	0,13	0,13	0,13	0,12	0,12	0,12	0,12	0,12	0,12	0,11	0,11
60 Food services and drinking places	0,22	0,22	0,22	0,21	0,21	0,21	0,21	0,20	0,20	0,20	0,20
61 Other services, except government	0,19	0,19	0,19	0,18	0,18	0,18	0,18	0,18	0,18	0,18	0,18
62 Federal general government	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
63 Federal government enterprises	0,18	0,17	0,17	0,16	0,16	0,15	0,15	0,15	0,14	0,14	0,14
64 State and local general government	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
65 State & local government enterprises	0,09	0,09	0,10	0,11	0,11	0,12	0,13	0,13	0,14	0,14	0,15
66 Scrap, used and secondhand goods	2,06	2,05	2,04	2,03	2,02	2,02	2,01	2,01	2,00	2,00	2,00
67 Noncomparable imports & RoW adjustment	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12

Table 12
Value Added by commodity: % changes from benchmark - from 2014 to 2024

sigma = 0.5	Scenario S_PRIV									
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,32	0,31	0,30	0,30	0,29	0,29	0,28	0,28	0,27	0,27	0,27
2 Forestry, fishing, related activities	0,03	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,02	0,01	0,01
3 Oil and gas extraction	0,05	0,05	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,02	0,02
4 Mining, except oil and gas	-0,45	-0,45	-0,46	-0,46	-0,46	-0,47	-0,47	-0,47	-0,48	-0,48	-0,49
5 Support activities for mining	-3,18	-3,18	-3,19	-3,19	-3,20	-3,21	-3,22	-3,23	-3,24	-3,25	-3,26
6 Utilities	0,31	0,31	0,30	0,30	0,30	0,29	0,29	0,28	0,28	0,27	0,27
7 Construction	-2,81	-2,81	-2,81	-2,81	-2,81	-2,81	-2,82	-2,82	-2,83	-2,83	-2,84
8 Wood products	-1,23	-1,23	-1,24	-1,24	-1,24	-1,24	-1,25	-1,25	-1,26	-1,26	-1,27
9 Nonmetallic mineral products	-1,26	-1,26	-1,26	-1,26	-1,27	-1,27	-1,27	-1,27	-1,28	-1,28	-1,29
10 Primary metals	-0,41	-0,41	-0,41	-0,41	-0,41	-0,41	-0,41	-0,41	-0,41	-0,41	-0,42
11 Fabricated metal products	-0,90	-0,90	-0,90	-0,90	-0,91	-0,91	-0,91	-0,91	-0,92	-0,92	-0,93
12 Machinery	-1,44	-1,44	-1,44	-1,44	-1,43	-1,43	-1,43	-1,44	-1,44	-1,44	-1,44
13 Computer & electronic products	-1,03	-1,03	-1,03	-1,03	-1,03	-1,04	-1,04	-1,04	-1,05	-1,05	-1,05
14 Electrical equipment	-0,77	-0,77	-0,77	-0,77	-0,77	-0,77	-0,77	-0,78	-0,78	-0,78	-0,78
15 Motor vehicles, bodies & trailers	-0,55	-0,54	-0,54	-0,54	-0,54	-0,53	-0,53	-0,53	-0,53	-0,53	-0,53
16 Other transportation equipment	-0,65	-0,65	-0,66	-0,66	-0,66	-0,66	-0,66	-0,67	-0,67	-0,67	-0,68
17 Furniture and related products	-1,03	-1,03	-1,03	-1,02	-1,02	-1,02	-1,02	-1,02	-1,02	-1,02	-1,02
18 Miscellaneous manufacturing	-0,03	-0,03	-0,04	-0,04	-0,05	-0,05	-0,06	-0,06	-0,07	-0,07	-0,08
19 Food, beverage, tobacco products	0,48	0,48	0,48	0,48	0,47	0,47	0,47	0,47	0,47	0,46	0,46
20 Textile mills & textile product mills	0,14	0,14	0,14	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,16
21 Apparel & leather & allied products	1,09	1,09	1,10	1,10	1,11	1,11	1,12	1,12	1,13	1,13	1,14
22 Paper products	0,22	0,22	0,21	0,21	0,20	0,20	0,19	0,19	0,18	0,18	0,18
23 Printing & related support activities	-0,06	-0,07	-0,07	-0,08	-0,09	-0,10	-0,11	-0,12	-0,12	-0,13	-0,14
24 Petroleum and coal products	0,18	0,17	0,17	0,16	0,15	0,14	0,14	0,13	0,12	0,12	0,11
25 Chemical products	4,77	4,49	4,22	3,96	3,71	3,48	3,26	3,04	2,84	2,65	2,46
26 Plastics and rubber products	-0,18	-0,18	-0,19	-0,19	-0,20	-0,20	-0,20	-0,21	-0,21	-0,22	-0,22
27 Wholesale trade	-0,20	-0,20	-0,20	-0,20	-0,19	-0,20	-0,20	-0,20	-0,20	-0,20	-0,20
28 Retail trade	-0,01	-0,01	-0,00	0,00	0,01	0,01	0,02	0,02	0,03	0,03	0,03
29 Air transportation	0,33	0,33	0,34	0,34	0,34	0,34	0,34	0,35	0,35	0,35	0,35
30 Rail transportation	-0,03	-0,04	-0,04	-0,05	-0,05	-0,06	-0,06	-0,06	-0,07	-0,07	-0,08
31 Water transportation	0,18	0,17	0,16	0,16	0,15	0,14	0,14	0,13	0,12	0,11	0,11
32 Truck transportation	-0,35	-0,35	-0,35	-0,35	-0,36	-0,36	-0,36	-0,36	-0,37	-0,37	-0,37
33 Transit & passenger transportation	0,33	0,33	0,33	0,32	0,32	0,32	0,32	0,31	0,31	0,31	0,30
34 Pipeline transportation	0,29	0,28	0,28	0,27	0,27	0,26	0,26	0,25	0,25	0,24	0,23
35 Other transportation & support	0,07	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,05	0,05
36 Warehousing and storage	0,03	0,03	0,02	0,02	0,02	0,01	0,01	0,01	0,00	0,00	-0,00
37 Publishing industries	-1,16	-1,16	-1,16	-1,16	-1,16	-1,17	-1,17	-1,17	-1,18	-1,18	-1,19
38 Motion picture & sound recording	0,39	0,39	0,38	0,38	0,37	0,36	0,36	0,35	0,35	0,34	0,34
39 Broadcasting & telecommunications	0,28	0,27	0,26	0,25	0,25	0,24	0,23	0,22	0,21	0,20	0,20
40 Information & data processing	0,35	0,34	0,33	0,32	0,31	0,30	0,29	0,29	0,28	0,27	0,26
41 Federal Reserve banks, credit	0,11	0,09	0,08	0,07	0,06	0,05	0,04	0,04	0,03	0,02	0,01
42 Securities, contracts, investments	0,09	0,09	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10
43 Insurance carriers & related	5,15	4,66	4,20	3,76	3,34	2,94	2,56	2,20	1,85	1,52	1,20
44 Funds, trusts, financial vehicles	0,05	0,05	0,05	0,05	0,05	0,04	0,04	0,04	0,04	0,04	0,04
45 Real estate	0,36	0,34	0,32	0,30	0,29	0,27	0,25	0,24	0,22	0,20	0,18
46 Rental and leasing services	-0,05	-0,06	-0,06	-0,07	-0,08	-0,08	-0,09	-0,10	-0,11	-0,11	-0,12
47 Legal services	0,01	0,02	0,02	0,03	0,04	0,04	0,05	0,06	0,06	0,07	0,08
48 Computer systems design & related	-1,95	-1,95	-1,95	-1,95	-1,95	-1,95	-1,96	-1,96	-1,97	-1,97	-1,98
49 Professional, scientific services	-0,20	-0,21	-0,22	-0,23	-0,24	-0,24	-0,25	-0,26	-0,27	-0,28	-0,29
50 Management of companies & enterprises	-0,04	-0,04	-0,04	-0,05	-0,05	-0,05	-0,06	-0,06	-0,06	-0,06	-0,07
51 Administrative and support services	0,15	0,14	0,13	0,12	0,11	0,10	0,09	0,08	0,07	0,06	0,05
52 Waste management & remediation	0,39	0,38	0,37	0,36	0,35	0,33	0,32	0,31	0,30	0,29	0,28
53 Educational services	0,31	0,32	0,33	0,34	0,35	0,35	0,36	0,37	0,38	0,39	0,40
54 Ambulatory health care services	1,91	1,87	1,84	1,80	1,76	1,73	1,70	1,66	1,63	1,60	1,57
55 Hospitals, nursing, residential care	1,96	1,92	1,89	1,86	1,82	1,79	1,76	1,73	1,70	1,67	1,65
56 Social assistance	0,17	0,18	0,19	0,20	0,21	0,21	0,22	0,23	0,24	0,24	0,25
57 Performing arts, sports, museums	0,15	0,15	0,14	0,14	0,14	0,14	0,13	0,13	0,13	0,13	0,12
58 Amusements, gambling, recreation	0,20	0,21	0,21	0,21	0,22	0,22	0,22	0,22	0,23	0,23	0,23
59 Accommodation	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10
60 Food services and drinking places	0,23	0,23	0,24	0,24	0,24	0,24	0,25	0,25	0,25	0,25	0,25
61 Other services, except government	0,19	0,19	0,19	0,19	0,20	0,20	0,20	0,20	0,20	0,20	0,20
62 Federal general government	2,52	2,46	2,41	2,35	2,29	2,24	2,19	2,14	2,09	2,04	1,99
63 Federal government enterprises	0,19	0,19	0,19	0,18	0,18	0,18	0,17	0,17	0,17	0,16	0,16
64 State and local general government	2,47	2,41	2,36	2,31	2,25	2,20	2,15	2,10	2,06	2,01	1,97
65 State & local government enterprises	0,40	0,40	0,40	0,40	0,39	0,39	0,39	0,39	0,39	0,39	0,39
66 Scrap, used and secondhand goods	22,35	22,34	22,34	22,35	22,36	22,39	22,42	22,47	22,52	22,59	22,65
67 Noncomparable imports & RoW adjustment	0,38	0,38	0,37	0,37	0,37	0,36	0,36	0,36	0,35	0,35	0,35

Table 13
Total Output: % change from benchmark - from 2014 to 2024

sigma = 0.5	Scenario S_FED										
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,16	0,16	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21
2 Forestry, fishing, related activities	0,16	0,17	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21
3 Oil and gas extraction	0,13	0,14	0,14	0,14	0,15	0,15	0,15	0,16	0,16	0,17	0,17
4 Mining, except oil and gas	0,06	0,07	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,08
5 Support activities for mining	-0,05	-0,05	-0,05	-0,05	-0,06	-0,06	-0,06	-0,06	-0,06	-0,06	-0,07
6 Utilities	0,22	0,23	0,23	0,24	0,24	0,25	0,26	0,26	0,27	0,28	0,28
7 Construction	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00	-0,00
8 Wood products	0,08	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,10	0,10	0,10
9 Nonmetallic mineral products	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,12
10 Primary metals	0,17	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,23
11 Fabricated metal products	0,10	0,11	0,11	0,11	0,11	0,12	0,12	0,12	0,13	0,13	0,13
12 Machinery	0,13	0,14	0,14	0,14	0,15	0,15	0,16	0,16	0,17	0,17	0,17
13 Computer & electronic products	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,23	0,23	0,24
14 Electrical equipment	0,18	0,18	0,19	0,19	0,20	0,21	0,21	0,22	0,22	0,23	0,23
15 Motor vehicles, bodies & trailers	0,21	0,21	0,22	0,23	0,23	0,24	0,25	0,25	0,26	0,27	0,27
16 Other transportation equipment	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25	0,26
17 Furniture and related products	0,14	0,15	0,15	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,19
18 Miscellaneous manufacturing	0,19	0,19	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25
19 Food, beverage, tobacco products	0,22	0,23	0,23	0,24	0,25	0,25	0,26	0,27	0,27	0,28	0,29
20 Textile mills & textile product mills	0,05	0,05	0,05	0,05	0,05	0,06	0,06	0,06	0,06	0,06	0,06
21 Apparel & leather & allied products	0,44	0,45	0,47	0,48	0,49	0,51	0,52	0,54	0,55	0,57	0,58
22 Paper products	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,09	0,10	0,10	0,10
23 Printing & related support activities	-0,24	-0,25	-0,26	-0,26	-0,27	-0,28	-0,29	-0,29	-0,30	-0,31	-0,32
24 Petroleum and coal products	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23	0,24	0,24	0,25
25 Chemical products	-1,23	-1,26	-1,30	-1,33	-1,37	-1,41	-1,45	-1,49	-1,53	-1,57	-1,62
26 Plastics and rubber products	-0,04	-0,04	-0,04	-0,04	-0,04	-0,05	-0,05	-0,05	-0,05	-0,05	-0,05
27 Wholesale trade	0,15	0,16	0,16	0,17	0,17	0,17	0,18	0,18	0,19	0,19	0,20
28 Retail trade	0,18	0,19	0,19	0,20	0,20	0,21	0,22	0,22	0,23	0,23	0,24
29 Air transportation	0,25	0,26	0,26	0,27	0,28	0,29	0,29	0,30	0,31	0,32	0,33
30 Rail transportation	0,09	0,09	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,11
31 Water transportation	0,11	0,11	0,11	0,12	0,12	0,12	0,12	0,13	0,13	0,13	0,14
32 Truck transportation	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02
33 Transit & passenger transportation	0,13	0,14	0,14	0,15	0,15	0,15	0,16	0,16	0,17	0,17	0,17
34 Pipeline transportation	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22	0,23
35 Other transportation & support	0,13	0,14	0,14	0,14	0,15	0,15	0,15	0,16	0,16	0,17	0,17
36 Warehousing and storage	0,11	0,11	0,12	0,12	0,12	0,13	0,13	0,13	0,14	0,14	0,14
37 Publishing industries	0,08	0,08	0,09	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11
38 Motion picture & sound recording	0,24	0,25	0,25	0,26	0,27	0,28	0,28	0,29	0,30	0,31	0,31
39 Broadcasting & telecommunications	0,22	0,23	0,23	0,24	0,24	0,25	0,26	0,26	0,27	0,28	0,28
40 Information & data processing	0,13	0,13	0,13	0,14	0,14	0,14	0,15	0,15	0,16	0,16	0,16
41 Federal Reserve banks, credit	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,04	0,04	0,04	0,04
42 Securities, contracts, investments	-0,13	-0,13	-0,13	-0,14	-0,14	-0,15	-0,15	-0,16	-0,16	-0,16	-0,17
43 Insurance carriers & related	-5,09	-5,23	-5,38	-5,53	-5,68	-5,84	-6,00	-6,17	-6,35	-6,52	-6,70
44 Funds, trusts, financial vehicles	-0,03	-0,03	-0,03	-0,04	-0,04	-0,04	-0,04	-0,04	-0,04	-0,05	-0,05
45 Real estate	0,18	0,18	0,18	0,19	0,19	0,20	0,20	0,21	0,21	0,22	0,22
46 Rental and leasing services	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,07
47 Legal services	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
48 Computer systems design & related	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01
49 Professional, scientific services	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,02	-0,03	-0,03	-0,03	-0,03
50 Management of companies & enterprises	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
51 Administrative and support services	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	-0,04
52 Waste management & remediation	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,08	0,08	0,09
53 Educational services	0,28	0,29	0,30	0,30	0,31	0,32	0,33	0,34	0,35	0,36	0,37
54 Ambulatory health care services	-0,03	-0,03	-0,03	-0,03	-0,03	-0,03	0,04	0,04	0,04	0,04	0,04
55 Hospitals, nursing, residential care	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,05	0,05
56 Social assistance	0,15	0,16	0,16	0,17	0,17	0,18	0,18	0,19	0,19	0,20	0,20
57 Performing arts, sports, museums	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,09	0,10	0,10	0,10
58 Amusements, gambling, recreation	0,14	0,14	0,14	0,15	0,15	0,15	0,16	0,16	0,17	0,17	0,17
59 Accommodation	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,08	0,08	0,09	0,09
60 Food services and drinking places	0,14	0,15	0,15	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,19
61 Other services, except government	0,16	0,16	0,17	0,17	0,18	0,18	0,18	0,19	0,19	0,20	0,21
62 Federal general government	0,15	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,18	0,19	0,19
63 Federal government enterprises	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,11	0,11	0,11	0,12
64 State and local general government	0,15	0,16	0,16	0,16	0,17	0,17	0,18	0,18	0,18	0,19	0,19
65 State & local government enterprises	0,26	0,26	0,27	0,28	0,28	0,29	0,30	0,31	0,32	0,32	0,33
66 Scrap, used and secondhand goods	2,00	2,05	2,10	2,16	2,22	2,27	2,33	2,40	2,46	2,53	2,60
67 Noncomparable imports & RoW adjustment	0,12	0,13	0,13	0,13	0,14	0,14	0,14	0,15	0,15	0,16	0,16

Table 14
Total Output: % change from benchmark - from 2014 to 2024

sigma = 0.5	Scenario S_PRIV									
I-O commodities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1 Farms	0,32	0,32	0,33	0,33	0,33	0,34	0,34	0,35	0,35	0,36	0,36
2 Forestry, fishing, related activities	0,03	0,03	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,02	0,01
3 Oil and gas extraction	0,12	0,11	0,11	0,10	0,10	0,09	0,09	0,08	0,07	0,06	0,06
4 Mining, except oil and gas	-0,45	-0,46	-0,48	-0,50	-0,52	-0,54	-0,56	-0,58	-0,60	-0,63	-0,65
5 Support activities for mining	-3,18	-3,27	-3,37	-3,47	-3,58	-3,68	-3,80	-3,92	-4,04	-4,17	-4,30
6 Utilities	0,33	0,33	0,33	0,33	0,34	0,34	0,34	0,34	0,34	0,34	0,35
7 Construction	-2,81	-2,89	-2,97	-3,05	-3,14	-3,23	-3,32	-3,42	-3,52	-3,63	-3,74
8 Wood products	-1,24	-1,27	-1,31	-1,35	-1,39	-1,43	-1,47	-1,52	-1,57	-1,62	-1,67
9 Nonmetallic mineral products	-1,26	-1,30	-1,34	-1,37	-1,41	-1,46	-1,50	-1,55	-1,59	-1,64	-1,69
10 Primary metals	-0,41	-0,42	-0,43	-0,44	-0,45	-0,47	-0,48	-0,50	-0,51	-0,53	-0,55
11 Fabricated metal products	-0,90	-0,93	-0,95	-0,98	-1,01	-1,04	-1,07	-1,11	-1,14	-1,18	-1,22
12 Machinery	-1,44	-1,48	-1,52	-1,56	-1,60	-1,64	-1,69	-1,74	-1,79	-1,84	-1,90
13 Computer & electronic products	-1,02	-1,05	-1,08	-1,12	-1,15	-1,18	-1,22	-1,26	-1,30	-1,34	-1,38
14 Electrical equipment	-0,77	-0,79	-0,81	-0,84	-0,86	-0,89	-0,91	-0,94	-0,97	-1,00	-1,03
15 Motor vehicles, bodies & trailers	-0,54	-0,55	-0,57	-0,58	-0,60	-0,61	-0,63	-0,64	-0,66	-0,68	-0,70
16 Other transportation equipment	-0,65	-0,67	-0,69	-0,71	-0,74	-0,76	-0,78	-0,81	-0,84	-0,86	-0,89
17 Furniture and related products	-1,03	-1,06	-1,08	-1,11	-1,14	-1,17	-1,20	-1,23	-1,27	-1,30	-1,34
18 Miscellaneous manufacturing	-0,03	-0,03	-0,04	-0,04	-0,05	-0,06	-0,07	-0,07	-0,08	-0,09	-0,10
19 Food, beverage, tobacco products	0,48	0,49	0,50	0,51	0,52	0,53	0,54	0,55	0,56	0,58	0,59
20 Textile mills & textile product mills	0,14	0,14	0,15	0,15	0,16	0,16	0,17	0,18	0,18	0,19	0,20
21 Apparel & leather & allied products	1,10	1,14	1,17	1,21	1,25	1,29	1,33	1,37	1,41	1,46	1,51
22 Paper products	0,22	0,22	0,22	0,22	0,22	0,22	0,22	0,22	0,23	0,23	0,23
23 Printing & related support activities	-0,06	-0,07	-0,08	-0,10	-0,11	-0,12	-0,13	-0,15	-0,16	-0,17	-0,19
24 Petroleum and coal products	0,19	0,19	0,18	0,18	0,18	0,17	0,17	0,16	0,16	0,15	0,15
25 Chemical products	-0,99	-1,03	-1,06	-1,10	-1,14	-1,17	-1,21	-1,25	-1,29	-1,34	-1,38
26 Plastics and rubber products	-0,19	-0,20	-0,21	-0,22	-0,23	-0,24	-0,26	-0,27	-0,28	-0,29	-0,30
27 Wholesale trade	-0,22	-0,23	-0,24	-0,24	-0,25	-0,26	-0,27	-0,27	-0,28	-0,29	-0,30
28 Retail trade	-0,05	-0,05	-0,04	-0,04	-0,03	-0,03	-0,02	-0,02	-0,01	-0,01	-0,00
29 Air transportation	0,35	0,36	0,37	0,38	0,39	0,40	0,41	0,42	0,43	0,44	0,46
30 Rail transportation	-0,03	-0,04	-0,04	-0,05	-0,05	-0,06	-0,07	-0,08	-0,08	-0,09	-0,10
31 Water transportation	0,17	0,16	0,16	0,16	0,15	0,15	0,14	0,14	0,14	0,13	0,13
32 Truck transportation	-0,36	-0,37	-0,38	-0,39	-0,41	-0,42	-0,44	-0,45	-0,47	-0,48	-0,50
33 Transit & passenger transportation	0,33	0,34	0,35	0,35	0,36	0,36	0,37	0,38	0,38	0,39	0,40
34 Pipeline transportation	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27	0,27
35 Other transportation & support	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06
36 Warehousing and storage	0,03	0,02	0,02	0,02	0,02	0,01	0,01	0,01	0,00	-0,00	-0,00
37 Publishing industries	-1,16	-1,19	-1,23	-1,26	-1,30	-1,34	-1,38	-1,43	-1,47	-1,52	-1,57
38 Motion picture & sound recording	0,39	0,40	0,40	0,40	0,41	0,41	0,42	0,42	0,43	0,43	0,44
39 Broadcasting & telecommunications	0,29	0,28	0,28	0,28	0,27	0,27	0,27	0,26	0,26	0,26	0,25
40 Information & data processing	0,35	0,35	0,35	0,35	0,35	0,35	0,34	0,34	0,34	0,34	0,34
41 Federal Reserve banks, credit	0,10	0,09	0,08	0,07	0,06	0,05	0,04	0,03	0,02	0,01	0,00
42 Securities, contracts, investments	-0,10	-0,11	-0,11	-0,11	-0,12	-0,12	-0,13	-0,13	-0,13	-0,14	-0,14
43 Insurance carriers & related	4,86	5,01	5,16	5,31	5,46	5,62	5,79	5,96	6,13	6,31	6,50
44 Funds, trusts, financial vehicles	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04
45 Real estate	0,36	0,35	0,34	0,33	0,31	0,30	0,28	0,27	0,25	0,24	0,22
46 Rental and leasing services	-0,06	-0,07	-0,08	-0,09	-0,10	-0,11	-0,12	-0,14	-0,15	-0,16	-0,18
47 Legal services	-0,01	-0,02	-0,03	-0,04	-0,05	-0,06	-0,07	-0,08	-0,09	-0,10	-0,11
48 Computer systems design & related	-1,95	-2,00	-2,06	-2,12	-2,18	-2,24	-2,31	-2,38	-2,45	-2,53	-2,61
49 Professional, scientific services	-0,20	-0,22	-0,23	-0,25	-0,27	-0,28	-0,30	-0,32	-0,34	-0,36	-0,38
50 Management of companies & enterprises	-0,05	-0,05	-0,05	-0,06	-0,06	-0,07	-0,07	-0,08	-0,08	-0,09	-0,10
51 Administrative and support services	0,15	0,14	0,13	0,13	0,12	0,11	0,10	0,09	0,08	0,07	0,06
52 Waste management & remediation	0,37	0,37	0,37	0,37	0,36	0,36	0,36	0,36	0,35	0,35	0,35
53 Educational services	0,30	0,32	0,34	0,36	0,38	0,40	0,42	0,44	0,47	0,49	0,52
54 Ambulatory health care services	1,91	1,92	1,93	1,95	1,96	1,98	1,99	2,01	2,03	2,05	2,06
55 Hospitals, nursing, residential care	1,95	1,97	1,99	2,01	2,03	2,05	2,07	2,09	2,11	2,13	2,16
56 Social assistance	0,17	0,18	0,20	0,21	0,23	0,24	0,26	0,27	0,29	0,31	0,33
57 Performing arts, sports, museums	0,12	0,12	0,12	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,13
58 Amusements, gambling, recreation	0,18	0,19	0,20	0,20	0,21	0,22	0,23	0,24	0,26	0,27	0,28
59 Accommodation	0,07	0,07	0,07	0,08	0,08	0,08	0,08	0,09	0,09	0,10	0,10
60 Food services and drinking places	0,21	0,22	0,22	0,23	0,24	0,25	0,26	0,27	0,28	0,29	0,31
61 Other services, except government	0,18	0,19	0,19	0,20	0,21	0,21	0,22	0,23	0,24	0,25	0,26
62 Federal general government	2,52	2,53	2,54	2,55	2,56	2,57	2,58	2,59	2,60	2,61	2,62
63 Federal government enterprises	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,22	0,22	0,22
64 State and local general government	2,47	2,48	2,49	2,50	2,52	2,53	2,54	2,55	2,56	2,58	2,59
65 State & local government enterprises	0,41	0,42	0,43	0,44	0,45	0,47	0,48	0,49	0,50	0,52	0,53
66 Scrap, used and secondhand goods	22,35	22,99	23,66	24,35	25,06	25,81	26,58	27,38	28,22	29,08	29,98
67 Noncomparable imports & RoW adjustment	0,38	0,39	0,39	0,40	0,41	0,42	0,42	0,43	0,44	0,45	0,46

Table 15
Real GDP growth rate from 2014 to 2024

	SIGMA = 0.4			SIGMA = 0.3			SIGMA = 0.5		
	Bench	S_fed	S_priv	Bench	S_fed	S_priv	Bench	S_fed	S_priv
2014	2,503	2,834	2,984	2,503	2,853	2,998	2,503	2,816	2,970
2015	2,517	2,490	2,486	2,517	2,489	2,487	2,517	2,491	2,486
2016	2,530	2,504	2,500	2,530	2,503	2,500	2,529	2,505	2,499
2017	2,542	2,518	2,513	2,543	2,517	2,514	2,541	2,518	2,512
2018	2,554	2,530	2,525	2,555	2,530	2,526	2,553	2,531	2,525
2019	2,565	2,543	2,537	2,566	2,542	2,538	2,564	2,543	2,537
2020	2,576	2,554	2,549	2,577	2,554	2,550	2,575	2,554	2,548
2021	2,586	2,566	2,560	2,587	2,566	2,561	2,585	2,565	2,559
2022	2,596	2,576	2,570	2,597	2,576	2,572	2,594	2,576	2,569
2023	2,605	2,586	2,580	2,607	2,587	2,582	2,604	2,586	2,579
2024	2,614	2,596	2,590	2,616	2,597	2,591	2,612	2,596	2,588