Deutsches Institut für
Wirtschaftsforschung

DIW BERLIN

Productivity Development in Germany And the Financial Crisis

by
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Germany‘s Productivity Growth

Inlandsproduktsberechnung

Arbeitsproduktivität, Durchschnittslöhne und Lohnstückkosten nach Wirtschaftbereichen - Personenkonzept
Veränderung gegenüber dem Vorjahr in %

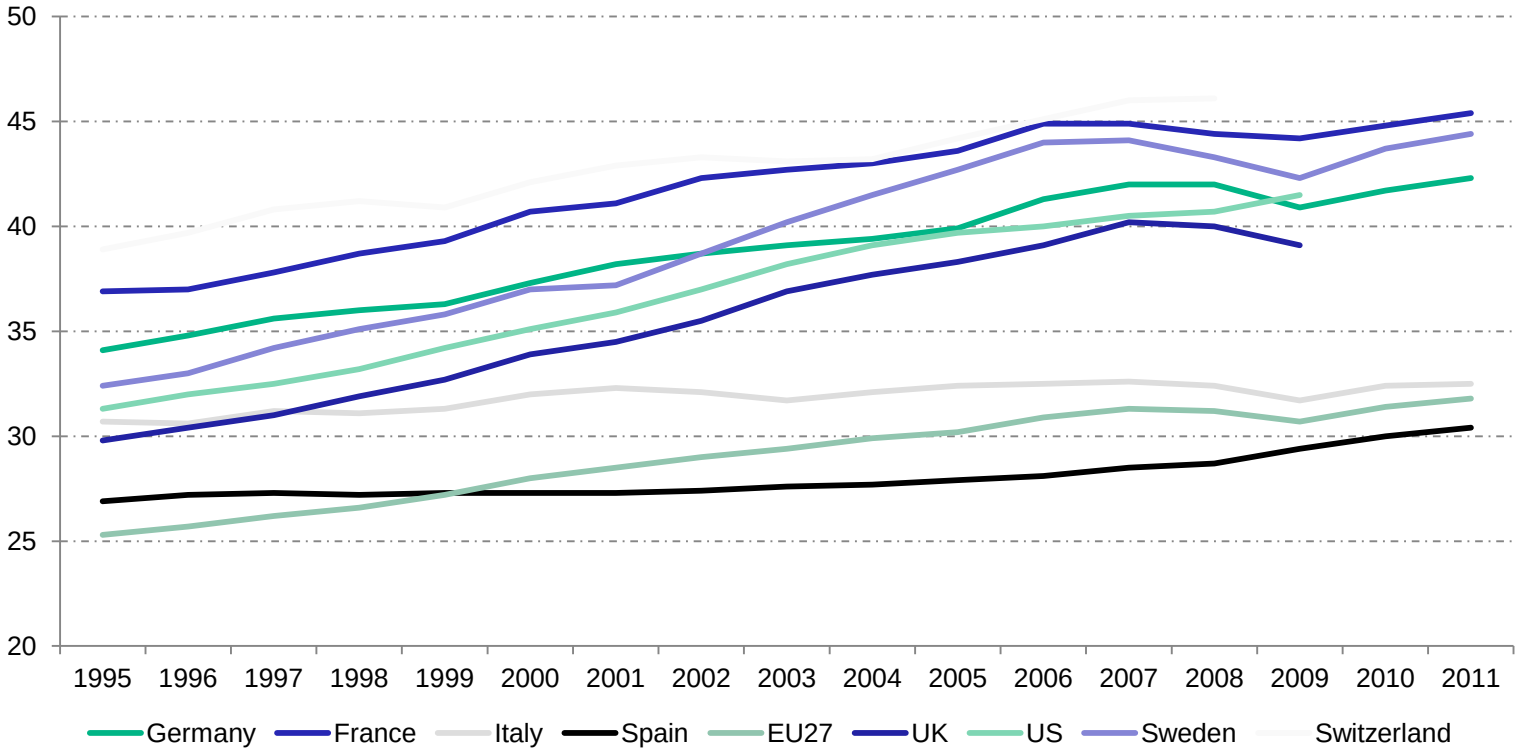
Wirtschaftsbereiche	2009	2010	2011
Arbeitsproduktivität[1]			
Land- und Forstwirtschaft; Fischerei	3,7	-14,0	-9,7
Produzierendes Gewerbe	-14,5	15,4	4,1
Dienstleistungsbereiche	-1,9	-0,2	0,6
Alle Wirtschaftsbereiche	-5,2	3,6	1,6
Arbeitnehmerentgelt je Arbeitnehmer			
Land- und Forstwirtschaft; Fischerei	0,2	3,0	0,9
Produzierendes Gewerbe	-1,7	3,8	3,6
Dienstleistungsbereiche	1,4	1,9	2,7
Alle Wirtschaftsbereiche	0,2	2,4	3,0
Bruttolöhne und -gehälter je Arbeitnehmer			
Land- und Forstwirtschaft; Fischerei	0,4	2,8	0,9
Produzierendes Gewerbe	-2,1	3,9	4,0
Dienstleistungsbereiche	1,3	1,8	3,0
Alle Wirtschaftsbereiche	-0,0	2,3	3,3
Lohnstückkosten[2]			
Land- und Forstwirtschaft; Fischerei	-3,3	19,7	11,8
Produzierendes Gewerbe	15,0	-10,1	-0,5
Dienstleistungsbereiche	3,3	2,1	2,1
Alle Wirtschaftsbereiche	5,6	-1,1	1,4

[1] Bruttoinlandsprodukt (preisbereinigt, Kettenindex 2005=100) je Erwerbstätigen (jeweils umgerechnet auf Messzahlen 2005=100).
[2] Arbeitnehmerentgelt je Arbeitnehmer (jeweils umgerechnet auf Messezahlen 2005=100) in Relation zur Arbeitsproduktivität (je Erwerbstätigen).

Stand: 23. August 2012

Germany has not experienced a major overall productivity miracle

Labor Productivity per Working Hour in Euro



productivity slowdown continued in Germany

- Overall the labor productivity growth fell from 3.7% in the decade 1991/2000 to 2.1% for 2001/2010.
- Manufacturing experienced the highest growth with 4.3% in 1991/2000 to 3.0% for 2001/2010.
- With the prevailing high share of manufacturing of the total gross value added, this significantly contributed to a relative more stable performance as other countries which lost significant shares in manufacutring through deindustrialization, e.g. UK, Italy, etc.
- For the services industries the average growth was much lower with 3.3% for 1991/2000 and 1.6% for 2001/2010.
- The current re-industrialization debate in the US and also in Europe illustrates that this now gives Germany in this area a competitve advantage

indicators for financial sector effectiveness

- Efficient financial markets should **support overall long-term economic growth**

- **Productivity** of the financial service industry should be rising and the **efficiency frontier should be moving outwards (see e.g. Erber, Madlener 2009 in SURF 2009)**

- Countries, the whole industry and single banking institutions should aim to **approach the efficiency frontier**

Productivity in the Financial Services Sector
SUERF Studies, SUERF - The European Money and Finance Forum , 2009

Germany has less overall indebtedness than most other big EU countries

- Germany has had a much more prudent approach to public and private debt
- Its persistent high current account surplus led to a high external net wealth position.
- Often this is combined with FDI in external markets as recently in particular in China and the other big BRICS-countries
- Germany used globalization to build according to their traditional comparative advantages in particular manufacturing industries like automobile, machinery, chemistra and electrical equipment to use the possibilities of scale and scope effectively

Market failure leads to biased market interest rates

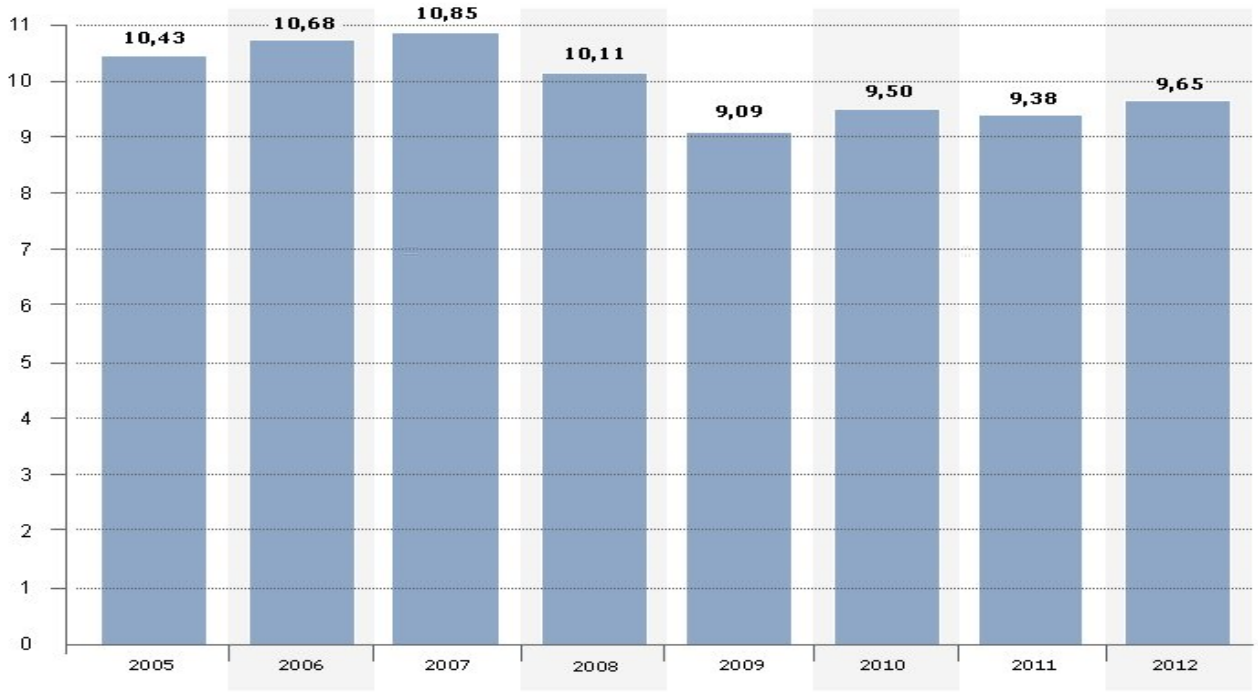
- **Austrian capital theorist** like **Böhm-Bawerk** and **Hayek** following the tradition of **Wicksell** suggested that capital markets should **establish an intertemporal equilibrium** by setting a **yield curve** through the competitive process on **credit markets** that **allows only those credits to be given to debtors which are willing and able to regularly fulfill their obligations.**
- There should exist a **well defined credit constraint** which **allocates financial ressources** to **those with the highest ability to repay the money as agreed upon before**
- However, **something must have gone totally wrong over the past decades**.

Rising indebtedness and defaults signify major market failures

- In Germany the **over-indebtedness has last year again further increased significantly**. Close to **10 percent of all private households** are considered by the most recent **Schuldner-Atlas 2012 (debt map) of Creditreform** to have reached debt levels were they are **unable to service their debts regularly**.
- **6,6 Mill. people above 18 years in Germany in 2012 have reached such high debt levels that they are close to insolvency.**
- This outcome is not primarily a result of increasing powerty, but a willingness to consume at a level beyond their financial incomes.
- **Easy credit** offered by financial services, **credit cards** and **buy-now-pay-later offerings in the retailing industry** in cooperation with banks caused this problem.
- **Banks are less and less critical to assess the creditworthyness of their customers** appropriately. They **tend to pass-over the risk through new techniques of financial engineering** to other market participants.
- ... and **Germany is by far not an extreme case of excessive over-consumption** in the developed countries

Development of over-indebtedness in Germany, 2005-2012

Die Schuldnerquote in Deutschland 2005 bis 2012
Angaben in Prozent



Quelle: Creditreform

profitability and over-leveraged banking industry

- **Leveraging, i.e. higher risk taking,** is a means to **increase profitability** in the short-term in the banking industry. **The lower the own-capital-ratio a bank has, they greater their opportunity to raise its profitability** if major external shocks could be avoided.
- **CEOs of banks** hope that **in times of a financial crisis they are bailed out by their governments**.
- In **good times** their profitability is higher,
- and in **bad times** of a financial crisis a floor against a financial collapse is supported by the government, i.e. limiting excessive losses, creating **moral hazard** and **adverse selection plus the trajedy of the commons**

The state as a debtor

- Traditionally **governments** have been considered - at least in the major OECD countries - to be **a reliable debtor** which regularly services his debts.
- However, **governments tend to use public deficits** to **win political support from their constituencies**.
- This led to a **secular increase of the public debt burden**.
- In **times of an economic crisis** public debts even increase via **deficit spending** more rapidly.
- In **times of a financial sector crisis** public debts increase via **bailouts of the banking industry**
- **The current debt crisis embodies all three elements at the same time**

The countries as debtors

- If **countries are over-consuming** they also increase their indebtedness opposite the world by running **current account deficits via capital imports**
- All in all there are **three major dimensions of indebtedness**

- **Private sector indebtedness**
- **Public sector indebtedness**
- **External indebtedness**

- From a **macroeconomic perspective** the **efficiency of a national economy** can be **judged by its capability to keep all three dimensions under control**

Let‘s have a look a the current state based on data published by the EU-Commission

three dimensions of indebtedness external indebtedness

	Net Foreign Wealth in Relation to the GDP in percent										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Germany	3,3	8,7	5,1	6,6	10,7	21,0	27,9	26,5	25,0	35,1	38,4
Ireland	-7,9	-15,1	-17,8	-20,0	-17,9	-24,5	-5,3	-19,4	-75,7	-103,1	-90,9
Greece	-40,1	-46,5	-52,9	-58,9	-67,0	-77,3	-85,3	-96,3	-76,9	-86,1	-92,5
Spain	-32,0	-35,6	-41,6	-45,2	-51,9	-55,6	-65,8	-78,1	-79,3	-93,8	-89,5
France	18,5	13,2	2,8	0,7	-1,0	1,1	1,1	-1,5	-12,9	-8,6	-10,0
Italy	-7,2	-5,8	-12,4	-13,6	-15,8	-16,8	-22,2	-24,5	-24,1	-25,2	-23,9
Portugal	-39,5	-46,3	-55,4	-58,2	-63,1	-67,4	-78,8	-88,9	-96,1	-110,6	-107,5
Great Britain	-9,9	-13,4	-10,4	-9,6	-18,1	-21,5	-28,9	-23,4	-5,8	-21,8	-23,8

three dimensions of indebtedness
private indebtedness

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Private Indebtedness in Relation to the GDP in percent										
Germany	131,5	133,1	136,0	135,6	131,3	128,4	124,4	122,4	123,7	130,6	128,1
Ireland	-	149,4	160,1	153,5	170,9	192,3	205,3	215,3	284,0	336,1	341,3
Greece	58	65,0	68,2	72,0	78,6	90,2	98,0	107,6	119,3	122,7	124,1
Spain	122,3	132,5	139,5	147,8	159,9	176,6	200,4	215,1	221,1	227,2	227,3
France	117,2	123,7	124,1	123,7	126,9	131,6	136,8	142,5	149,9	156,8	159,9
Italy	79,5	84,0	86,7	90,8	94,5	101,0	107,5	114,9	119,3	125,6	126,4
Portugal	173	186,7	191,0	196,3	197,4	205,1	209,4	223,1	240,4	252,0	248,5
Great Britain	148,1	157,0	166,4	172,6	182,5	195,7	207,0	206,6	222,3	223,3	212,2

three dimensions of indebtedness
public indebtedness

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Public debt in Relation to the GDP in percent										
Germany	60,2	59,1	60,7	64,4	66,3	68,6	68,1	65,2	66,7	74,4	83,2
Ireland	37,5	35,2	31,9	30,7	29,4	27,2	24,7	24,8	44,2	65,2	92,5
Greece	103,4	103,7	101,7	97,4	98,9	101,2	107,3	107,4	113,0	129,3	144,9
Spain	57,4	56,9	52,6	48,8	46,3	43,1	39,6	36,2	40,1	53,8	61,0
France	57,4	56,9	59,0	63,2	65,0	66,7	64,0	64,2	68,2	79,0	82,3
Italy	108,5	108,2	105,1	103,9	103,4	105,4	106,1	103,1	105,8	115,5	118,4
Portugal	48,4	51,1	53,7	55,7	57,5	62,5	63,7	68,3	71,6	83,1	93,4
Great Britain	41	37,7	37,5	39,0	40,9	42,5	43,4	44,4	54,8	69,7	79,6

total gross indebtedness

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Sum of all three debts in percent of GDP										
Germany	188,4	183,5	191,6	193,4	186,9	176,0	164,6	161,1	165,4	169,9	172,9
Ireland		199,7	209,8	204,2	218,2	244,0	235,3	259,5	403,9	504,4	524,7
Greece	201,5	215,2	222,8	228,3	244,5	268,7	290,6	311,3	309,2	338,1	361,5
Spain	211,7	225,0	233,7	241,8	258,1	275,3	305,8	329,4	340,5	374,8	377,8
France	156,1	167,4	180,3	186,2	192,9	197,2	199,7	208,2	231,0	244,4	252,2
Italy	195,2	198,0	204,2	208,3	213,7	223,2	235,8	242,5	249,2	266,3	268,7
Portugal	260,9	284,1	300,1	310,2	318,0	335,0	351,9	380,3	408,1	445,7	449,4
Great Britain	199,0	208,1	214,3	221,2	241,5	259,7	279,3	274,4	282,9	314,8	315,6

significant legacy of malinvestments

- These are **constitutional questions** how a society are framing their economic system how markets work.

- By **setting necessary constraints to satisfy social responsibility one might recapture control over the out-of-control global market system**.

- This process will be painful because much what has emerged over the past two decades in particular has led to **significant malinvestments and over-consumption**.

On the road towards unhappiness

- Traditionally in the theory of economic development, development was always considered to lead to **a steady progress of society and economic income and wealth**.

- However, the present system tends to have left this path. As happiness research over the past decades have demonstrated **unemployment** (Ohtake 2012), **rising income and wealth inequality are key drivers to raise unhappiness** (Frey, Stutzer 2002, Alesina, Di Tella, MacCulloch 2004, Smyth, Qian 2008, Ng 2008, Easterley 2012).

unemployment catastrophe

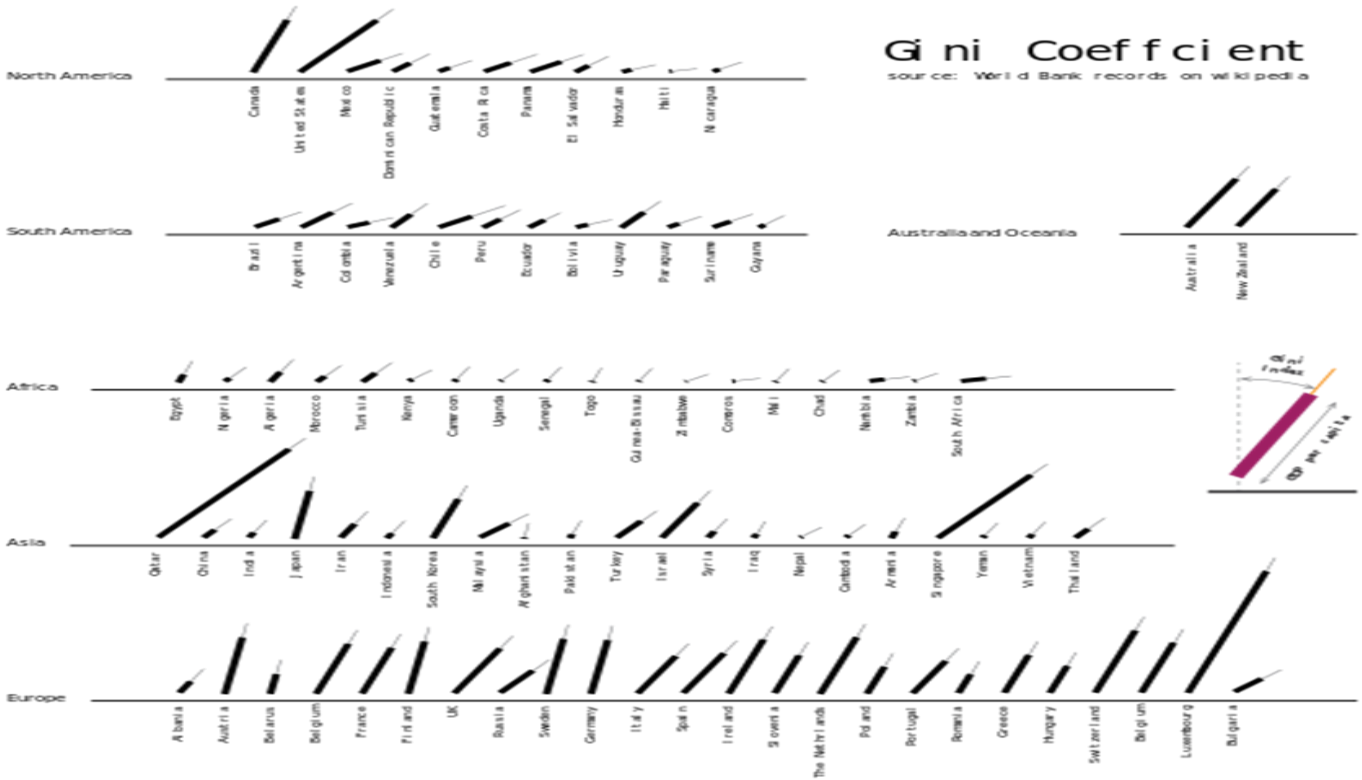
- With currently **25,751 million people out of work in the EU27-countries,**
- with **unemployment rates above 25 percent in Spain and Greece**,
- **Youth unemployment even above 50 percent**.
- the **situation has recently spiraled out of control in Europe and elsewhere around the world**.

income and wealth inequality is rising

- Income inequality globally is steadily rising as well, the development towards increasing unhappiness will continue under current circumstances and framework settings.
- The following figure shows the relation between GDP-per-capita to the Gini-coefficient[1] of the respective countries and regions in the world.
- The deviation from the 90° angle measures the Gini-coefficient. The length of the bold line represents the per-capita-income of the respective country.

[1] The Gini coefficient is a measure of statistical dispersion developed by the Italian statistician and sociologist Corrado Gini and published in his 1912 paper "Variability and Mutability". The Gini coefficient measures the inequality among values of a frequency distribution (for example levels of income). A Gini coefficient of zero expresses perfect equality where all values are the same (for example, where everyone has an exactly equal income).

per-capita-income and income inequality



Cecchinis Analysis

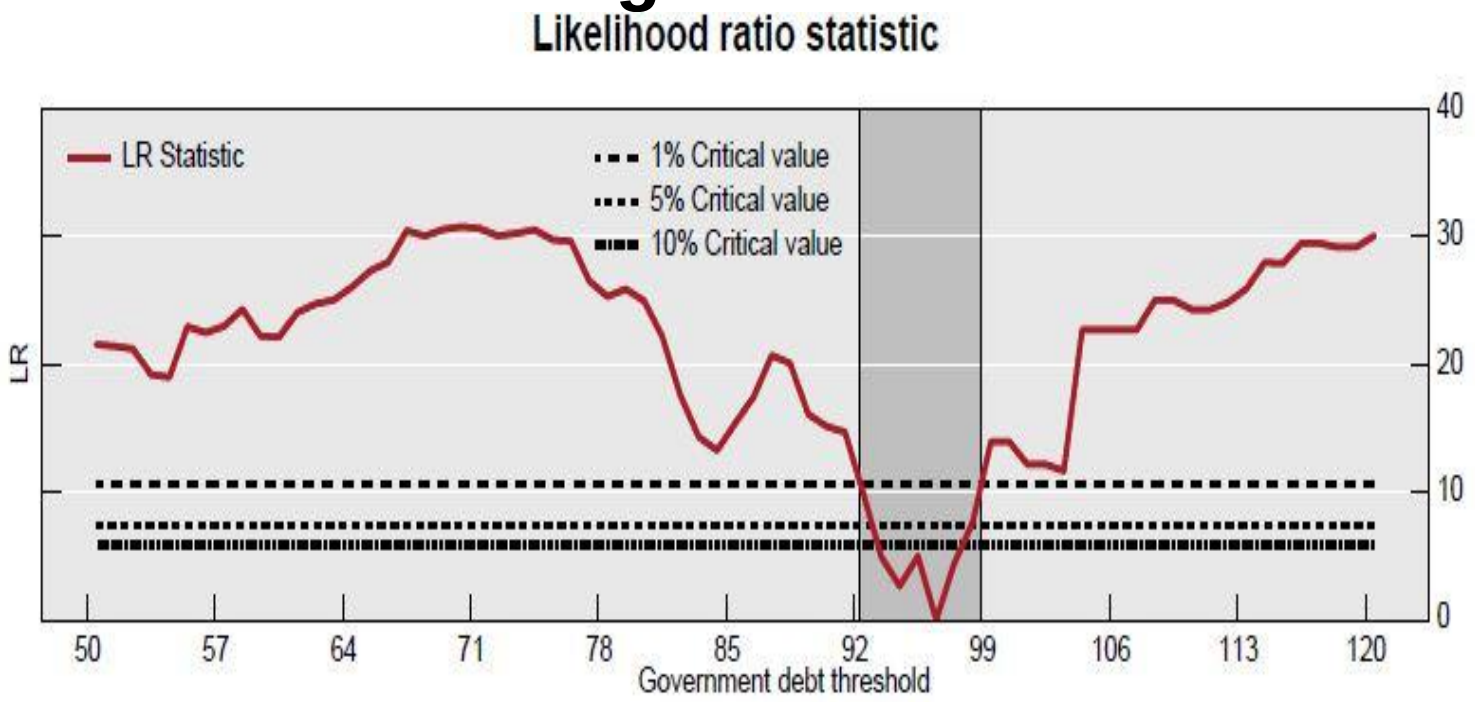
Household, corporate and government debt as a percentage of nominal GDP

	Levels				Changes[2]		
	1980	1990	2000	2010[1]	1980–90	1990–2000	2000–10
United States	151	200	198	268	49	–2	70
Japan	290	364	410	456	75	46	46
Germany	136	137	226	241	1	89	15
United Kingdom	160	203	223	322	43	20	99
France	160	198	243	321	37	45	78
Italy	109	180	252	310	71	72	58
Canada	236	278	293	313	42	15	20
Australia	128	174	185	235	46	11	49
Austria	162	178	205	238	16	27	32
Belgium	170	264	298	356	94	34	58
Denmark			259	336			77
Finland	146	173	222	270	26	49	48
Greece	92	139	195	262	47	55	67
Netherlands	205	265	294	327	60	29	33
Norway			256	334			78
Portugal	144	141	251	366	–2	110	115
Spain	172	187	258	355	15	70	97
Sweden	219	289	320	340	70	31	21
Total of above							
Median	160	192	251	322	45	40	58
Weighted average[3]	172	218	246	306	47	28	61
Simple average	168	211	255	314	43	44	59
G7	177	223	264	303	45	41	55
Other advanced	160	201	249	321	41	46	61
Memo: Std deviation	*50*	*64*	*54*	*43*			

[1] Some figures refer to 2009. [2] In percentage points of GDP. [3] Based on 2005 GDP and PPP exchange rates.

Sources: OECD; national data, authors' estimates.

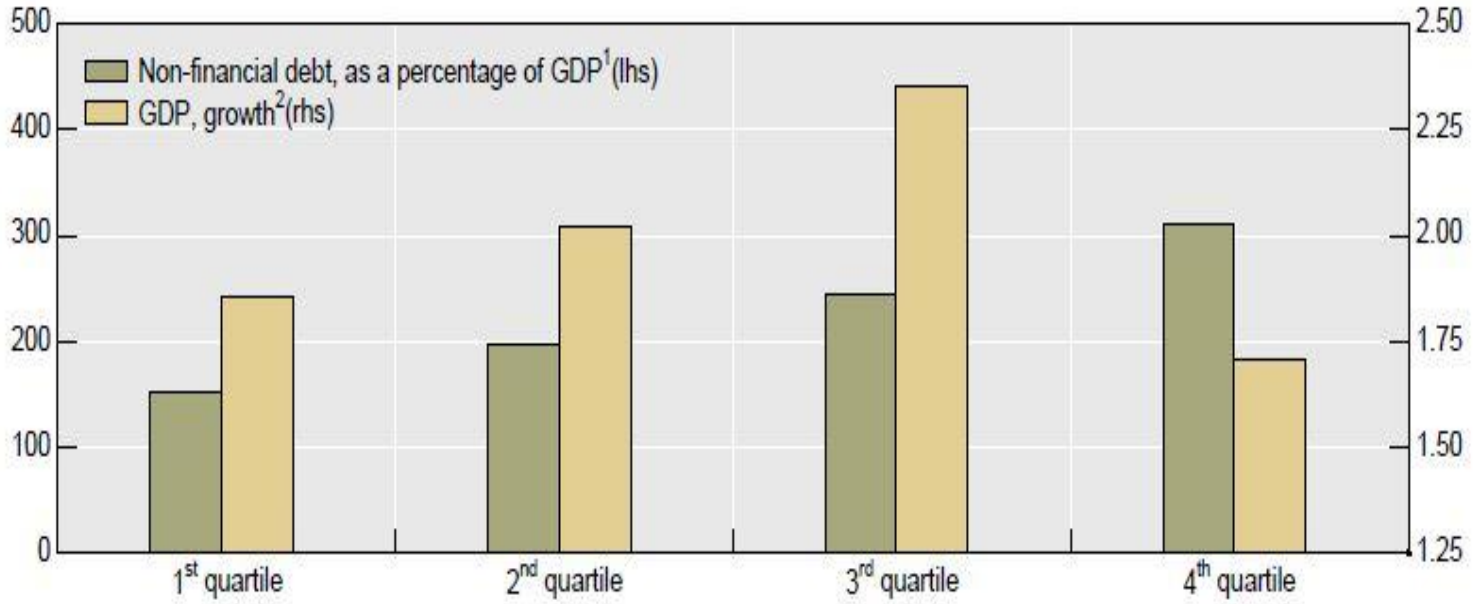
Critical threshhold of government debt on growth



The LR statistic is constructed as $LR(\tau) = (SSR(\tau) - SSR(\hat{t}))/\hat{\sigma}^2$, where $\hat{\tau} = \arg\min SSR(\tau)$; SSR is the sum of squared residuals obtained by estimating text equation (2) for different values of the threshold variable.

Are we beyond the threshholds?

Non-financial sector debt and output growth for 18 OECD countries



[1] The average of the quartiles. [2] Average growth within the quartiles.

Sources: OECD; Penn World Tables 7.0.

Three seperate threshholds

Threshold effects

	Threshold estimate	Coefficients		
Government debt				
Controlling for crises	96%	<96%	>=96%	
		−0.0065	−0.0138***	
		(0.232)	(0.004)	
Not controlling for crises	84%	<84%	>=84%	
		−0.0074	−0.0133*	
		(0.382)	(0.057)	
Corporate debt				
Controlling for crises	73%	<73%	>=73%	
		0.0119	0.0047	
		(0.156)	(0.474)	
Controlling for crises (2 threshold points)	73%; 99%	<73%	>=73% & <99%	>=99%
		0.0055	−0.0019	0.0038
		(0.151)	(0.399)	(0.208)
Not controlling for crises (2 threshold points)	73%; 88%	<73%	>=73% & <88%	>=88%
		0.0041	−0.0044	−0.0059**
		(0.221)	(0.260)	(0.041)
Household debt				
Controlling for crises	84%	<84%	>=84%	
		0.0069	−0.0065	
		(0.618)	(0.658)	
Not controlling for crises	84%	<84%	>=84%	
		0.0049	−0.0115	
		(0.733)	(0.458)	

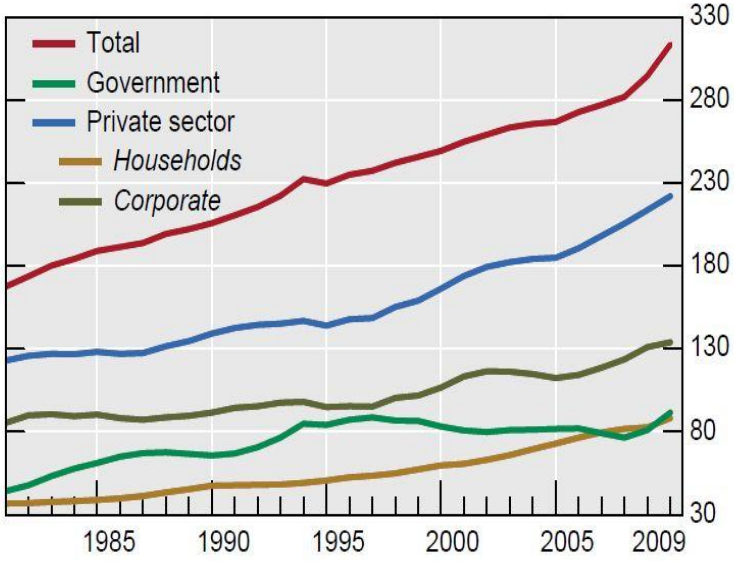
Reported threshold estimates are obtained by minimising the sum of squared residuals in text equation (2). Reported coefficients are for the marginal impact of debt on the five-year forward average per capita growth rate from estimating text equation (2). Numbers in parentheses are asymptotic p-values for the test that the coefficient estimate is equal to zero computed using standard errors estimated using the Huber-White sandwich estimator. */**/*** indicate coefficient estimates significantly different from zero at the 10/5/1% level.

Source: Authors' calculations.

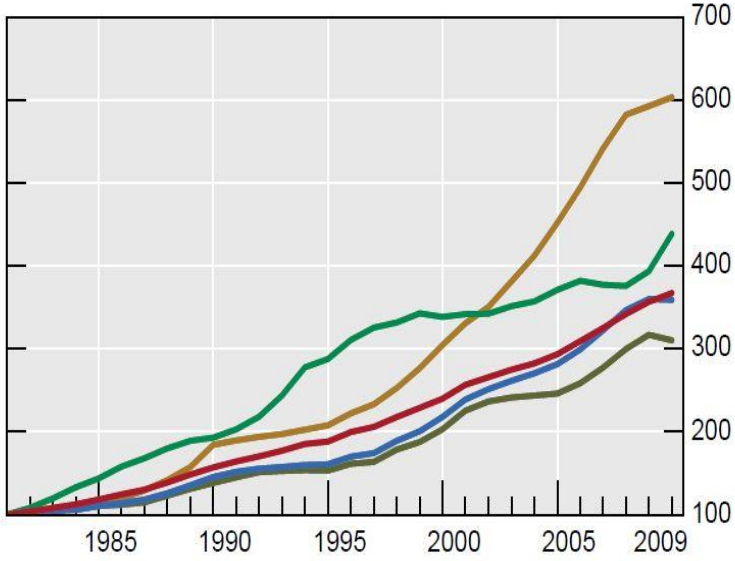
private households and government debt are currently key drivers

Non-financial sector debt

As a percentage of GDP[1]



Real levels, deflated by consumer prices[2]



[1] Simple averages for 18 OECD economies. [2] Rebased to 1980 = 100; simple average of 16 OECD economies, including the United States.

Government debt is seemingly the most harmful

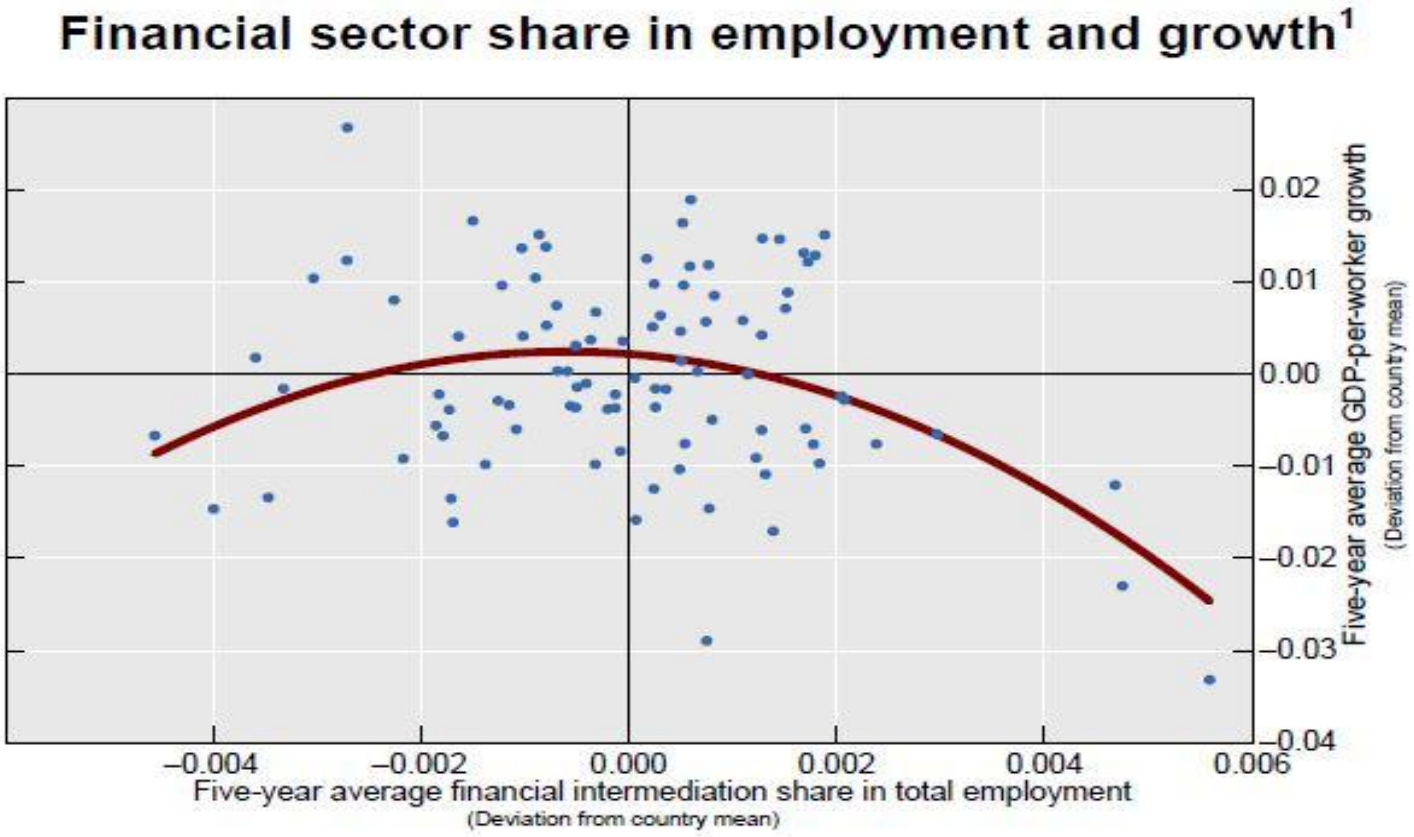
Effect of debt on future growth

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Controlling for banking crises										
Total	−0.0078 (0.177)									
Government		−0.0167*** (0.007)				−0.0180** (0.011)	−0.0174*** (0.009)	−0.0175*** (0.008)	−0.0180** (0.010)	
Private sector			0.0016 (0.824)			−0.0023 (0.701)				
Corporate				0.0006 (0.938)			−0.0030 (0.629)		−0.0023 (0.745)	0.0008 (0.916)
Household					0.0050 (0.716)			−0.0033 (0.789)	−0.0027 (0.821)	0.0047 (0.717)
Not controlling for banking crises										
Total	−0.0116** (0.025)									
Government		−0.0164** (0.025)				−0.0169** (0.032)	−0.0191*** (0.006)	−0.0136* (0.093)	−0.0165** (0.030)	
Private sector			−0.0054 (0.279)			−0.0093** (0.046)				
Corporate				−0.0082 (0.163)			−0.0117** (0.028)		−0.0109* (0.058)	−0.0078 (0.194)
Household					0.0023 (0.870)			−0.0043 (0.756)	−0.0013 (0.923)	0.0055 (0.709)
Including financial flow variables										
Total	−0.0103* (0.051)									
Government		−0.0208*** (0.000)				−0.0240*** (0.000)	−0.0226*** (0.001)	−0.0218*** (0.000)	−0.0240*** (0.000)	
Private sector			0.0030 (0.597)			−0.0051 (0.300)				
Corporate				0.0027 (0.689)			−0.0043 (0.459)		−0.0054 (0.377)	0.0023 (0.756)
Household					0.0065 (0.554)			−0.0047 (0.632)	−0.0041 (0.675)	0.0057 (0.610)

Reported coefficients are for the marginal impact of debt on the five-year forward average per capita growth rate from estimating text equation (1). Numbers in parentheses are asymptotic p-values for the test that the coefficient estimate is equal to zero computed using standard errors estimated using the Huber-White sandwich estimator. */**/*** indicate coefficient estimates significantly different from zero at the 10/5/1% level.

Source: Authors' calculations.

Are we over-banked?



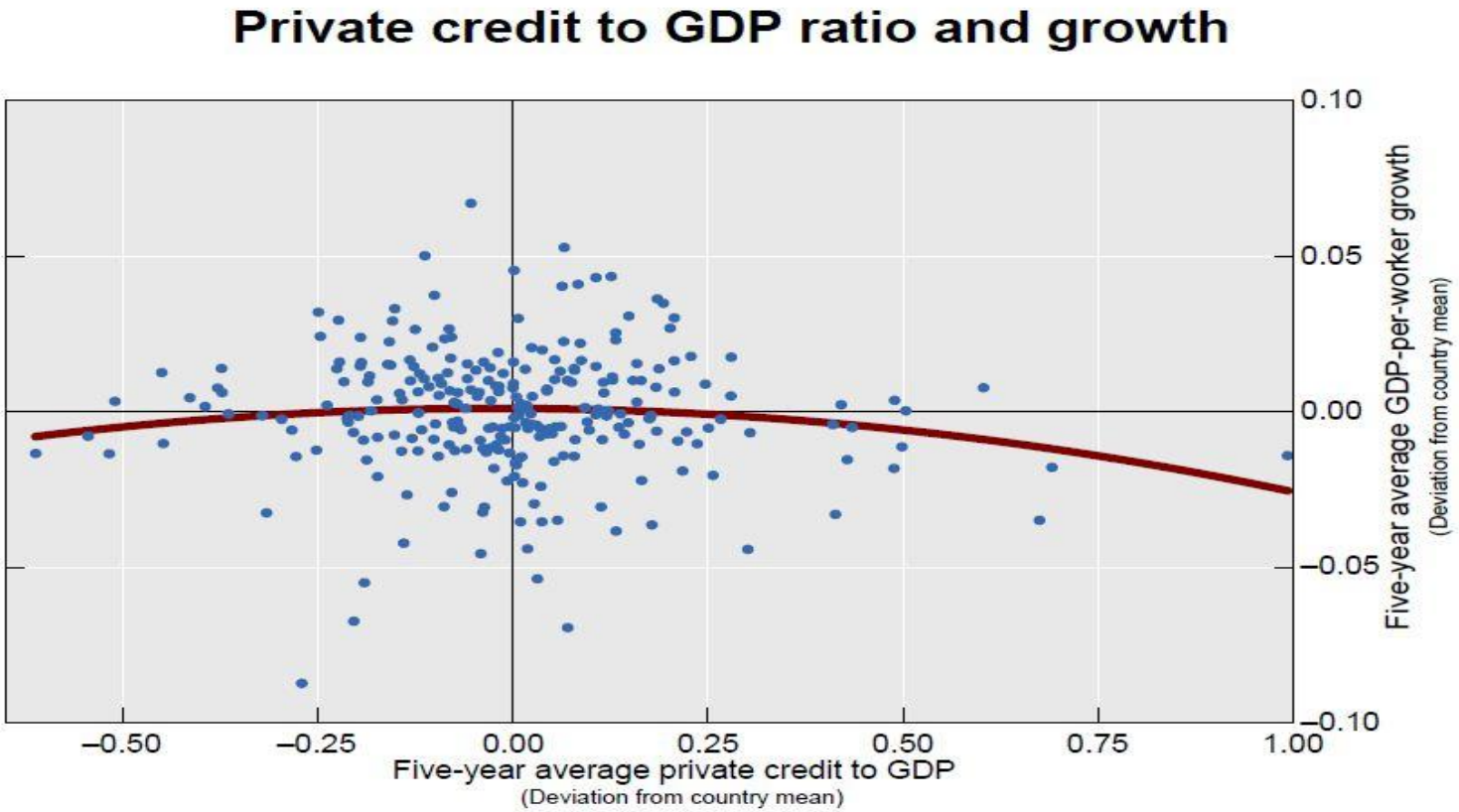
empirical evidence on banking inefficiency

GDP-per-worker growth and financial sector growth

Dependent variable: five-year average real GDP-per-worker growth	(1)	(2)	(3)	(4)	(5)
Five-year average financial intermediation employment growth	−0.471*** (0.083)	−0.327*** (0.074)	−0.325*** (0.073)	−0.328*** (0.073)	−0.331*** (0.074)
Five-year working population growth	−0.356* (0.204)	−0.275 (0.186)	−0.286 (0.183)	−0.270 (0.188)	−0.259 (0.191)
Five-year average openness to trade	0.007 (0.0148)	0.022 (0.0138)	0.023 (0.0143)	0.022 (0.0142)	0.022 (0.0138)
Five-year average government consumption share in GDP	−0.762*** (0.212)	−0.636*** (0.219)	−0.626*** (0.220)	−0.637*** (0.220)	−0.635*** (0.219)
Five-year average CPI inflation	0.021 (0.018)	0.011 (0.018)	0.011 (0.018)	0.011 (0.018)	0.011 (0.018)
Log of real GDP per worker	−0.083*** (0.014)	−0.073*** (0.012)	−0.072*** (0.012)	−0.074*** (0.012)	−0.076*** (0.012)
Financial intermediation share in total employment	−1.732*** (0.529)				
Private credit to GDP		−0.001 (0.005)			
Private credit by banks to GDP			−0.002 (0.006)		
Financial system assets to GDP				−0.000 (0.006)	
Banking system assets to GDP					0.002 (0.005)
Observations	104	110	110	110	110
R-squared	0.616	0.583	0.584	0.583	0.583

The dependent variable is the five-year average real GDP-per-worker growth for 1980–2009 for each country. Five-year averages for the independent variables are computed over the same period as the dependent variable. The log of real GDP per worker is the natural logarithm of real GDP per worker for the initial year of the period over which the averages are computed. The financial intermediation share in total employment is the share of the financial intermediation sector in total employment for the initial year of the period over which the averages are computed. Private credit (by banks) to GDP is the ratio of private credit (by banks) to GDP for the initial year of the period over which the averages are computed. Financial (banking) system assets to GDP are measured as the ratio of financial (banking) system assets to GDP for the initial year of the period over which the averages are computed. All estimates include country dummies. Robust standard errors are in parentheses. Significance at the 1/5/10% level is indicated by ***/**/*. For country sample and sources, see data appendix.

Are we over-indebted?



Too much private credit

GDP-per-worker growth and private credit to GDP

Dependent variable: five-year average real GDP-per-worker growth	(1)	(2)	(3)	(4)	(5)	(6)
Five-year average private credit to GDP	0.036*** *(0.011)*	0.038*** *(0.011)*	0.035*** *(0.011)*	0.035*** *(0.011)*	0.035*** *(0.011)*	0.048** *(0.021)*
Five-year average private credit to GDP *squared*	−0.018*** *(0.005)*	−0.018*** *(0.005)*	−0.018*** *(0.005)*	−0.017*** *(0.005)*	−0.017*** *(0.005)*	−0.022*** *(0.008)*
Log of real GDP per worker	−0.742*** *(0.211)*	−1.020*** *(0.210)*	−1.110*** *(0.208)*	−1.110*** *(0.207)*	−1.160*** *(0.204)*	−6.220*** *(1.200)*
Five-year working population growth		−0.478*** *(0.162)*	−0.480*** *(0.160)*	−0.471*** *(0.163)*	−0.501*** *(0.152)*	−0.685*** *(0.162)*
Five-year average openness to trade			0.010*** *(0.003)*	0.010*** *(0.003)*	0.009*** *(0.003)*	0.054*** *(0.010)*
Five-year average government consumption share in GDP				0.0106 *(0.046)*	0.0107 *(0.045)*	−0.145 *(0.331)*
Five-year average CPI inflation					0.0378 *(0.036)*	0.047 *(0.037)*
Turning point for the effect of private credit to GDP on real GDP-per-worker growth	0.98	1.02	0.99	0.99	1.01	1.08
95% confidence interval	[0.97;1.00]	[1.01;1.03]	[0.98;1.01]	[0.98;1.01]	[0.99;1.02]	[1.06;1.11]
Observations	270	270	270	270	270	270
R-squared	0.098	0.160	0.190	0.190	0.213	0.424

The dependent variable is the five-year average real GDP-per-worker growth for 1980–2009 for each country, which yields six observations per country. Five-year averages for the independent variables are computed over the same period as the dependent variable. The log of real GDP per worker is the natural logarithm of real GDP per worker for the initial year of the period over which the averages are computed, divided by 100. All estimates include a non-reported constant. Column (6) includes country dummies. Robust standard errors are in parentheses. Significance at the 1/5/10% level is indicated by ***/**/*. The turning point for the effect of private credit to GDP on real GDP-per-worker growth is the level for private credit to GDP below (above) which an increase in private credit to GDP is estimated to raise (reduce) real GDP-per-worker growth. For country sample and sources, see data appendix.

Conclusions

- The lesson to be learned is that the current economic development based on the current highly unregulated financial market system has led to a seemingly unsustainable development crisis globally.

- It is time for major reforms of the fundamental value systems which have to be embedded into the market order through tighter regulations and shrinking the financial service industry.

- Social responsibility has to reduce debt levels in particular of the governments, the private households and shrink the bank industry.

Thank you for your attention