

Mathematical Economics

Lab 1

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<http://prawo.uni.wroc.pl/user/12141/students-resources>

GDP

- <https://data.worldbank.org/indicator>
- Exports of goods and services (constant 2010 US\$)
- Imports of goods and services (constant 2010 US\$)
- Gross capital formation (constant 2010 US\$)
- General government final consumption expenditure (constant 2010 US\$)
- Households and NPISHs Final consumption expenditure (constant 2010 US\$)
- **Households and NPISHs Final consumption expenditure (constant 2010 US\$) modified**
- GDP (constant 2010 US\$)
- GDP growth (annual %)

NPISHs - nonprofit institutions serving households

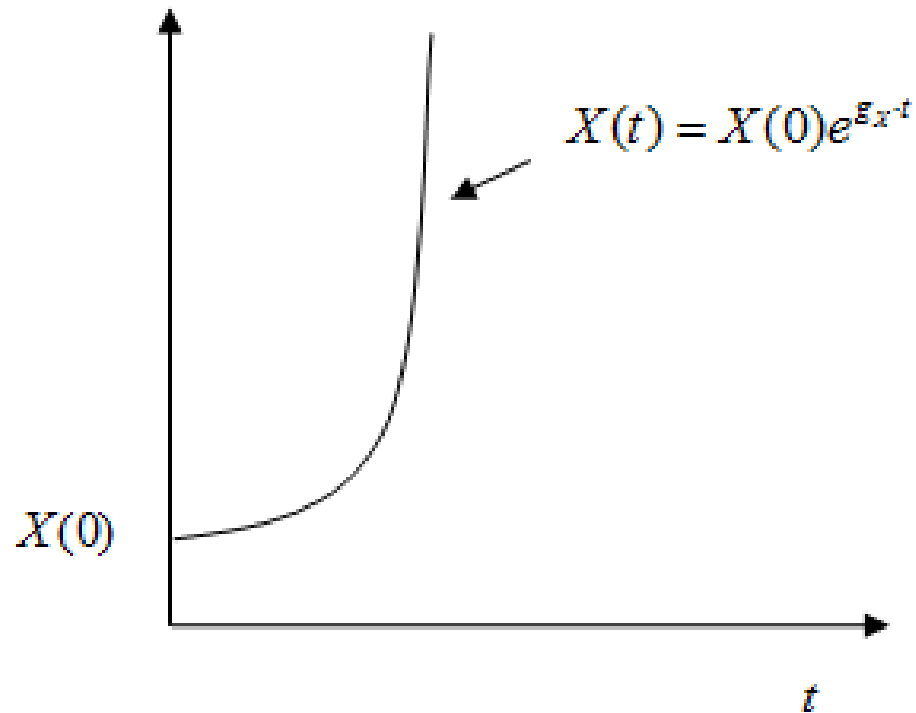
Argentina	2001	2002	2003	2004	2005
Exports of goods and services (constant 2010 US\$)	50640355142	5,2207E+10	5,5337E+10	5,9827E+10	6,7536E+10
Imports of goods and services (constant 2010 US\$)	36623502524	1,829E+10	2,5161E+10	3,5256E+10	4,0843E+10
Gross capital formation (constant 2010 US\$)	39572801787	2,5149E+10	3,4748E+10	4,671E+10	5,3622E+10
General government final consumption expenditure (constant 2010 US\$)	45178652388	4,2884E+10	4,3511E+10	4,4694E+10	4,9098E+10
Households and NPISHs Final consumption expenditure (constant 2010 US\$)	1,91092E+11	1,5633E+11	1,7267E+11	1,9051E+11	2,042E+11
Final consumption	2,36271E+11	1,9922E+11	2,1618E+11	2,3521E+11	2,533E+11
GDP calculated	2,89861E+11	2,5828E+11	2,8111E+11	3,0649E+11	3,3362E+11
			Share in GDP		
Exports of goods and services (constant 2010 US\$)	0,175	0,202	0,197	0,195	0,202
Imports of goods and services (constant 2010 US\$)	0,126	0,071	0,090	0,115	0,122
Gross capital formation (constant 2010 US\$)	0,137	0,097	0,124	0,152	0,161
General government final consumption expenditure (constant 2010 US\$)	0,156	0,166	0,155	0,146	0,147
Households and NPISHs Final consumption expenditure (constant 2010 US\$)	0,659	0,605	0,614	0,622	0,612
Final consumption	0,815	0,771	0,769	0,767	0,759
	1,000	1,000	1,000	1,000	1,000

			growth rate		
	2001	2002	2003	2004	2005
Exports of goods and services (constant 2010 US\$)		3,1%	6,0%	8,1%	12,9%
Imports of goods and services (constant 2010 US\$)		-50,1%	37,6%	40,1%	15,8%
Gross capital formation (constant 2010 US\$)		-36,4%	38,2%	34,4%	14,8%
General government final consumption expenditure (constant 2010 US\$)		-5,1%	1,5%	2,7%	9,9%
Households and NPISHs Final consumption expenditure (constant 2010 US\$)		-18,2%	10,5%	10,3%	7,2%
Final consumption		-15,7%	8,5%	8,8%	7,7%
GDP calculated		-10,9%	8,8%	9,0%	8,9%
GDP growth (annual %)		-4,4	-10,9	8,8	9,0

	decomposition of GDP				
Exports of goods and services (constant 2010 US\$)		0,5%	1,2%	1,6%	2,5%
Imports of goods and services (constant 2010 US\$)		-6,3%	2,7%	3,6%	1,8%
Gross capital formation (constant 2010 US\$)		-5,0%	3,7%	4,3%	2,3%
General government final consumption expenditure (constant 2010 US\$)		-0,8%	0,2%	0,4%	1,4%
Households and NPISHs Final consumption expenditure (constant 2010 US\$)		-12,0%	6,3%	6,3%	4,5%
Final consumption		-12,8%	6,6%	6,8%	5,9%
GDP		-10,9%	8,8%	9,0%	8,9%
		0,0%	0,0%	0,0%	0,0%
		2002	2003	2004	2005

Growth Rate

$$g_X = \frac{\dot{X}(t)}{X(t)} \equiv \frac{d \ln X(t)}{dt} \quad \text{where} \quad \dot{X}(t) \equiv \frac{dX(t)}{dt}$$



Properties of Growth Rate

Let $X(t)$, $Y(t)$, then

1. $g_{X \cdot Y} = g_X + g_Y$.

2. $g_{X/Y} = g_X - g_Y$.

3. $g_{X+Y} = \frac{X}{X+Y} g_X + \frac{Y}{X+Y} g_Y$.

4. $g_{X-Y} = \frac{X}{X-Y} g_X - \frac{Y}{X-Y} g_Y$.

where g_X is the growth rate of $X(t)$.

g_Y is the growth rate of $Y(t)$.