

# Roads and Poverty Reduction: A Cameroon Case Study

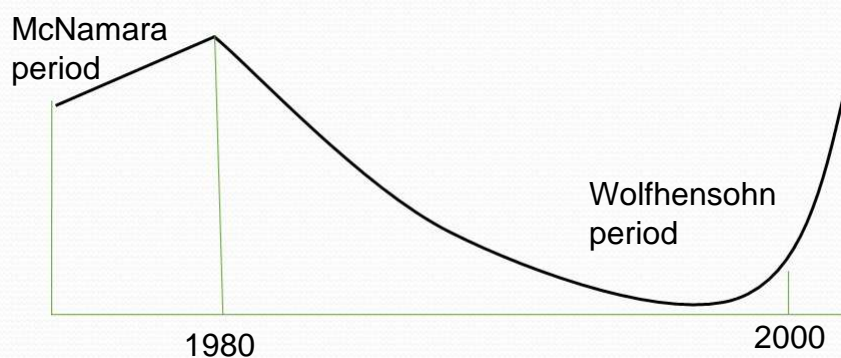
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## Motivations I

- Long-time and widely accepted consensus:  
Transport infrastructure has a significant, positive and substantial impact on economic growth and poverty.



## Motivations II

- An ineluctable effect? Indeed not:
  - Transport prices in Africa remain the highest in the world .
  - The share of Africa in world's trade has decreased.
  - Poverty does not decline in most rural areas in Africa
- "Knowledge about [roads'] impacts and the heterogeneity in those impacts continues to be limited" van de Walle (2009)
- Need more robust and reliable evaluations  
Mu et van de Walle, 2007; Khandker et al, 2009

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## Objectives

=>Relevance of a "one-size-fits-all" approach for roads investments?

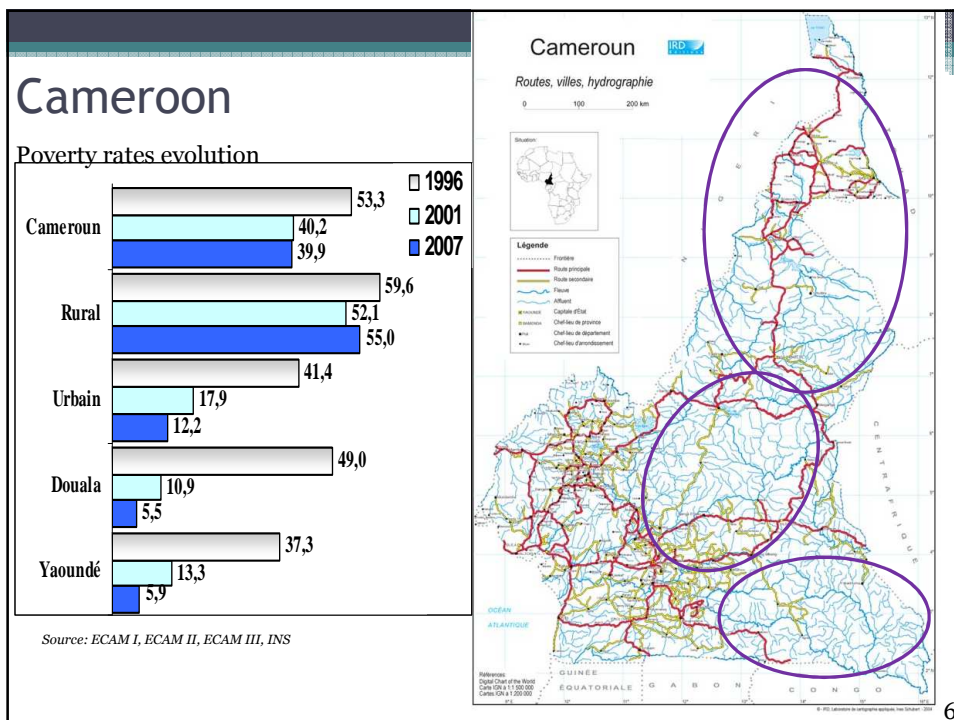
- Direct effect apart from
  - Human Capital
  - Market Access
  - Labor Opportunities?
- The Labor Activities Channel
  - What activities to escape from poverty?
  - Heterogeneity of roads 'impact

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## Outline

- Roads and Poverty in Cameroon
- Literature Review
- Data & Main variables
- Econometric Specification & Empirical issues
- Conclusion & Discussion

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## Literature review I

- The Human Capital Channel
  - “[Human capital is] fundamental to the broader notion of expanded human capabilities” Todaro & Smith (2006)
  - **Roads as a complementary input for these provisions of human capital formation facilities to be effective** Gannon and Liu (1997)

Mu et van de Walle (2007); Khandker et al (2009)
- The Market Access Channel
  - **Improved road access reduces transport cost** Gannon and Liu (1997)
  - **Input Market: Reduced prices for inputs enhance productivity** Fan et al (2004); Minten and Stifel (2008); Khandker et al (2009)
  - **Output Market: Rise in income thanks to greater opportunities of sales or higher prices** Gibson and Rozelle (2002); Escobal and Ponce (2002); Jacoby and Minten (2008); Khandker et al (2009).

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## Literature review II

- The Labor Activities Channel
  - **Creation of employment and new job opportunities**  
Jacobs and Greaves (2003); Fan (2004); Mu et van de Walle (2007)
  - **Diversification of income sources**
    - Diversification to meet local demand: Autarky argument.  
Barrett et al (2001)
    - Connectivity entails greater opportunities to diversify.  
Gibson and Rozelle (2002)
  - **Diversification outside the farming sector**  
Smith et al (2001); Lanjouw et al (2001)

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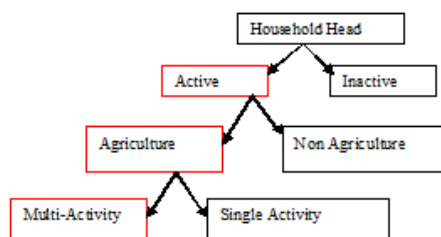
## Data

- The 2001 Cameroon National Household Survey (ECAM II)
  - Poverty measurement and analysis
  - Covers all the dimensions of poverty
    - Incomes, human capital, migration...
    - Both objective and subjective
  - Data at the individual and households levels
  - 10992 surveyed households

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## Main variables

- Poverty: *Welfare Ratio* (Gibson and Rozelle, 2002;2003)
  - (log of) nominal consumption expenditure per adult equivalent/poverty line
- Access to infrastructures
  - Time (in hours) to the nearest tarred road; primary public school; health center; food market
- Labor Activities



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## Econometric Specification

$$\text{Welfare Ratio} = \alpha_{wr}.z + \beta_{wr}.z_{wr} + \gamma_{wr}.\text{Roads} + \delta_{wr} \text{Labor} + u_{wr}$$

$$\text{Labor} = \alpha_1.z + \beta_1.z_1 + \gamma_1.\text{Roads} + u_1$$

- $z$ : Household's size and composition; fixed effects
- $z_{wr}$ : Human capital (household & cluster level); controls for the access to human capital facilities and markets.
- $z_1$ : HH-head's characteristics
- *Labor*
  - "Active" HH-head
  - "Agriculture" HH-head
  - "Agriculture Multi-Active" HH-head

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## Empirical Issues

- Endogeneity of *Roads*
  - Unobserved heterogeneity => District and rural FE
  - Reverse causality => External IV
- Reverse causality between *Labor* and *Welfare*  
Three-Stage Least Squares
- Selection bias  
Inverse Mills ratio

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## “Active” HH-head

	Welfare Ratio	"Active" HH-head
"Active" HH-head (D)	2.730 (0.961)**	
Time to the nearest primary school (in hours)	0.389 (0.276)	
Time to the nearest health center (in hours)	0.665 (0.442)	
Time to the nearest food market (in hours)	0.701 (0.467)	
Time to the nearest tarred road (in hours)	-1.860 (1.180)	0.023 (0.009)*
z	yes	yes
z <sub>WR</sub>	yes	
z <sub>1</sub>		yes
District Fixed Effects	yes	yes
Instrumental Variables	yes	yes
Observations	5938	5938
Rsq	0.3460	0.0661
RMSE	0.551	0.271

(Robust se); \*p&lt; 5%; \*\*p&lt; 1%

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## “Agriculture” HH-head

	Welfare Ratio	"Agriculture" HH-head
"Agriculture" HH-head (D)	-0.981 (0.130)**	
"Multi-Active" HH-head (D)	0.021 (0.020)	-0.016 (0.011)
Time to the nearest primary school (in hours)	0.060 (0.081)	
Time to the nearest health center (in hours)	0.134 (0.139)	
Time to the nearest food market (in hours)	0.122 (0.144)	
Time to the nearest tarred road (in hours)	-0.208 (0.349)	0.154 (0.011)**
Mills		Not sign.
z	yes	yes
z <sub>WR</sub>	yes	
z <sub>1</sub>		yes
District Fixed Effects	yes	yes
Instrumental Variables	yes	yes
Observations	5405	5405
Rsq	0.2698	0.5222
RMSE	0.585	0.330

(Robust se); \*p&lt; 5%; \*\*p&lt; 1%

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## “Agriculture Multi” HH-head

	Welfare Ratio	"Agriculture Multi" HH-head
"Agriculture Multi" HH-head (D)	0.030 (0.206)	
Time to the nearest primary school (in hours)	0.031 (0.022)	
Time to the nearest health center (in hours)	0.012 (0.023)	
Time to the nearest food market (in hours)	-0.003 (0.018)	
Time to the nearest tarred road (in hours)	-0.031 (0.024)	0.107 (0.039)**
Mills		Sign.**
z	yes	yes
z <sub>WR</sub>	yes	
z <sub>1</sub>		yes
District Fixed Effects	yes	yes
Instrumental Variables	yes	yes
Observations	1855	1855
Rsq	0.3644	0.1506
RMSE	0.428	0.445

(Robust se); \*p< 5%; \*\*p< 1%

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## Main results (I)

- **No significant direct** impact of road access on consumption expenditures
  - => **What matters are the opportunities opened up by roads**
- **Significant indirect** through the non-agricultural sector

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## Main results (II)

- **Agriculture as a poverty trap**
  - Isolation increases the probability to engage in the farming sector (no access to markets and trade opportunities)
  - As long as the household-head is primary involved in the farming sector, his diversification status does not significantly influence the level of consumption expenditures

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## Policy Implications

- Priority to locations where the development of non-farming activities is possible
  - A large main road may not be required
  - Take more into account economic potential

**=> No “one-size-fits-all” approach!!!**

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## Discussion

- To go further...
  - Human capital and markets channels
  - Labor structure in the household determines the choice of the HH-head
  
- To keep in mind
  - Governance
  - Internal labor mobility

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Thanks for your attention

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