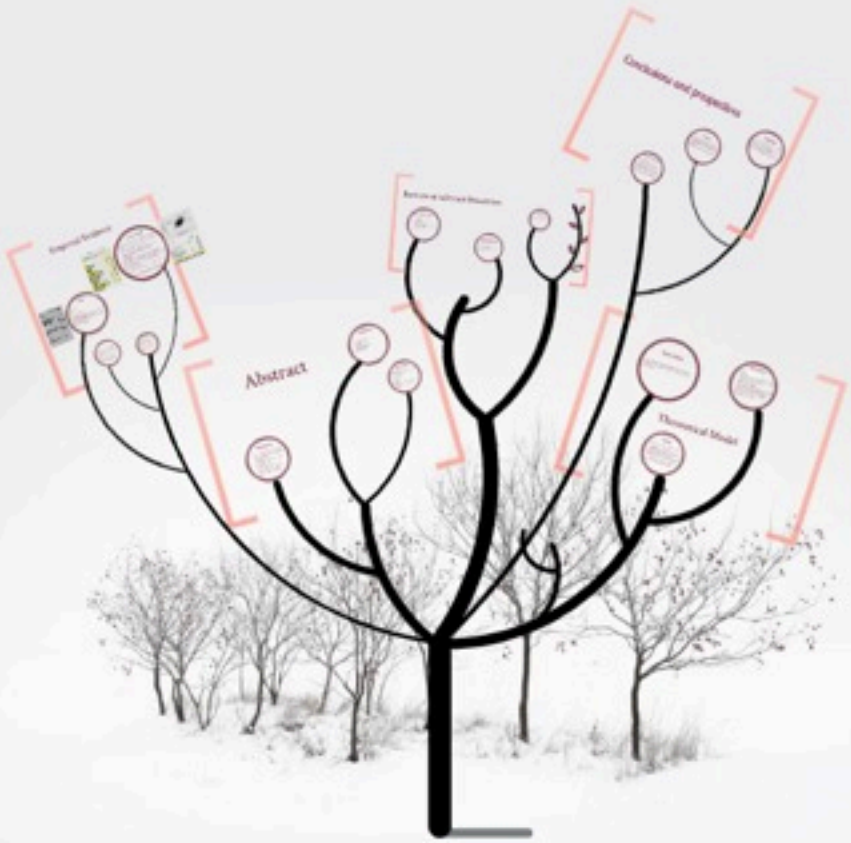

Geographic poverty traps? A micro model of consumption growth in rural China

Author: Jyotsna Jalan and Martin Ravallion

lecturer: Yishu Wu

02/20/2014

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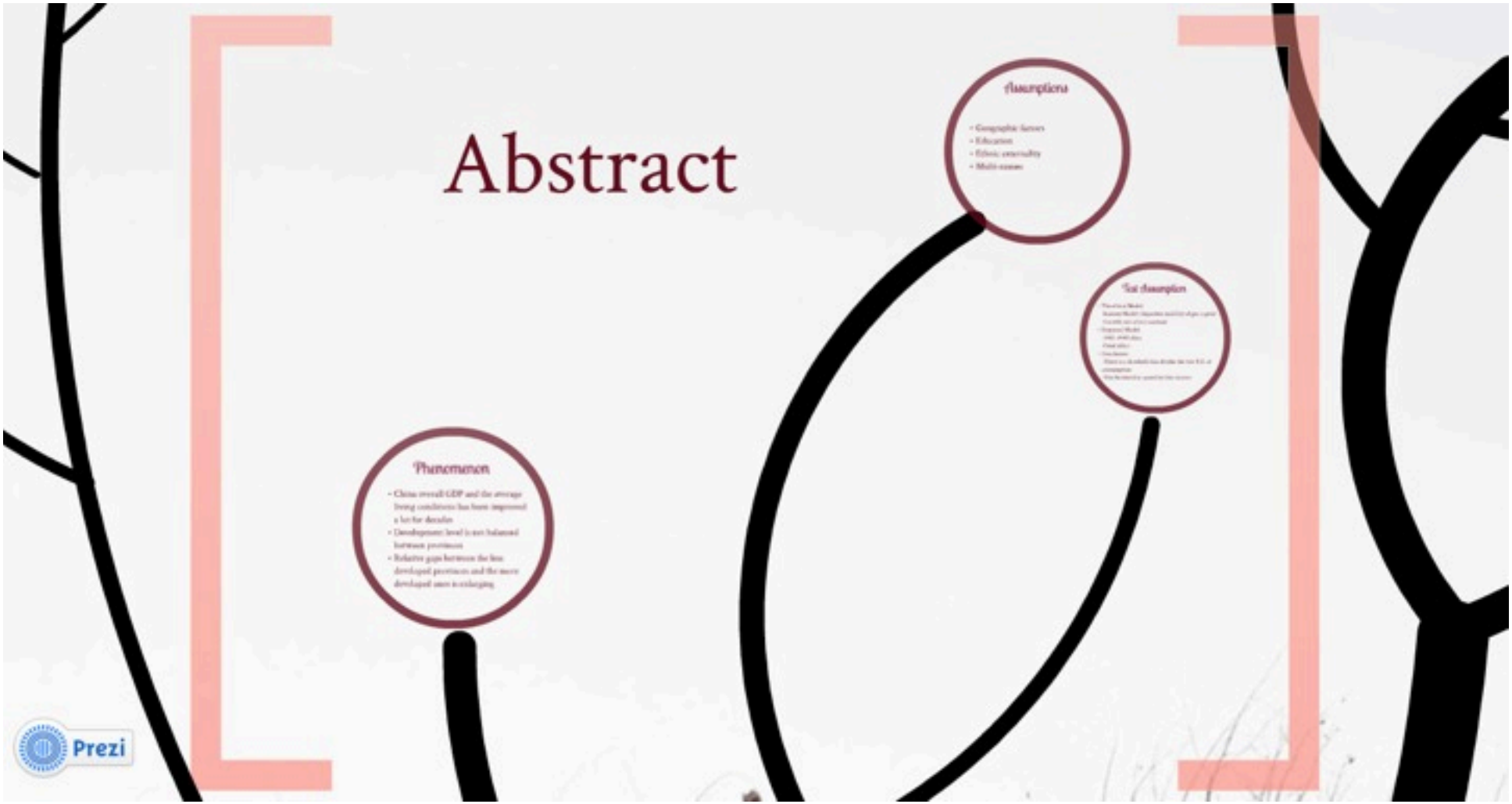
Abstract
Assumptions
Phenomenon
Prezi


Phenomenon
• China overall GDP and the average living conditions has been improved a lot for decades
• Development level is not balanced between provinces
• Relative gaps between the less developed provinces and the more developed ones is enlarging
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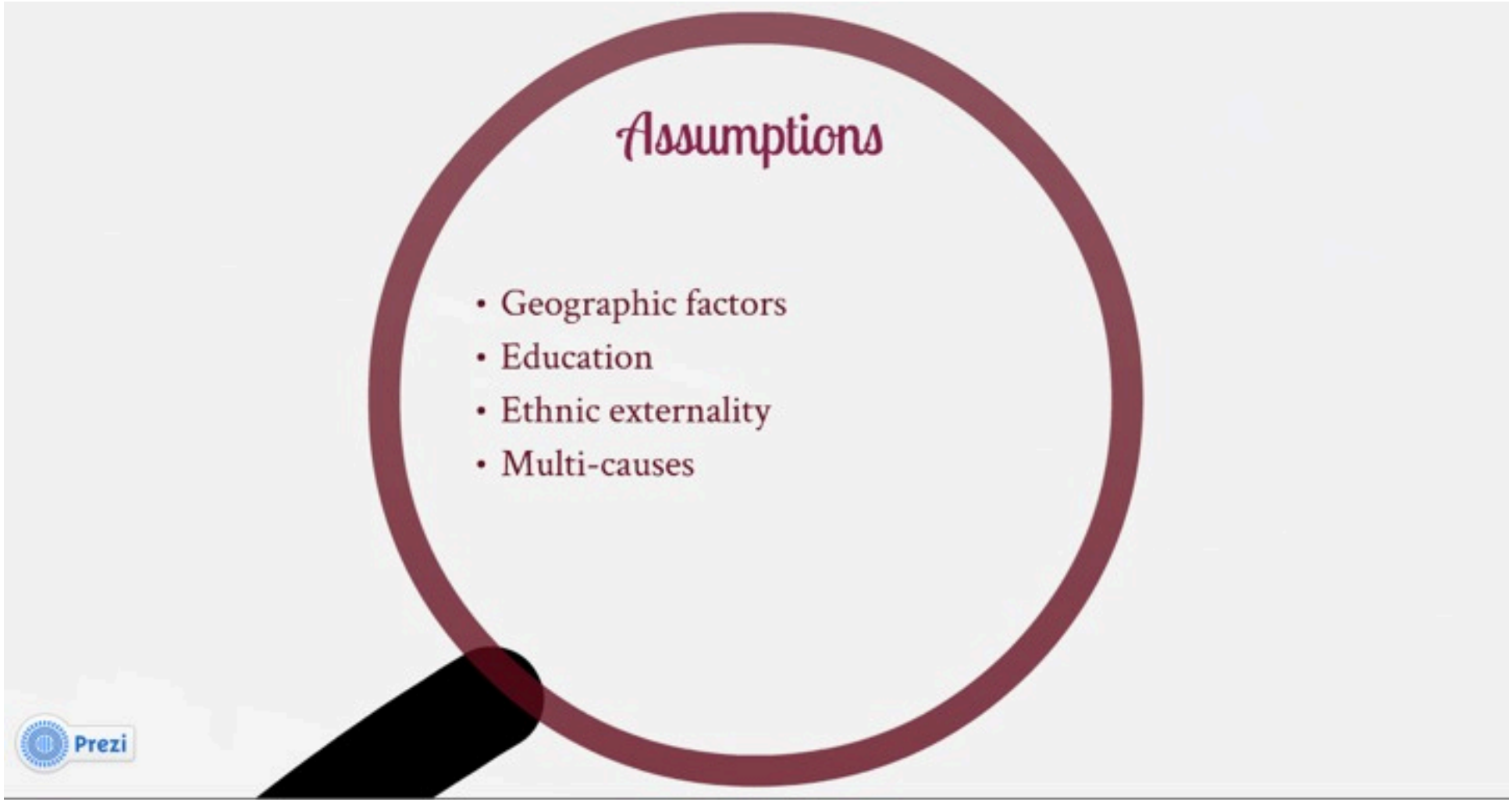
Assumptions
• Geographic factors
• Education
• Ethnic externality
• Multi-causes
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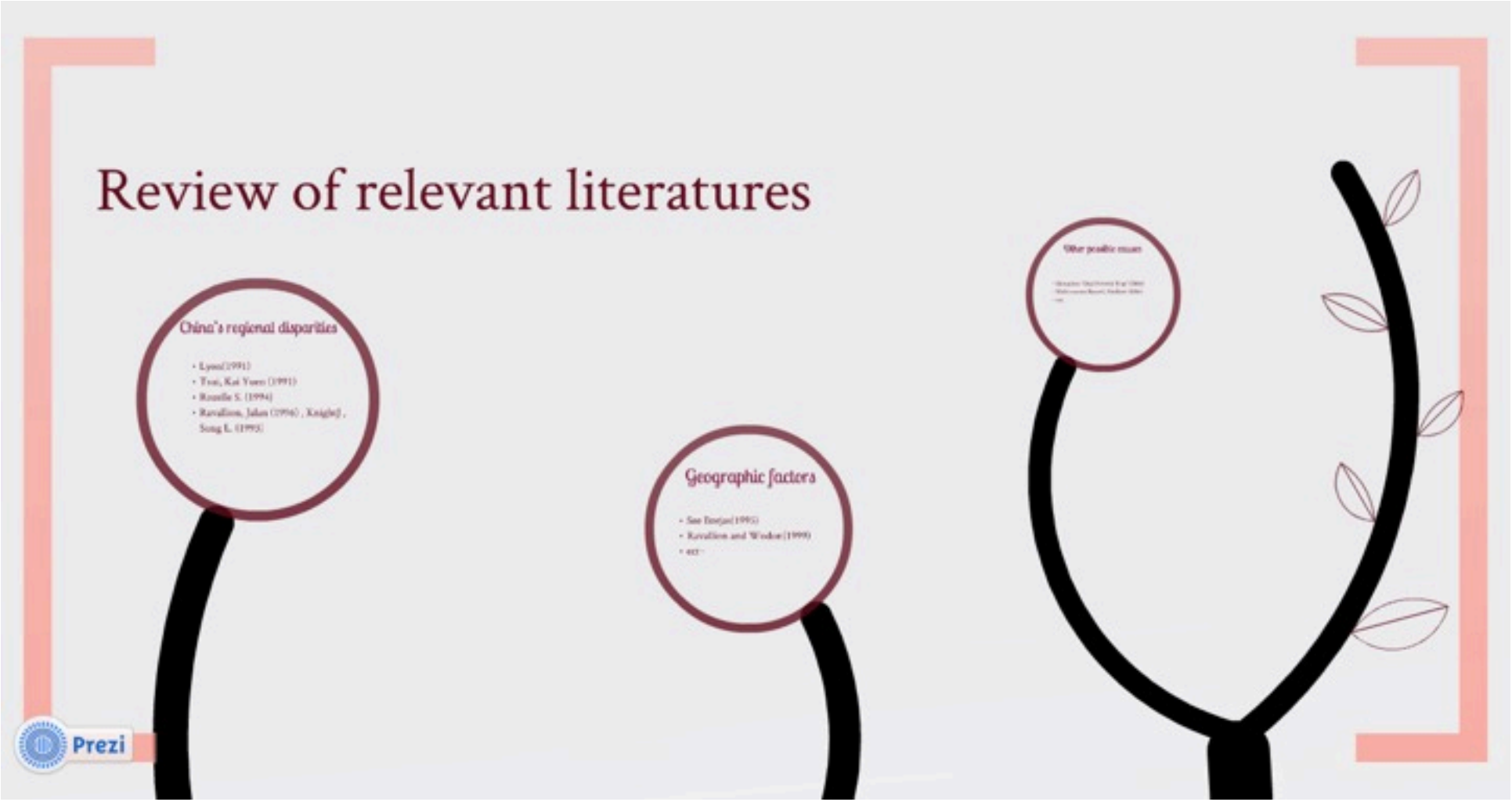
Test Assumption

- Theoritical Model:
  -Ramsey Model +Imperfect mobility of geo-captial
  -Growth rate of n is constant
- Empirical Model:
  -1985-1990's data
  -Fixed effect
- Conclusion:
  -There is a threshold that divides the two N.E. of consumption
  -The threshold is caused by Geo-factors


Review of relevant literatures
China's regional disparities
Geographic factors
Prezi


China's regional disparities
• Lyon(1991)
• Tsui, Kai Yuen (1991)
• Rozelle S. (1994)
• Ravallion, Jalan (1996) , KnightJ , Song L. (1993)
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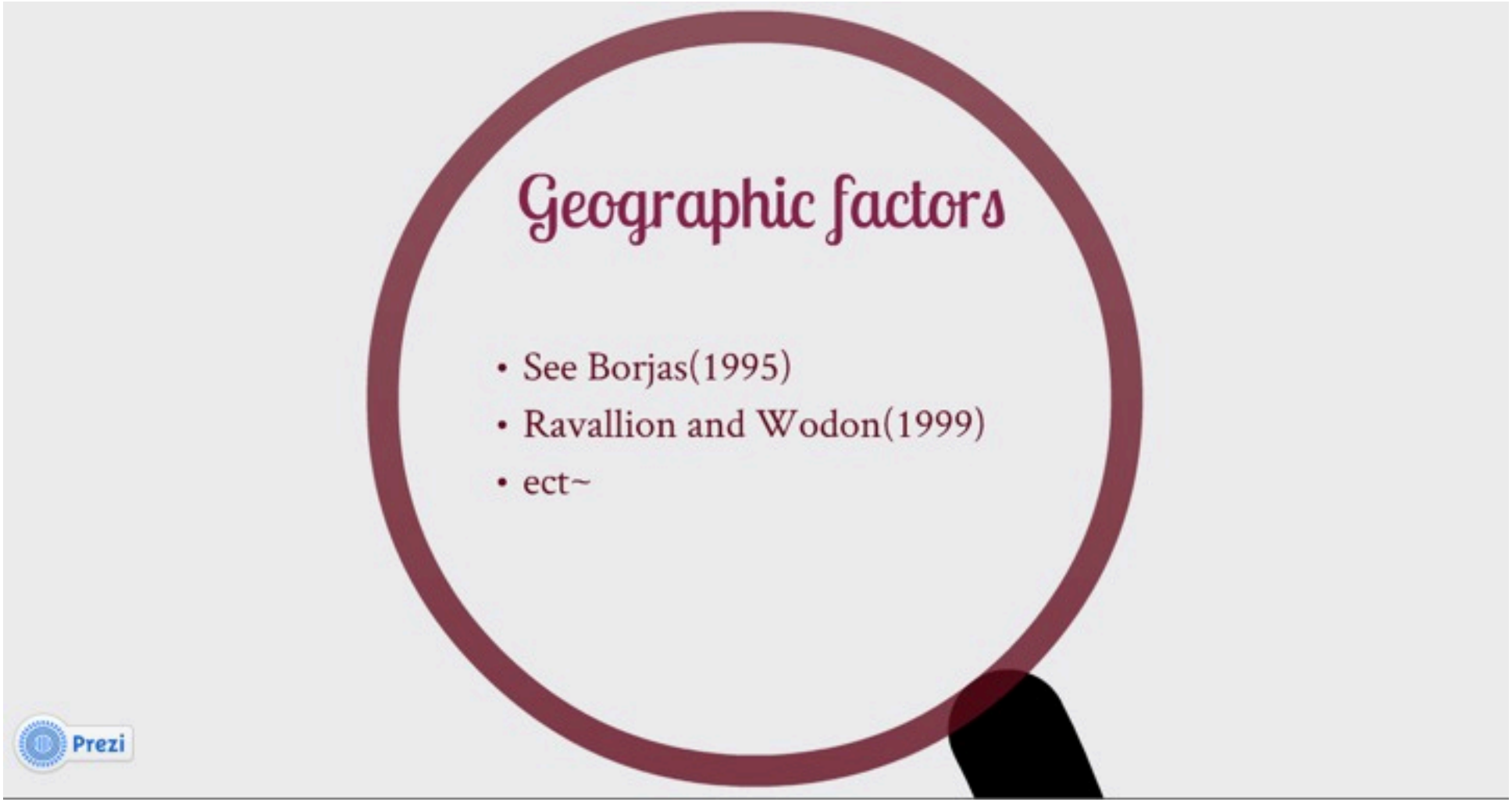
Geographic factors
• See Borjas(1995)
• Ravallion and Wodon(1999)
• ect~
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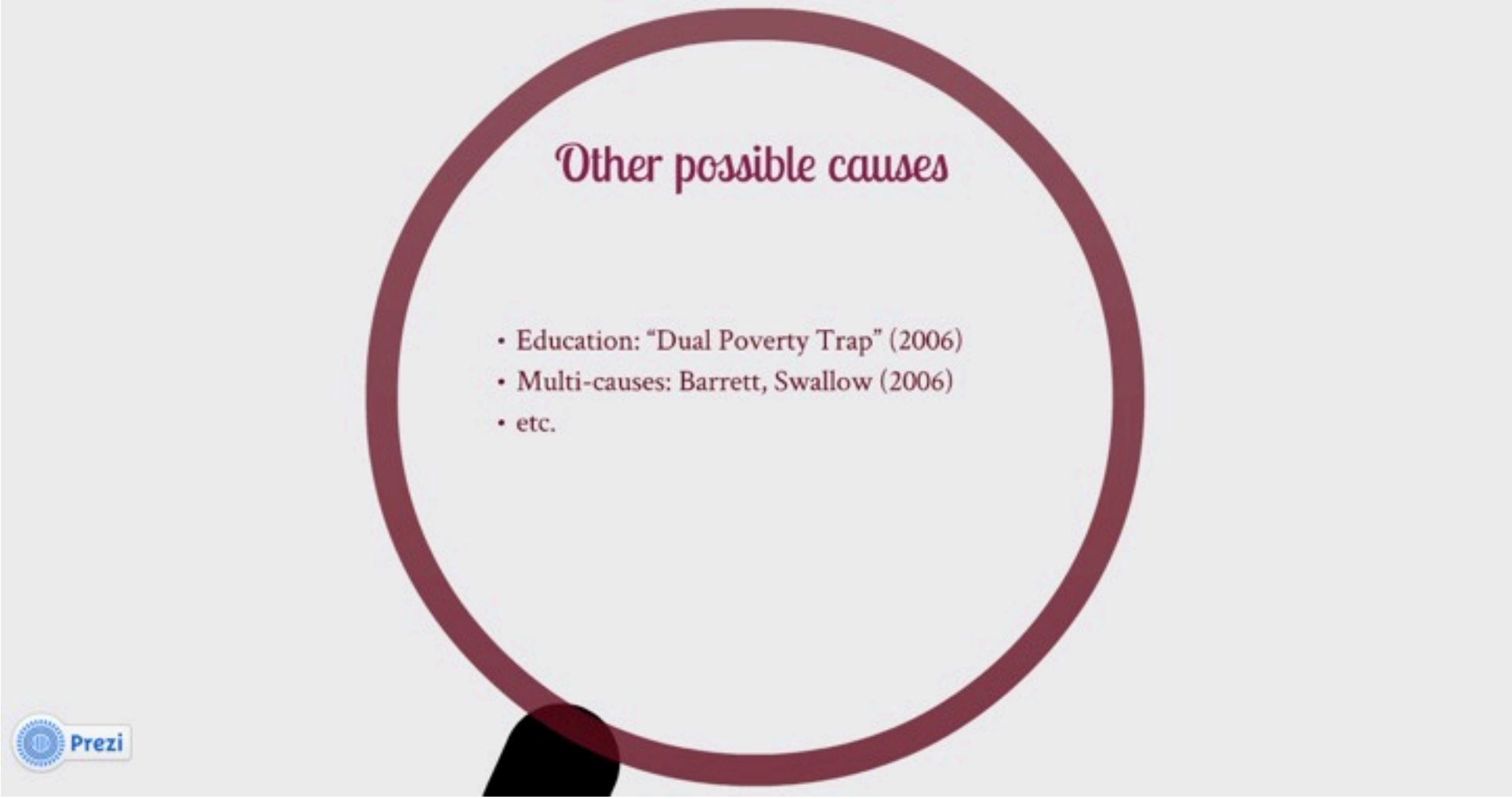
Other possible causes
• Education: "Dual Poverty Trap" (2006)
• Multi-causes: Barrett, Swallow (2006)
• etc.
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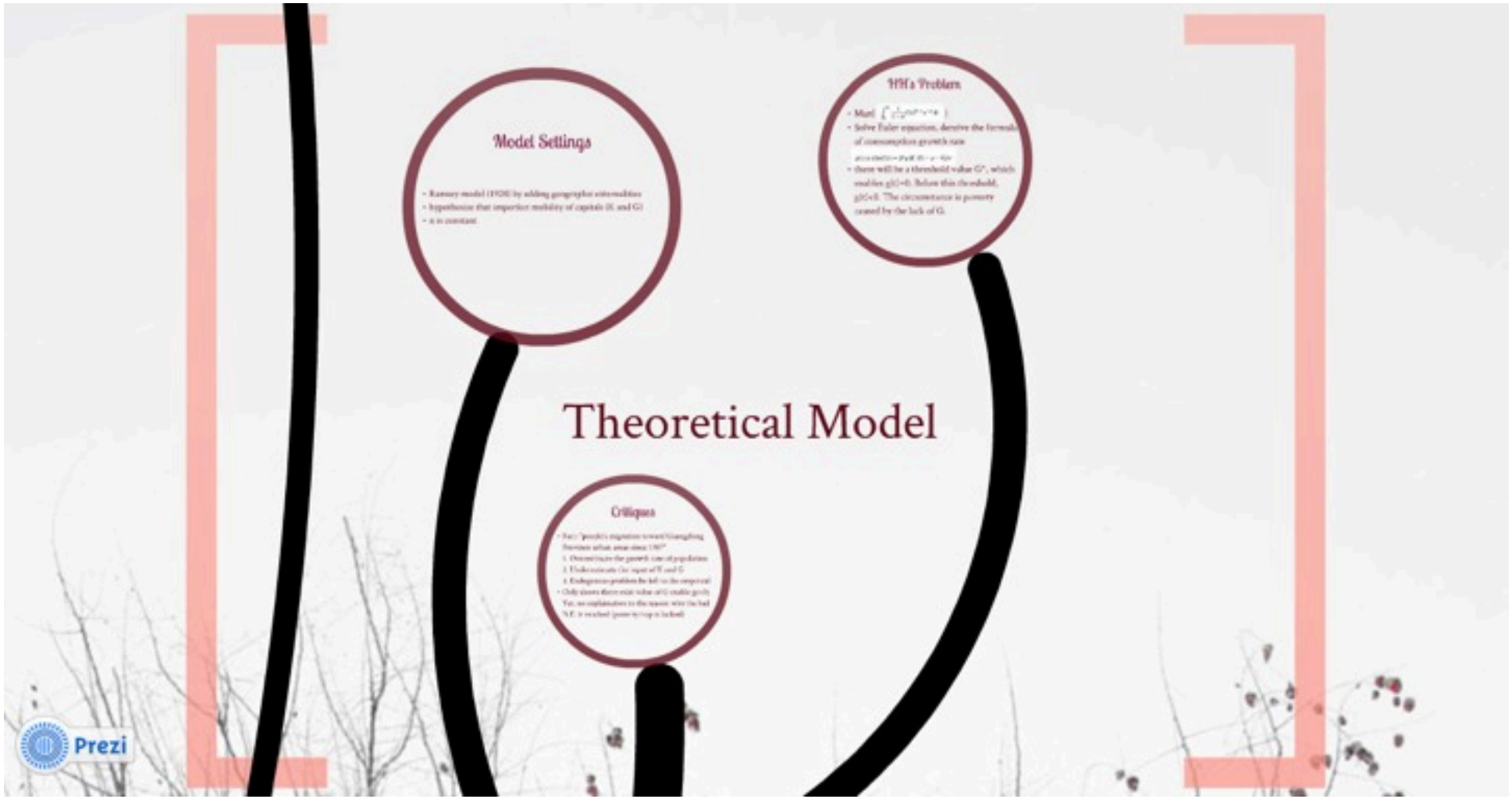
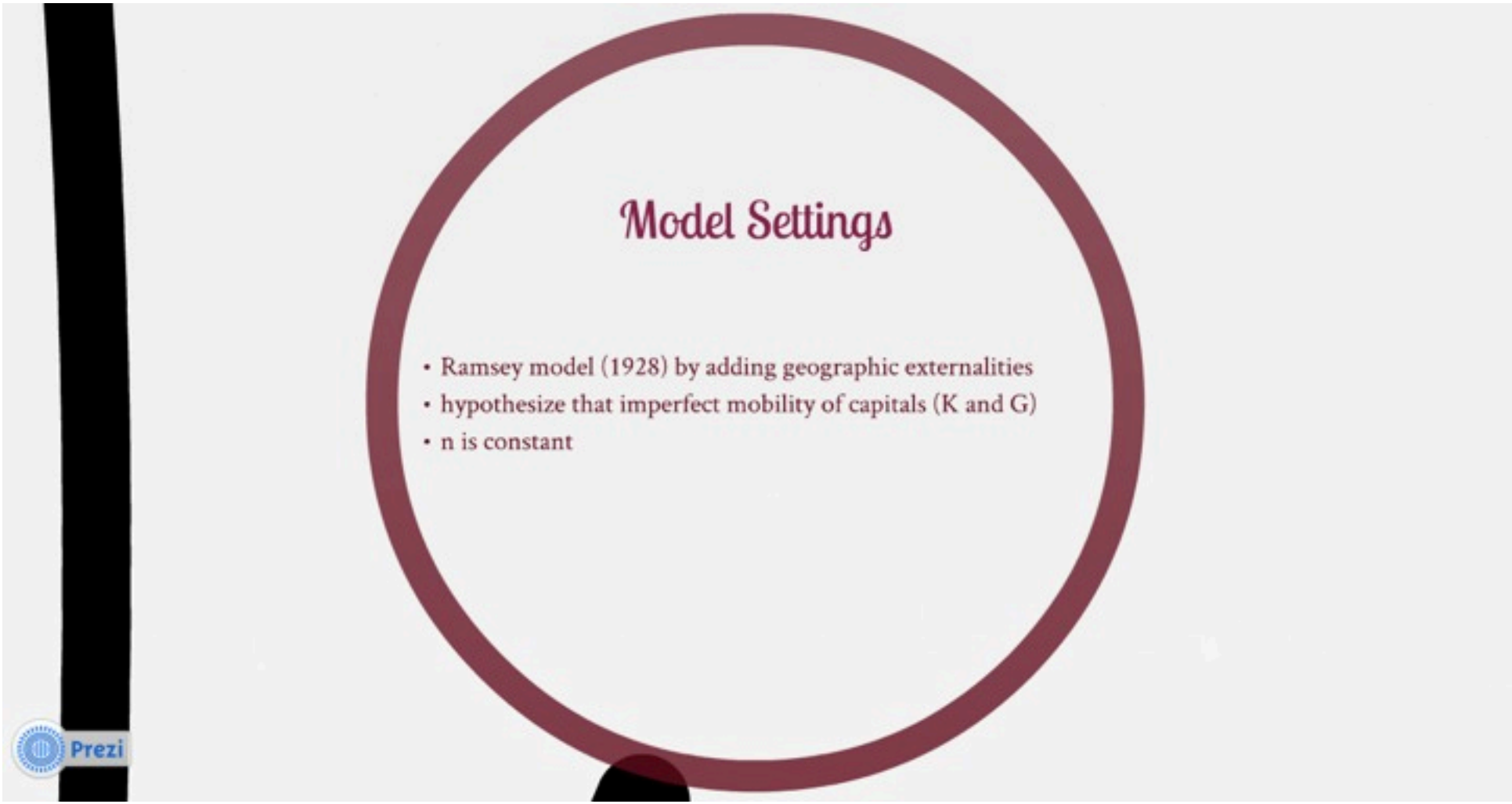

Model Settings
HH's Problem
Theoretical Model
Critiques
Prezi

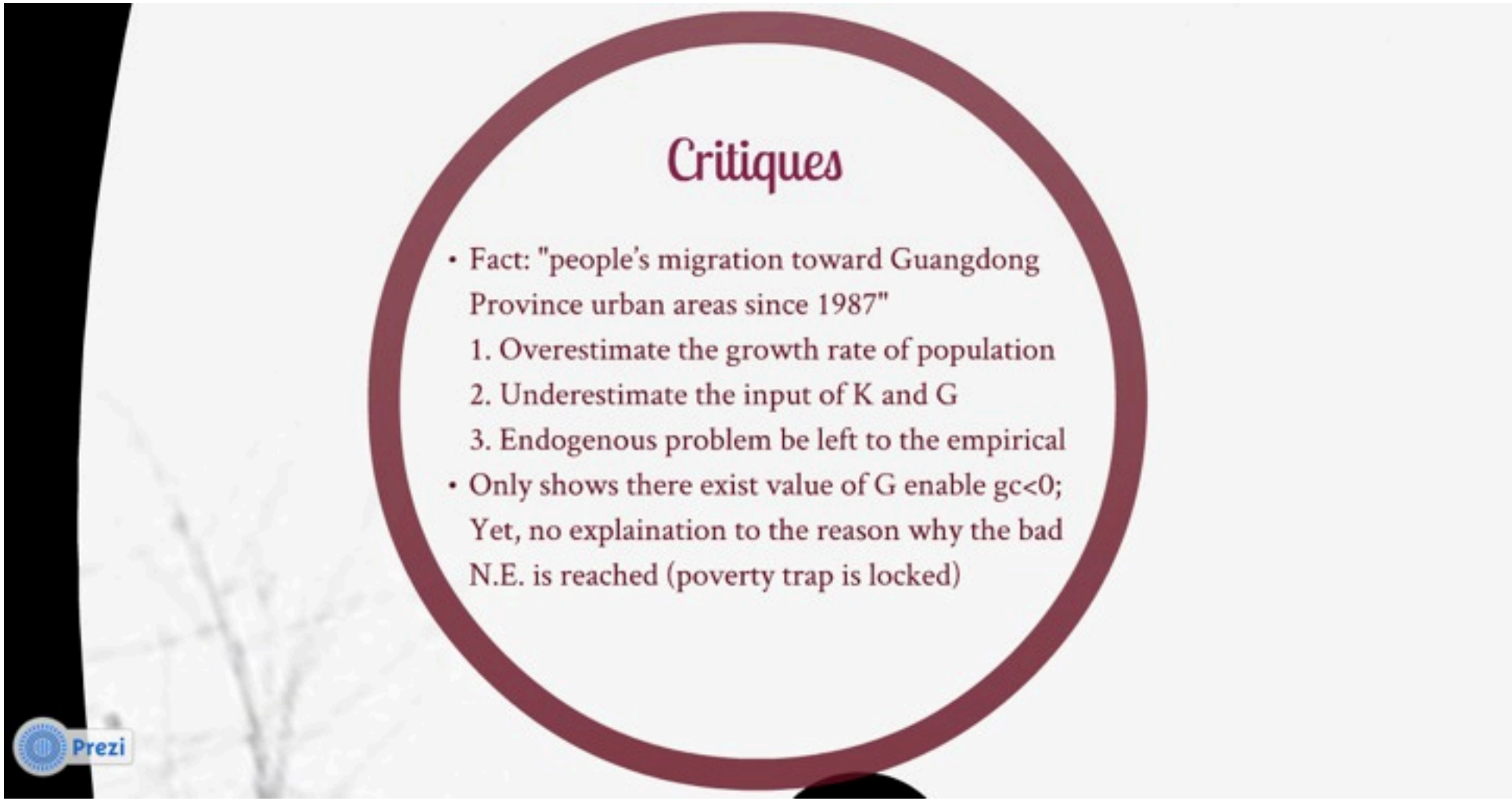

Model Settings
• Ramsey model (1928) by adding geographic externalities
• hypothesize that imperfect mobility of capitals (K and G)
• n is constant
Prezi

HH's Problem

- Max{ $\int_0^{\infty} \frac{1}{1-\sigma} C(t)^{1-\sigma} e^{-\rho t} dt$ }
- Solve Euler equation, dereive the formula of consumption growth rate

$$g(t) \equiv d \ln C(t) = [F_K(K, G) - \rho - \delta]/\sigma$$

- there will be a threshold value G*, which enables g(t)=0. Below this threshold, g(t)<0. The circumstance is poverty caused by the lack of G.


Critiques
• Fact: "people's migration toward Guangdong Province urban areas since 1987"
1. Overestimate the growth rate of population
2. Underestimate the input of K and G
3. Endogenous problem be left to the empirical
• Only shows there exist value of G enable gc<0; Yet, no explaination to the reason why the bad N.E. is reached (poverty trap is locked)
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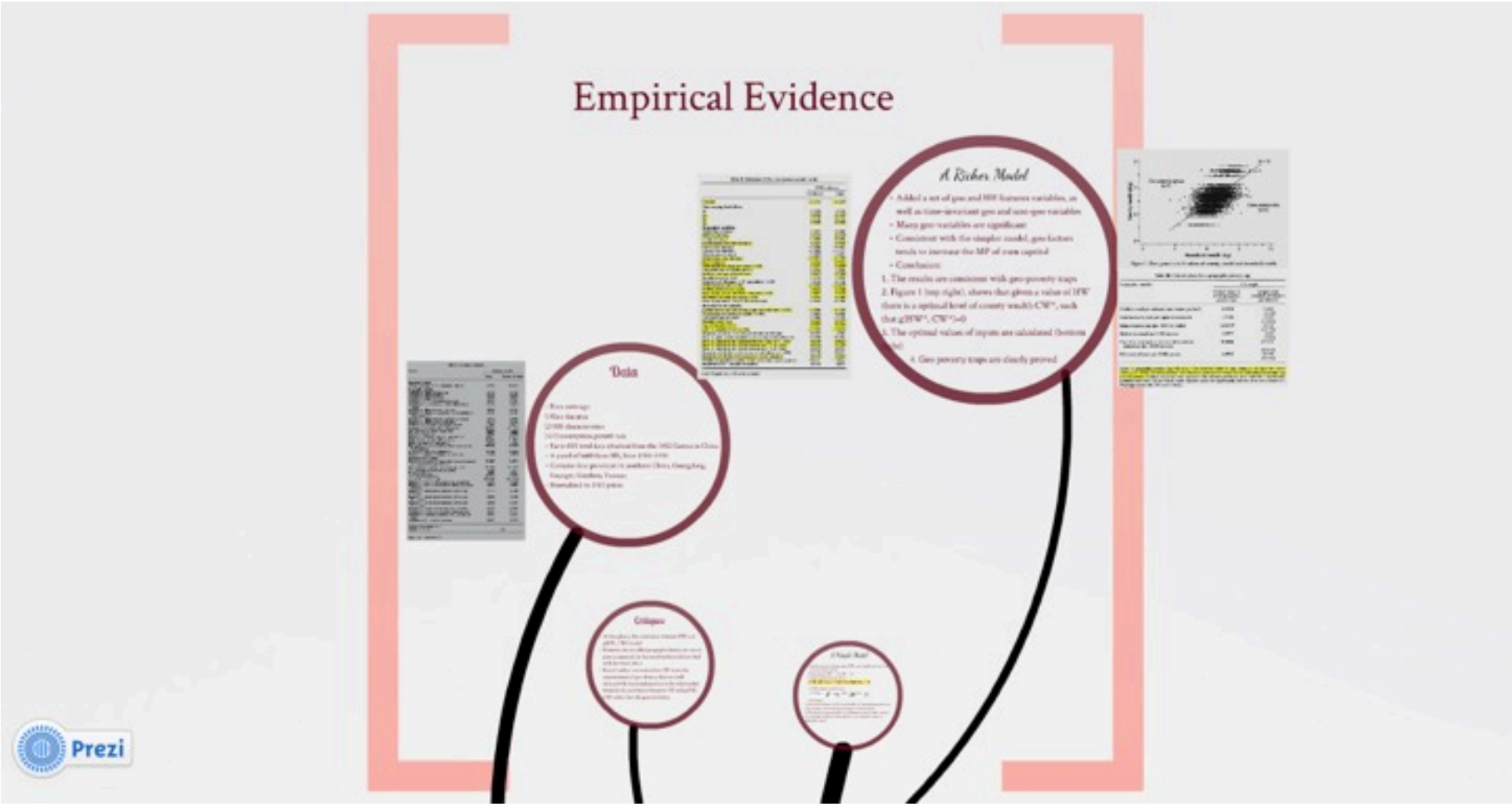

Empirical Evidence
A Richer Model
Data
Prezi

Table 1. Descriptive statistics

Variable	Summary statistics	
	Mean	Standard deviation
Dependent variable		
Average % growth rate of consumption, 1986–90	0.7004	28.5290
Geographic variables		
Proportion of sample in Guangdong	0.2586	0.4399
Proportion of sample in Guangxi	0.2442	0.4296
Proportion of sample in Yunnan	0.2029	0.4021
Proportion living in a revolutionary base area	0.0259	0.1587
Proportion of counties sharing a border with a foreign country	0.1547	0.3616
Proportion of villages located on the coast	0.0307	0.1724
Proportion of villages in which there is a concentration of ethnic minorities	0.2562	0.4365
Proportion of villages that have a mountainous terrain	0.4415	0.4966
Proportion of villages located in the plains	0.2171	0.4122
Fertilizers used per cultiv. area (tonnes per km^2)	11.8959	6.4937
Farm machinery used per capita (horsepower)	158.5453	150.2995
Cultivated area per 10 000 persons (km^2)	13.0603	3.2622
Population density (log)	8.2264	0.3786
Proportion of illiterates in the 15+ population (%)	34.8617	15.8363
Infant mortality rate (per 1000 live births)	40.4600	23.3683
Medical personnel per 10 000 persons	8.0576	5.0205
Pop. employed in commercial (non-farm) enterprises (per 10 000 persons)	117.8002	68.8162
Kilometers of roads per 10 000 persons	14.1900	10.4020
Proportion of population living in the urban areas	0.1018	0.0810
Household-level variables		
Expenditure on agricultural inputs (fertilizers and pesticides) per cultivated area (yuan per mu)	30.4597	80.5274
Fixed productive assets per capita (yuan per capita)	132.1354	217.5793
Cultivated land per capita (mu per capita)[a]	1.2294	1.1091
Household size (log)	1.6894	0.3461
Age of the household head	42.1315	11.4225
Age^2 of the household head	1905.5300	1024.7320
Proportion of adults in the household who are illiterate	0.3230	0.2898
Proportion of adults in the household with primary school education	0.3819	0.3063
Proportion of children in the household between ages 6–11 years	0.1173	0.1408
Proportion of children in the household between ages 12–14 years	0.0836	0.1066
Proportion of children in the household between ages 15–17 years	0.0698	0.1004
Proportion of children with primary school education	0.3672	0.3642
Proportion of children with secondary school education	0.0507	0.1757
Proportion of a household members working in the state sector	0.0436	0.2042
Proportion of 60+ household members	0.0637	0.1218
Number of households: 5644		
Number of counties	102	

Note: 1 mu = 0.300667 km^2.

Data

- Data coverage:

(1)Geo-features

(2) HH characteristics

(3) Consumption growth rate

- Farm-HH level data obtained from the 1982 Census in China
- A panel of 5600 farm HH, from 1985-1990
- Contains four provinces in southern China, Guangdong, Guangxi, Guizhou, Yunnan
- Normalized to 1985 prices

Prop. of children in the h'hold between
Prop. of children in the h'hold between
Proportion of children with primary scho
Proportion of children with secondary sc
Whether a household member works in t
Proportion of 60+ household members

Note: *Significant at 5% level or better.

A Simple Model

- Initial household wealth per capita(HW), mean wealth per capita in the county of residence(CW)
- Interpretation: HW——>K; CW——>G
- Long-run growth rate for HHi is:

$$g(HW_i, CW_i) \equiv (\alpha + \xi^c \ln CW_i + \xi^h \ln HW_i)/(1-\gamma)$$

- GMM estimate result is like:

$$g(HW, CW) = (\underset{(6.02)}{-0.278} - \underset{(4.52)}{0.0221} \ln HW + \underset{(7.27)}{0.0602} \ln CW)/\underset{(57.46)}{1.172}$$

- Conclusion:

1. the sign of coeffients: lnCW>0 and lnHW<0: Consumption growth rate is decreasing of own wealth; and increasing of average wealth
2. The substitution parameter (1-r) >0: Mariginal product of own captial is decreasing with respect to own capital, and increasing with respect to geographic capital

Table II. Estimates of the consumption growth model

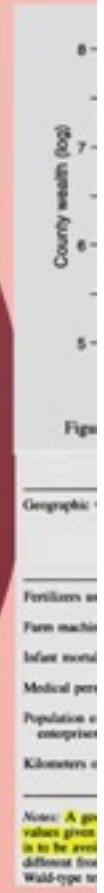
	GMM estimates	
	Coefficient	*t*-ratio
Constant	−0.2723	−3.1897*
Time-varying fixed effects		
η_{97}	0.0429	1.4876
η_{98}	0.1920	5.3425*
η_{99}	0.0126	0.4776
η_{00}	0.3690	9.0738*
Geographic variables		
Guangdong (dummy)	0.0019	0.3688
Guizhou (dummy)	0.0233	4.5430*
Yunnan (dummy)	−0.0048	−0.8196
Revolutionary base area (dummy)	0.0207	2.3962*
Border area (dummy)	−0.0030	−0.6967
Coastal area (dummy)	−0.0099	−1.1877
Minority area (dummy)	−0.0017	−1.1051
Mountainous area (dummy)	−0.0071	−2.1253*
Plains (dummy)	0.0103	2.7631*
Farm machinery usage per capita (×100)	0.0427	3.6099*
Cultivated area per 10000 persons	0.0010	1.2066
Fertilizer used per cultivated area	0.0017	3.7528*
Population density (log)	0.0142	1.5695
Proportion of illiterates in 15+ population (×100)	0.0135	0.7832
Infant mortality rate (×100)	−0.0244	−2.0525*
Medical personnel per capita	0.0010	3.5746*
Prop. of pop. empl. non-farm commerce (×100)	0.0072	2.3572*
Kilometers of roads per capita (×100)	0.0745	4.4783*
Prop. of population living in the urban areas	−0.0163	−0.7558
Household-level variables		
Expenditure on agricultural inputs per cultivated area (×100)	−0.0866	−4.7305*
Fixed productive assets per capita (×1000)	0.0037	0.2958
Cultivated land per capita	−0.0090	−1.5899
Household size (log)	0.0447	6.9717*
Age of household head	0.0023	2.8483*
Age^2 of household head (×100)	−0.0026	−2.9626*
Proportion of adults in the household who are illiterate	0.0087	1.4718
Prop. of adults in the household with primary school education	−0.0028	−0.5816
Prop. of children in the household between ages 6–11 years	0.0359	3.9065*
Prop. of children in the h'hold between ages 12–14 years	0.0434	3.3199*
Prop. of children in the h'hold between ages 15–17 years	0.0075	0.6983
Proportion of children with primary school education (×100)	−0.3790	−0.9674
Proportion of children with secondary school education	0.0193	2.3486*
Whether a household member works in the state sector (dummy)	−0.0101	−1.3062
Proportion of 60+ household members	0.0199	1.6839

Note: *Significant at 5% level or better.

A Richer Model

- Added a set of geo and HH features variables, as well as time-invariant geo and non-geo variables
- Many geo-variables are significant
- Consistent with the simpler model, geo factors tends to increase the MP of own captital
- Conclusion:

1. The results are consistent with geo-poverty traps
2. Figure 1 (top right), shows that given a value of HW there is a optimal level of county wealth CW*, such that g(HW*, CW*)=0
3. The optimal values of inputs are calculated (bottom right)
4. Geo poverty traps are clearly proved



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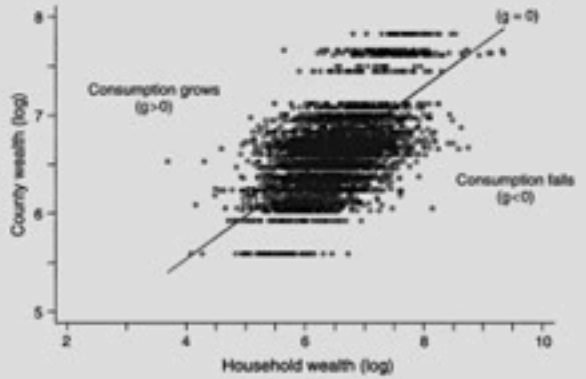
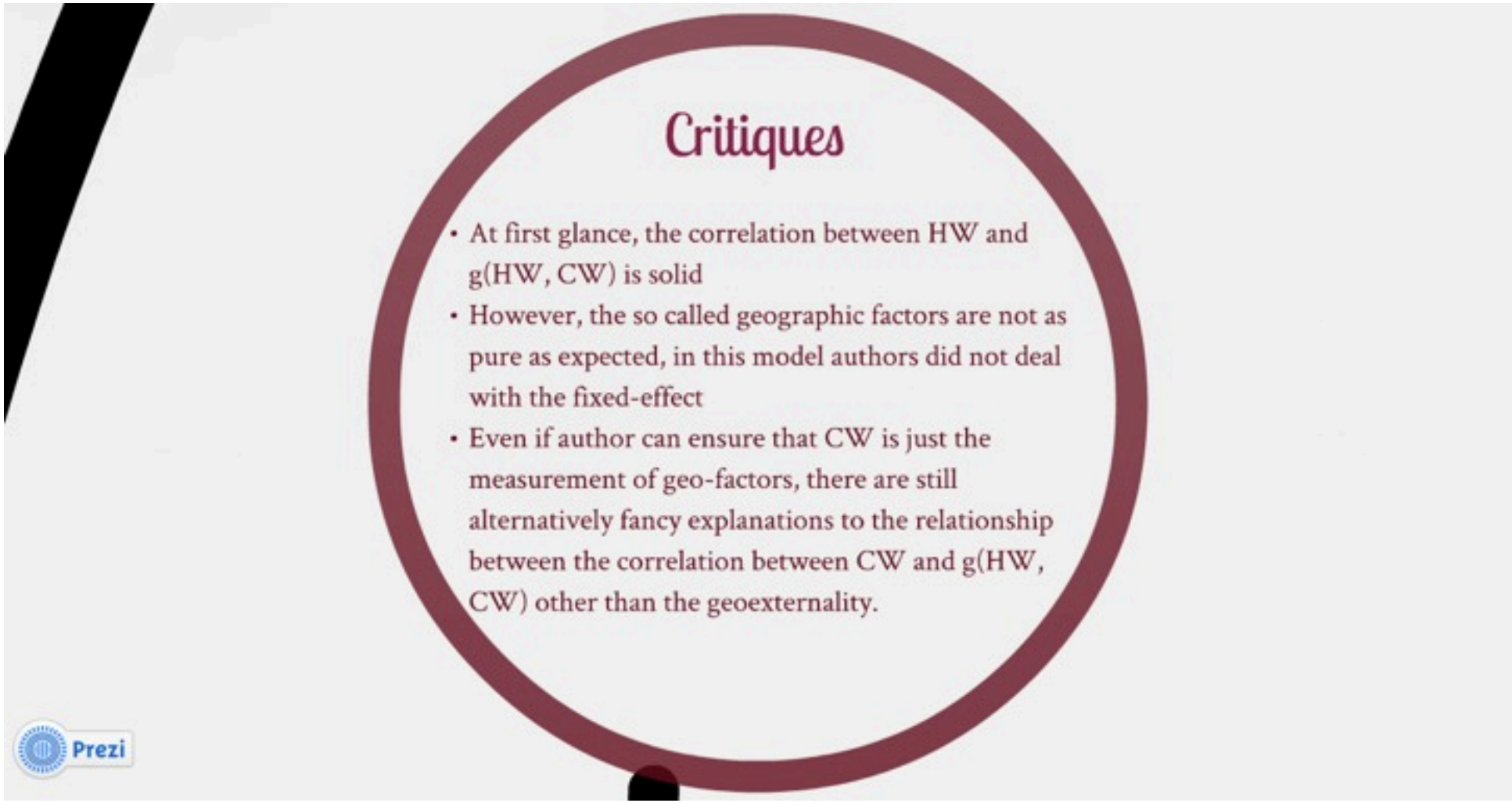


Figure 1. Zero growth combinations of country wealth and household wealth

Table III. Critical values for a geographic poverty trap

Geographic variables	Full sample	
	Critical values to avoid geographic poverty traps	Sample mean (standard deviation in parentheses)
Fertilizers used per cultivated area (tonnes per km^2)	8.5233	11.896 (6.494)
Farm machinery used per capita (horsepower)	2.5209	15.855 (11.811)
Infant mortality rate (per 1000 live births)	63.9573*	40.460 (23.370)
Medical personnel per 10000 persons	2.7977	8.056 (5.020)
Population employed in commercial (non-farm) enterprises (per 10000 persons)	38.1804	117.810 (68.816)
Kilometers of roads per 10000 persons	6.4942	14.190 (10.402)

Notes: A geographic poverty trap will exist if the observed value for any county is less than the critical values given above; for those marked * the observed value cannot exceed the critical value if a poverty trap is to be avoided. Critical values are only reported if the relevant coefficient from Table II is significantly different from zero. All the critical values reported above are significantly different from zero (based on a Wald-type test) at the 5% level or better.


Critiques
• At first glance, the correlation between HW and g(HW, CW) is solid
• However, the so called geographic factors are not as pure as expected, in this model authors did not deal with the fixed-effect
• Even if author can ensure that CW is just the measurement of geo-factors, there are still alternatively fancy explanations to the relationship between the correlation between CW and g(HW, CW) other than the geoexternality.
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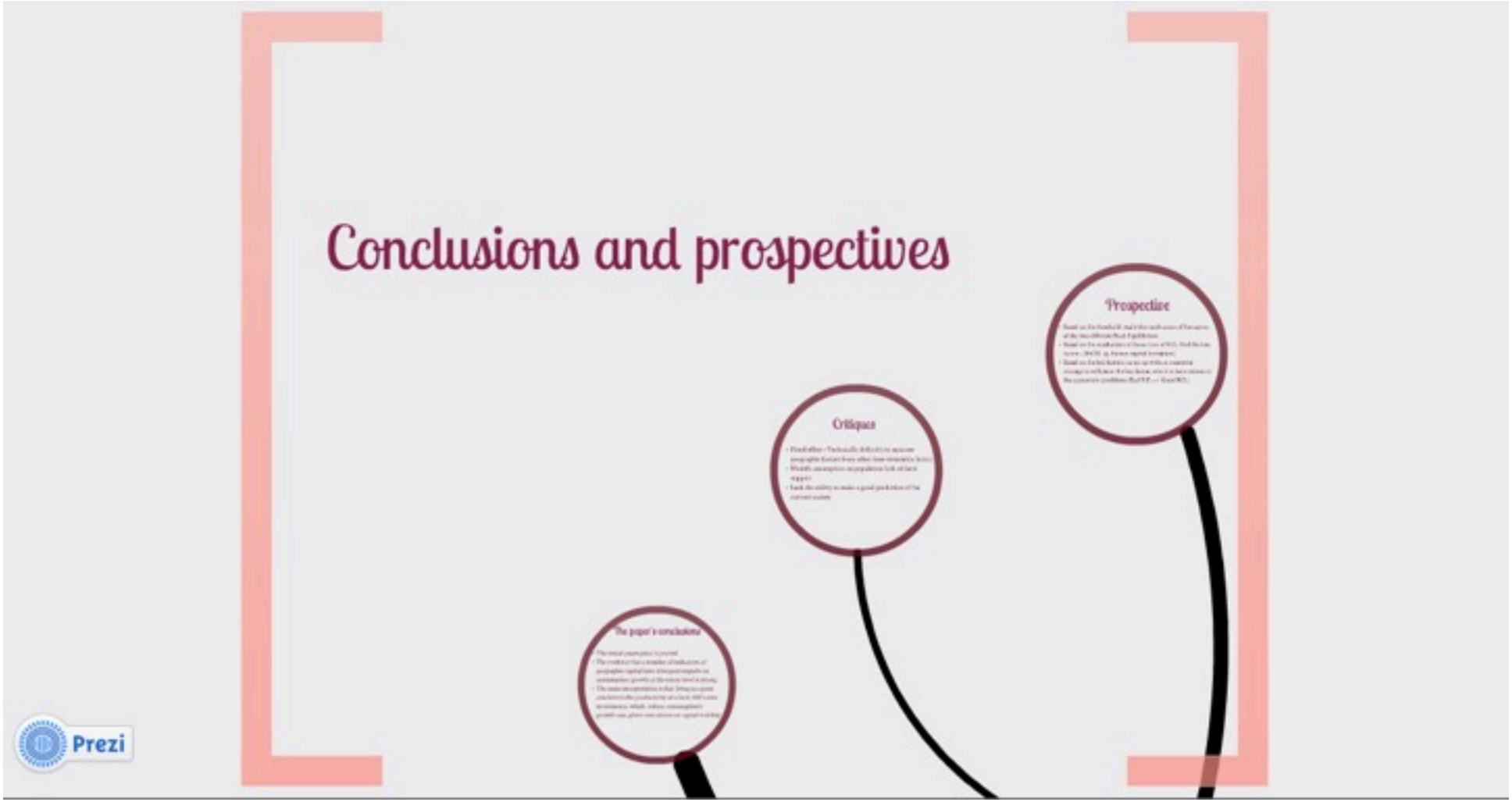
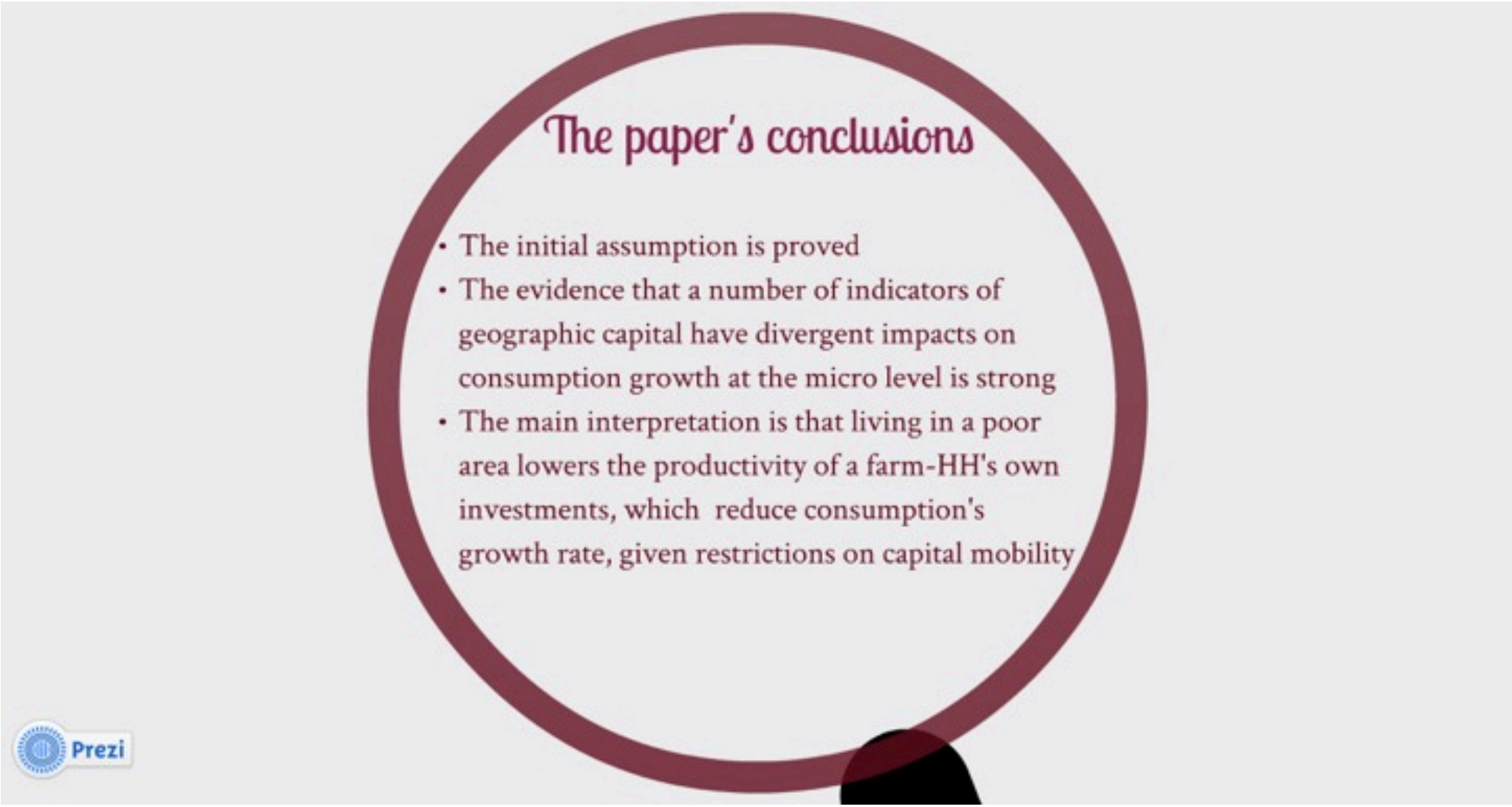

Conclusions and prospectives
Prospective
Critiques
The paper's conclusions
Prezi


The paper's conclusions
• The initial assumption is proved
• The evidence that a number of indicators of geographic capital have divergent impacts on consumption growth at the micro level is strong
• The main interpretation is that living in a poor area lowers the productivity of a farm-HH's own investments, which reduce consumption's growth rate, given restrictions on capital mobility
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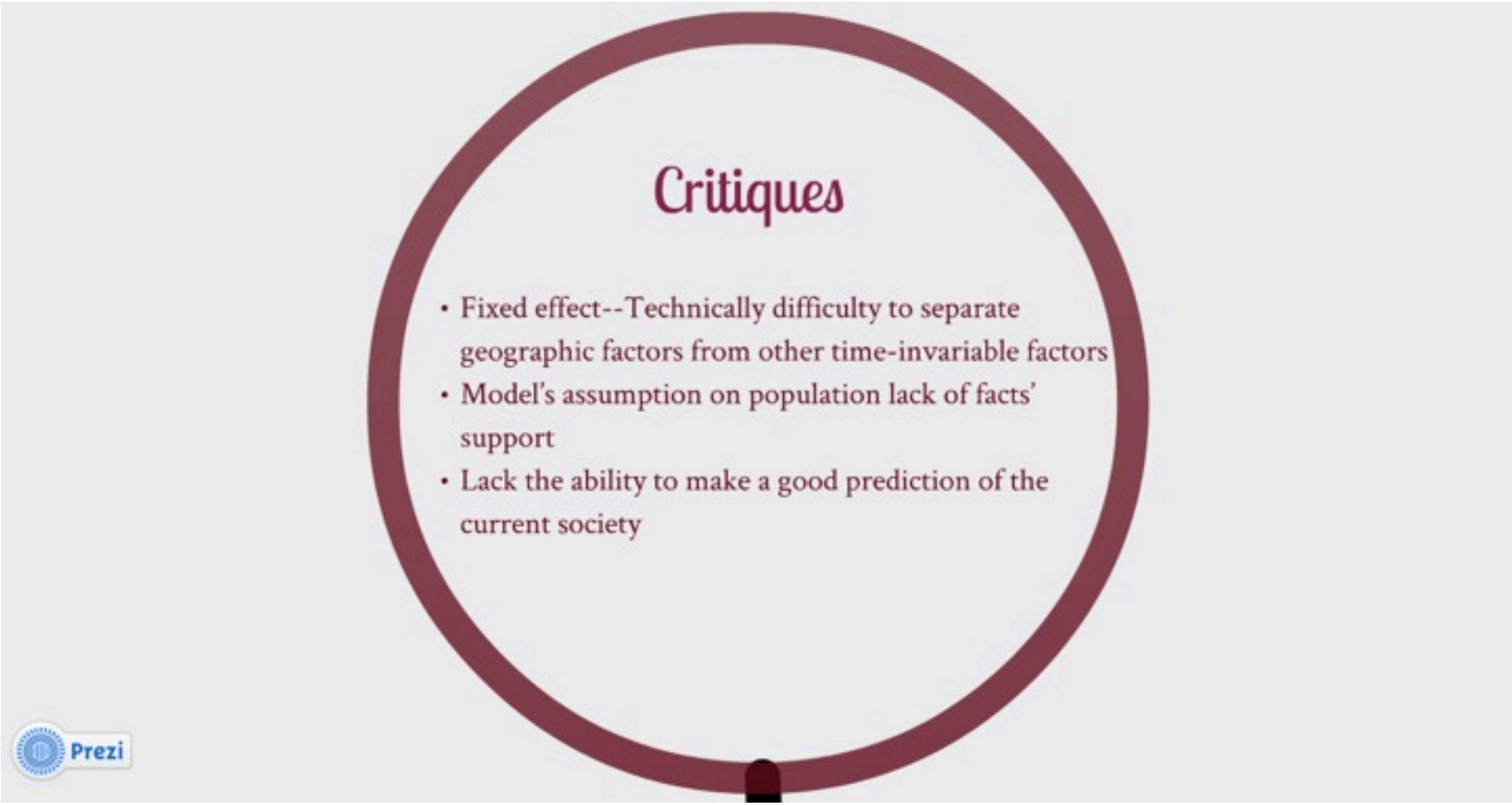
Critiques
• Fixed effect--Technically difficulty to separate geographic factors from other time-invariable factors
• Model's assumption on population lack of facts' support
• Lack the ability to make a good prediction of the current society
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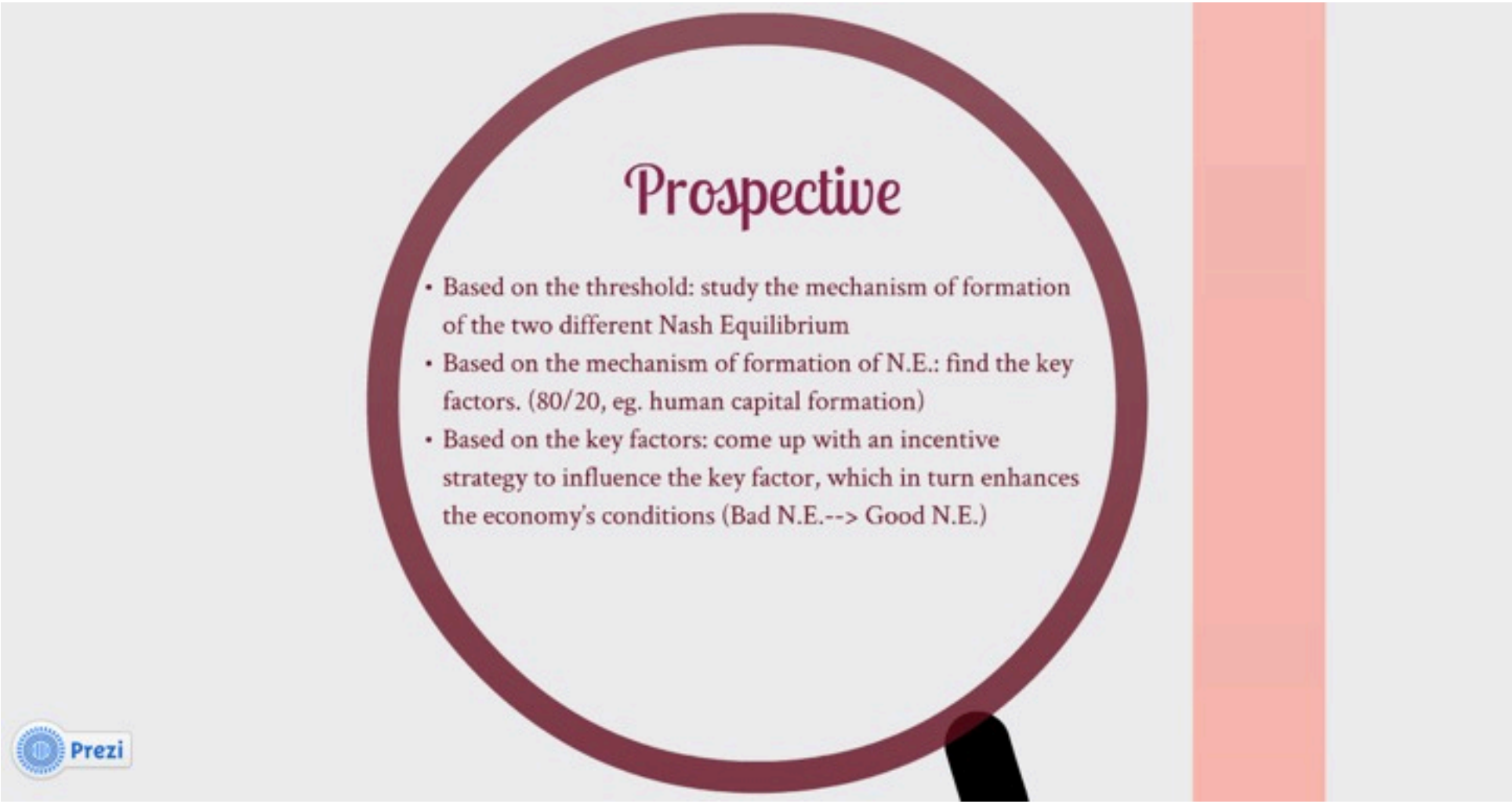
Prospective
• Based on the threshold: study the mechanism of formation of the two different Nash Equilibrium
• Based on the mechanism of formation of N.E.: find the key factors. (80/20, eg. human capital formation)
• Based on the key factors: come up with an incentive strategy to influence the key factor, which in turn enhances the economy's conditions (Bad N.E.--> Good N.E.)
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