Simulating Russia's Trouble Transition

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January, 2015

Our Model

- Fehr, Jokisch, Kambhampati, Kotlikoff (NBER, 2013)
- 6th region: Russia
- The world oil endowment

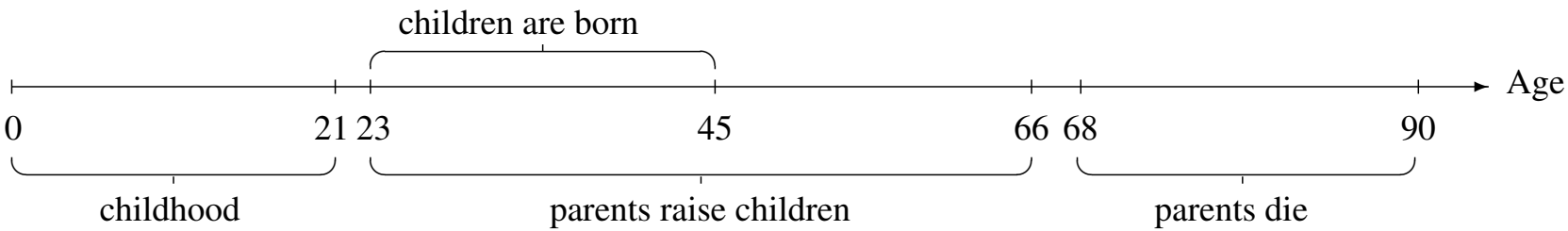
Regions

- United States
- European Union
- Japan, S.Korea
- China
- India
- Russia

- The UN Demographic forecasts for the six regions
- Effective tax rates for the six regions
- Households
- Production sector
- Government sector
- Oil endowment

Demographics

Life cycle



Households

- Time-separable CES utility function
- Children's utility is included into the individual's utility
- Children are born in fractions according to age specific rates of the UN forecast. After 2050 the birth rates remain unchanged (steady state).
- Uncertainty about death, unintentional bequests

Production

- Cobb-Douglas production function
- Skilled and unskilled labor (0.3:0.7)
- Productivity growth by cohorts catching up with the US.
- Plus oil as a windfall wealth, no labor or capital required.

Government

- Revenues: taxes and debt.
- Expenditures: pension and disability benefits, healthcare, education and other government purchases and interest on debt.

Demographic Calibration

Country	US		EU		Japan+		China		India		Russia	
Year	2013	2050	2013	2050	2013	2050	2013	2050	2013	2050	2013	2050
Total Population (in Millions)												
Model	310.3	403.6	507.3	500.2	207.6	181.4	1333.4	1401.5	1220.1	1643.9	140.8	130.7
Official	312.2	400.9	505.8	511.6	182.9	167.4	1359.8	1385.0	1205.6	1620.1	143.6	131.1*
Fertility Rate (ages up to 49)												
Model	2.05	1.85	1.53	1.82	1.56	1.75	1.67	1.85	2.67	1.96	1.38	1.64
Official	2.06	1.99	1.56	1.83	1.30	1.73	1.63	1.81	2.66	1.92	1.44	1.69
Age Structure (in Percent of total Population)												
0-9												
Model	13.59	11.76	10.09	10.03	10.09	8.90	2.52	10.76	21.63	12.06	11.30	9.50
Official	13.13	12.10	10.37	10.01	8.91	8.40	12.05	9.74	20.24	12.86	10.42	11.31
10-19												
Model	13.74	12.17	10.90	10.00	9.31	9.71	14.56	10.82	18.65	12.36	9.41	9.75
Official	13.79	12.19	10.85	9.94	10.58	8.64	14.07	10.00	19.62	13.52	10.63	11.34
20-29												
Model	13.93	12.33	12.36	10.84	10.98	9.36	15.79	10.84	16.86	12.74	16.47	9.50
Official	13.86	12.54	13.01	10.59	11.97	9.12	17.58	10.40	17.86	14.09	17.10	11.54
30-39												
Model	12.76	12.98	13.54	11.27	13.60	10.21	16.10	12.38	14.57	13.50	15.70	12.60
Official	13.06	12.42	14.08	11.43	14.79	9.81	15.62	12.46	14.54	14.31	14.66	13.65
40-49												
Model	14.68	12.51	15.55	11.58	12.85	11.83	16.79	11.66	11.51	14.15	13.76	12.84
Official	14.07	11.99	14.97	11.35	14.16	10.41	16.42	11.46	11.52	14.00	14.06	12.22
50-59												
Model	13.65	12.05	13.59	12.32	13.07	10.91	12.43	13.62	8.83	13.09	15.83	11.85
Official	13.59	11.76	13.33	11.55	13.05	10.63	11.84	13.13	8.48	12.91	15.16	11.47
60-69												
Model	9.49	11.90	11.68	13.04	14.68	12.64	8.04	14.92	5.59	12.45	9.50	19.40
Official	9.46	10.66	10.65	12.50	12.56	12.19	6.96	15.47	4.69	10.22	8.05	14.80
70-90												
Model	8.17	14.30	12.29	20.92	15.43	26.43	3.76	15.01	2.36	9.64	8.03	14.56
Official	9.05	16.34	12.73	22.64	13.96	30.80	5.46	17.34	3.05	8.09	9.91	13.68

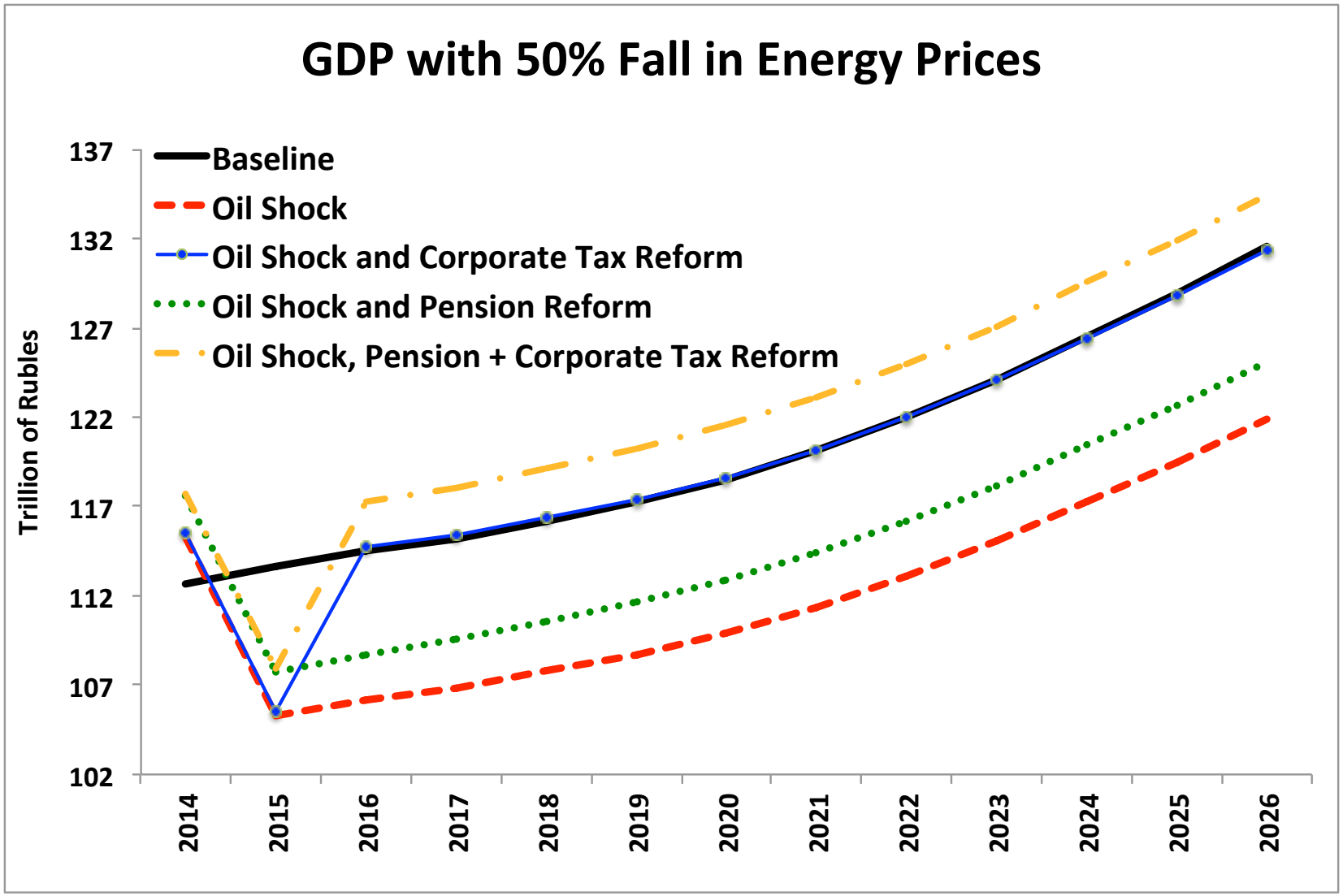
Calibration of key variables for 2013

	Model						Official					
	US	EU	Japan	China	India	Russia	US	EU	Japan	China	India	Russia
GDP (PPP)	100.0	103.4	37.9	96.4	40.3	20.8	100.0	104.2	37.9	96.3	40.4	20.8
Consumption	68.1	60.8	59.8	35.5	60.0	50.2	68.6	57.5	58.0	34.0	61.0	52.0
Government purchases	18.8	22.5	19.5	21.5	17.5	23.8	19.3	23.2	19.1	19.1	16.6	24.3
Government Indicators												
Pension benefits	8.2	17.0	7.8	2.9	4.8	9.1	8.5	16.9	6.2	2.6	4.1	8.9
Social insurance revenues	5.4	15.9	2.3	1.8	2.2	7.2	5.7	15.8	0.5	1.9	7.2	
Natural resources	0.4	0.3	0.1	0.2	1.2	11.1	1.1	1.5	1.8	0.0	0.4	11.1
Tax revenues	27.8	27.2	33.6	23.6	21.0	19.1	21.0	22.7	26.2	20.9	17.5	18.2
Consumption tax	12.4	14.9	17.4	17.9	13.9	11.7	9.8	11.7	13.7	15.7	11.7	11.3
Wage, capital tax	11.9	9.9	11.2	2.6	3.1	3.3	8.8	8.3	7.0	1.1	2.0	3.8
Corporate tax	3.6	2.4	5.0	3.1	4.0	4.0	2.4	2.7	5.5	4.1	3.7	3.1

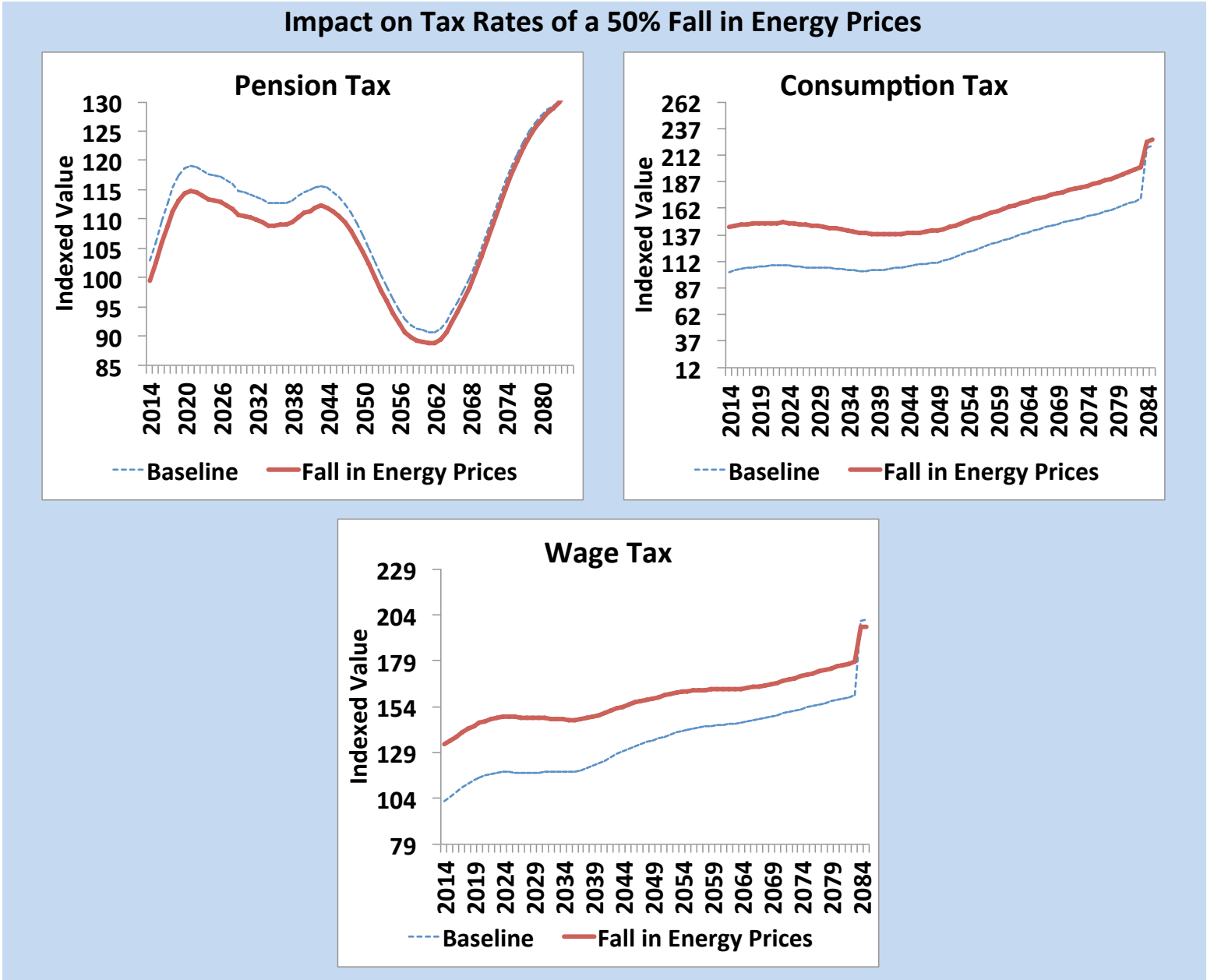
Scenarios

- Oil price shock, a 50% permanent drop of price
- Oil price shock and a corporate tax reform, corporate tax brought to zero and financed by wage and consumption taxes
- Oil price shock and a pension reform, pension system privatized
- Oil price shock and a combination of a corporate tax reform and a pension reform

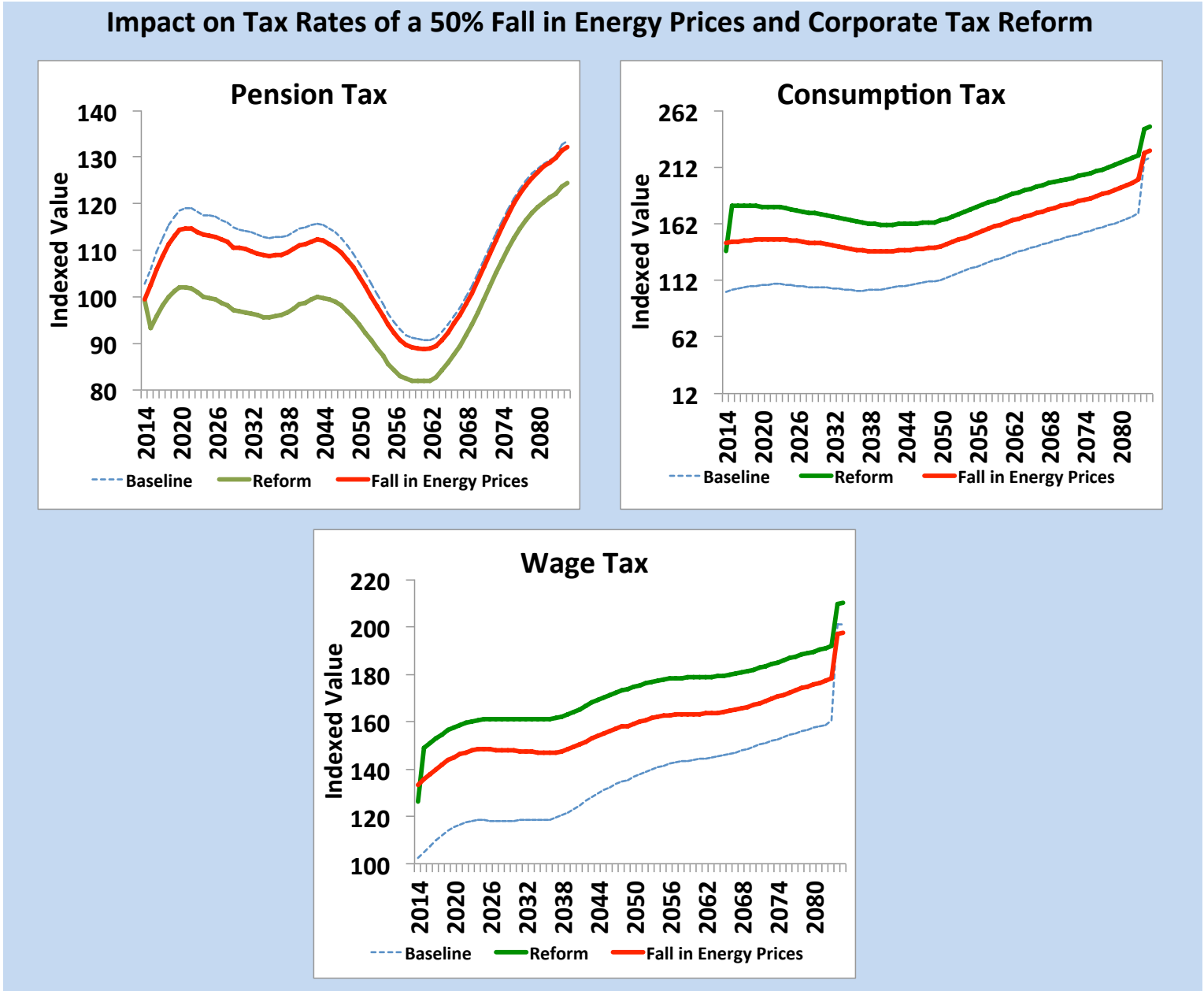
Results


GDP with 50% Fall in Energy Prices
Trillion of Rubles
137
132
127
122
117
112
107
102
Baseline
Oil Shock
Oil Shock and Corporate Tax Reform
Oil Shock and Pension Reform
Oil Shock, Pension + Corporate Tax Reform
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026

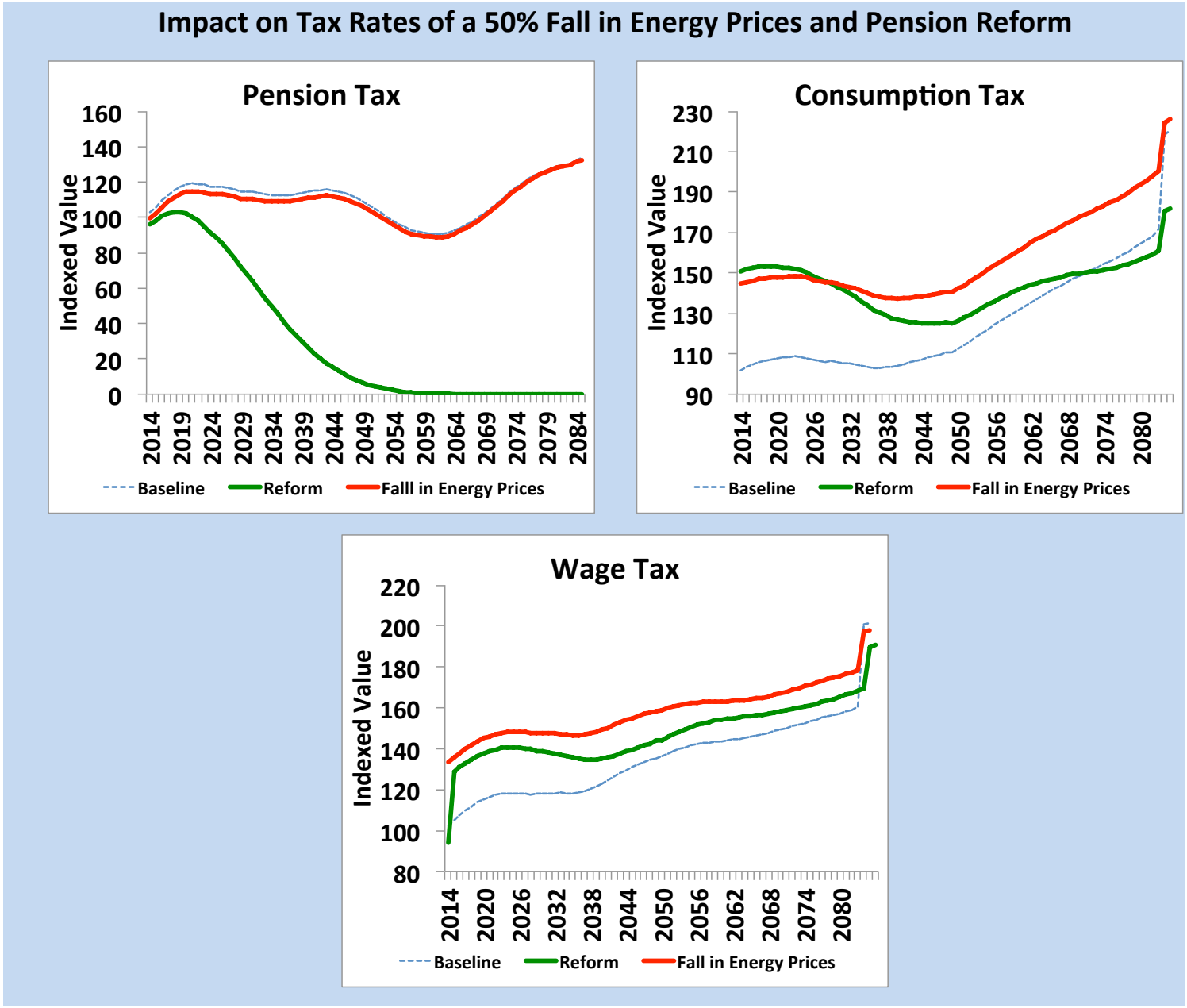
Results


Impact on Tax Rates of a 50% Fall in Energy Prices
Pension Tax
Indexed Value
130
125
120
115
110
105
100
95
90
85
2014
2020
2026
2032
2038
2044
2050
2056
2062
2068
2074
2080
Baseline
Fall in Energy Prices
Consumption Tax
Indexed Value
262
237
212
187
162
137
112
87
62
37
12
2014
2019
2024
2029
2034
2039
2044
2049
2054
2059
2064
2069
2074
2079
2084
Baseline
Fall in Energy Prices
Wage Tax
Indexed Value
229
204
179
154
129
104
79
2014
2019
2024
2029
2034
2039
2044
2049
2054
2059
2064
2069
2074
2079
2084
Baseline
Fall in Energy Prices

Results

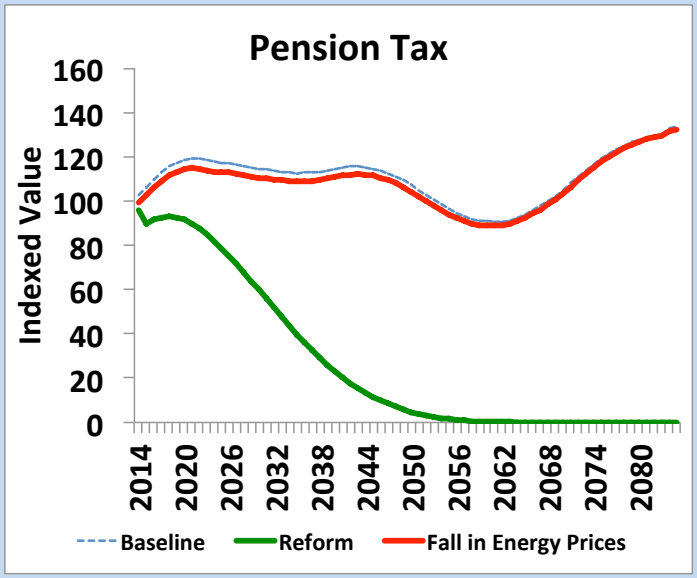

Impact on Tax Rates of a 50% Fall in Energy Prices and Corporate Tax Reform
Pension Tax
Indexed Value
140
130
120
110
100
90
80
2014
2020
2026
2032
2038
2044
2050
2056
2062
2068
2074
2080
Baseline
Reform
Fall in Energy Prices
Consumption Tax
Indexed Value
262
212
162
112
62
12
2014
2020
2026
2032
2038
2044
2050
2056
2062
2068
2074
2080
Baseline
Reform
Fall in Energy Prices
Wage Tax
Indexed Value
220
200
180
160
140
120
100
2014
2020
2026
2032
2038
2044
2050
2056
2062
2068
2074
2080
Baseline
Reform
Fall in Energy Prices

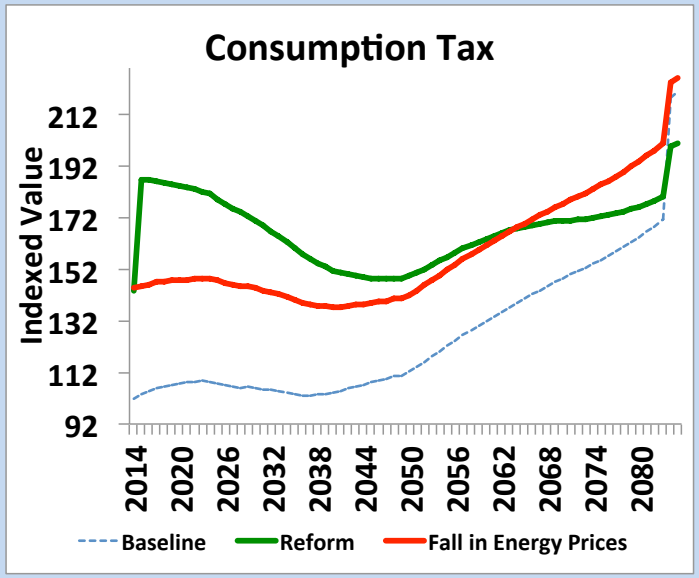
Results

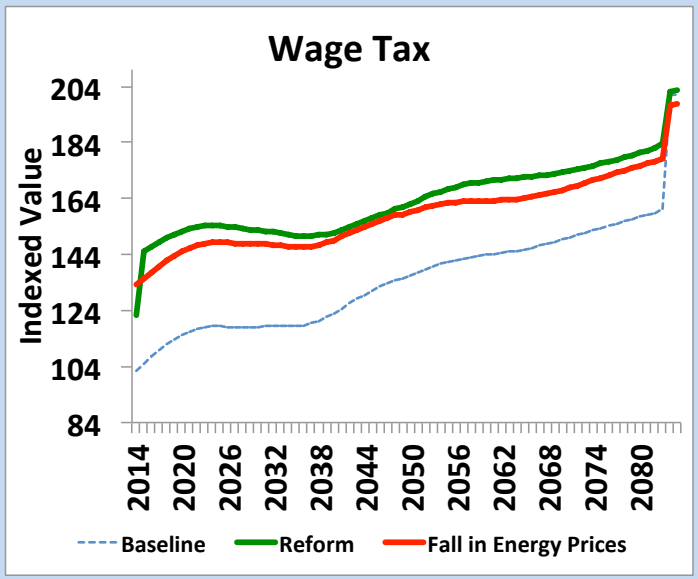

Impact on Tax Rates of a 50% Fall in Energy Prices and Pension Reform
Pension Tax
Indexed Value
160
140
120
100
80
60
40
20
0
2014 2019 2024 2029 2034 2039 2044 2049 2054 2059 2064 2069 2074 2079 2084
Baseline
Reform
Falll in Energy Prices
Consumption Tax
Indexed Value
230
210
190
170
150
130
110
90
2014 2020 2026 2032 2038 2044 2050 2056 2062 2068 2074 2080
Baseline
Reform
Fall in Energy Prices
Wage Tax
Indexed Value
220
200
180
160
140
120
100
80
2014 2020 2026 2032 2038 2044 2050 2056 2062 2068 2074 2080
Baseline
Reform
Fall in Energy Prices

Results

Impact on Tax Rates of a 50% Fall in Energy Prices, Pension and Corporate Tax Reform







Summary

- Corporate tax reform may be a useful instrument for the transition over an oil price shock. Everyone's welfare is higher
- Pension reform tends to be less effective as a remedy for the oil price shock. Generations born in several decades benefit from the pension reform
- A combination of both reforms appears to be even more effective