Violent crime built up and its relationship with Human migration in Minas Gerais State – Brazil in the late 1990s

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Abstract:

Presently, violent crime is one of the most debated themes in Brazil. Its incidence has reached alarming rates, depleting the quality of life of urban centers, and promoting gigantic economic losses. Despite its ubiquity, the specific causes of urban crime are still uncertain. Social science has presented numerous hypotheses and theories on violent crime; among them is the notion that crime is associated with in-migration. According to this hypothesis, intense in-migration atomizes social structures, weakening social cohesion at destination, besides promoting a series of cultural clashes between in-migrant and native groups. This study explores the interrelation between violent crime and intra and inter state migration rates among the *municípios* of Minas Gerais State in the late 1990s, from a geographical perspective. The results reveal specific spatial distributions for all types of crime under scrutiny, and a positive relationship between in-migration rates and robbery and armed robbery, but no relationships with homicide and rape.

Key words: urban crime, geography of violence, human migration, Minas Gerais

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1. Introduction

The recent built up in crime rates in Brazil has had a series of negative impacts not only upon its direct victims, but also on the entire social and economic organizations. Public security consumes huge portions of federal, state and municipal funds, drawing resources from key areas such as health, education and infrastructure. Due to alarming crime figures, Brazil receives international visitors at rates far below its potential. The same goes to foreign investments in industry, services and finance sectors, which are diverted to safer destinations (Kahn and Barbosa, 2000).

But soaring crime rates have also promoted tremendous non-material losses, as urban life-styles have changed for the worst. Houses have progressively been turned into fortresses, the population of large cities increasingly fear public places and private security guards outnumber policemen (Dellasoppa et al, 1999; Lima, 2000).

When contrasted with other Brazilian States, Minas Gerais appears to have a comfortable condition, as it holds the 23rd highest[2] homicide rate[3] (Table 1). However, Minas Gerais is no exception to the national crime built up trend, as it displays one of the largest homicide growth rates between 1991 and 2000 (Table 2), demanding immediate attention.

Table 1
Homicide Rates Among Brazilian States: 2000

States	Rank	Rate/100.000
Pernambuco	1	52.3
Rio de Janeiro	2	50.9
Espírito Santo	3	46.7
São Paulo	4	42.2
Mato Grosso	5	39.8
Roraima	6	39.5
Distrito Federal	7	37.5
Rondônia	8	34.9
Amapá	9	32.5
Mato Grosso do Sul	10	31.0
Minas Gerais	**23**	**11.0**

Table 2
Homicide Rates Percent Growth Among Brazilian States: 1991-2000

States	Rank	% growth
Bahia	1	247.7
Amapá	2	198.1
Mato Grosso	3	121.3
Piauí	4	105.3
Ceará	5	99.3
Tocantins	6	90.3
Mato Grosso do Sul	7	64.3
Minas Gerais	**8**	**62.7**
Roraima	9	62.0
São Paulo	10	61.3

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[2] The Brazilian Federation is comprised of 26 States and one Federal District.
[3] Given the variety of registration and classification methodologies deployed by the various Brazilian States, inter-state crime rates comparisons may be misleading. However, the unmistakable nature of homicides makes such risks minimal, allowing spatial contrasts.

Despite the growing importance of urban crime, its specific causes and correlated factors are uncertain and at times contradictory, as they operate at different levels of aggregation, varying from the individual to entire social systems (Dellasoppa et al, 1999). Among the plethora of theoretical proposals on urban crime, one in particular draws our attention: the one that links socially excluded individuals (poor, unemployed and immigrant groups) to criminality (Rodrigues, 2002). Its main argument is highly persuasive. Massive rural-to-urban population movements concentrate masses of poor, uneducated and unemployed individuals in peripheral areas of Brazilian metropolises, in social disarray (Paixão, 1983). As these individuals are exposed to new values and behaviors, material aspirations grow. This explosive combination, would favor the built up in crime rates. But to what degree does this supposition is corroborated by the reality of Minas Gerais State?

This study investigates this relationship, exploring the association between in-migrant and crime rates from a spatial perspective, based on 2000 census and police data for the 853 *municípios* of Minas Gerais. This approach deviates the focus of analysis away from the criminals, emphasizing the criminal events themselves, seeking to exploit the context in which urban crime takes place.

2. Determinants of urban crime

Lima (2000) organizes the various theoretical proposals on the determinants of urban crime in five major categories. The first associates certain types of violent crime, especially homicides, to personality disturbs; while the second group focuses on crimes committed in self-defense. A subculture of violence would be the reason portrayed by a third group, which believes that homicides and physical aggressions are not understood as signs of irrational behavior. On the contrary, they are thought to be rational acts, expected in the social milieu in which victims and aggressors are inserted. Similarly, the fourth explanatory group evocates certain social relations, in which victims and aggressors are "playing with their lives" seeking to wage forces.

The fifth and broadest approach associates urban crime with the material frustrations and aggressions related to social exclusion and poverty, furnishing the working hypothesis of the present work. Among the theorists of this group is Kahn (1999), who attributes the growing urban crime to a series of socioeconomic factors, such as unemployment rates, underemployment, rapid urbanization, low wages, social gap between the rich and the poor, educational levels, age composition, and population growth rates.

In an empirical study, Kahn (1998) explores the relationship between homicide rates and the development levels of a group of countries. The author demonstrates that once this relationship is graphed, it displays a bell-shape distribution, with the poorest and richest countries exhibiting the lowest levels of crime, while the intermediary countries – developing countries – are the ones with the highest crime rates on Earth. According to the author, an explosive combination of modernization and fast urbanization, together with high levels of social discrepancies, exacerbated consumption levels, and political freedom, among others, would be key determinants of crime in developing countries.

Beato (1998) reveals that many researches conducted in the United States confirm the existence of a close relation, although not causal, between urban crime and socioeconomic conditions. According to the author, areas marked by huge socioeconomic discrepancies tend to display higher levels of urban crime.
In a different study, Beato and Reis (1999) discuss the paradox between the growth of crime rates and the improvement of social indexes in Minas Gerais, Brazil. According to the authors, despite the improving socio-economic indicators (longevity, infant mortality, average schooling years, percentage of households with access to tap water) and the increasing stability of public institutions, crime rates are growing at a fast rate. However, not all types of crime respond positively to these advances. Instead, property offences (various types of robbery and armed robbery) are the ones correlated to statistical measures of wealth and development. The logic is simple: wealthier contexts

display a combination of factors which favor the incidence of property-related crimes, such as richness, larger amounts of material targets, weaker mechanisms of social vigilance and control and a larger number of potential motivated offenders. On the other hand, Beato and Reis (1999) reveal that personal offences (homicide, rape, i.e.) are negatively related to the statistical indicators of prosperity and development.

At the intra-urban level, Kahn (2000) explores the relationship between socioeconomic level and homicide rates in the various suburbs of São Paulo city. The study reveals a strong spatial correlation. The peripheral areas of the city, marked by high levels of poverty, and low human development tend to display the highest homicide rates. According to the author, this seems to be a common feature of Brazilian cities marked by social inequality, where poor and rich are segregated. This study also indicates, via linear regression models, that the "socioeconomic level" variable explains alone nothing less than 45% of the spatial variation of homicide rates, demonstrating, incontestably, their association.

The geographer Felix (2002) advances the debate on the determinants of urban crime by adopting an eminently spatial approach to the problem. Felix (2002) develops a typology of crime in space, in which personal offences (homicide, rape, i.e.) are generally associated with the least favorable parts of cities, while property offences abound in wealthier areas. Felix (2002) offers some explanations for the different spatial manifestation of urban crime.

Firstly, the absence of social control (formal or informal), inherent to large urban centers, favors criminality. The thefts occurring in dark, deserted, and depressed urban areas illustrate this relationship. Felix (2002) suggests that the structural density of certain urban centers has given life an anonymous character, dilapidating informal social control mechanisms. At the same token, the high levels of human density present in urban centers may also promote a higher cognizance of social inequalities, which, consequently, may incite criminal behavior as a means to equate material aspirations to the actual possibilities of consumption among the urban poor. Moreover, population density facilitates the diffusion of information on legitimate and illegitimate means of acquiring material goods, facilitating criminal practice.

Based on a longitudinal analysis of crime levels in Marília, São Paulo State, Felix (1996) reveals a clear relationship between age of suburbs and crime. The author claims the presence of a temporal selectivity factor mediating this relationship. As time progresses, suburb dwellers become more involved and aware with community problems, developing a clear sense of territoriality, which in turn augments formal and informal social control means. Consequently, as social interaction and involvement increases, disturbances such as urban crime diminish, exacerbating the sense of security (Felix, 2003).

Also based on the reality of Marília city, Teixeira (2003) studies the relationship between quality of life and urban crime. By making use of quality of life indicators, such as access to sewage and tap water, and income levels, the author finds that they are positively related to property offences. On the other hand, Teixeira (2003) found a negative relationship between social indicators and personal offences (homicide, rape, i.e.).

Curiously, based on the reality of Belo-Horizonte city – Minas Gerais State, Diniz et. al (2003) found similar results. Personal offences (homicide, rape, i.e.) were positively correlated with the Social Vulnerability Index (SVI)[4], across the 81 intra-urban planning units. On the other hand, property offences were negatively related to the SVI.

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[4] The SVI is composed of eleven socioeconomic indicators, georeferenced at the planning unit level (PU). The SVI seeks to estimate social vulnerability levels of local populations, by using population and household measures to measure the level of access that local populations have to certain key services. The computation of SVI yielded a hierarchical classification of all 81 PU's of Belo Horizonte city, demonstrating the more and less vulnerable populations (Diniz et al 2003).

Paixão (1983) presents an intriguing model that explains the relationship between urban crime and social exclusion, in which he emphasizes the role of in-migration. According to the proposal, migratory movements congregate isolated masses, lacking social control in the periphery of urban centers in Brazil, under conditions of extreme poverty and social disarray. As these populations come across with different behaviors and values, they start reviewing their own traditional habits, as their material aspirations increase. However, as they lack the financial means to materialize these new aspirations, many would turn to crime.

Therefore, urban crime would find in the cities exposed to rapid social changes and intense in-migration a thriving environment for its expansion. The structural factors mediating this relationship are the size, differentiation, affluence and income concentration levels; whereas, the psychosocial variables controlling this interplay are isolation, impersonality of social relations, and the formation of peripheral sub-cultures in which violence is regarded as a legitimate means to mediate conflicts and differences (Paixão, 1983).

Felix (2002) agrees with this view. According to her, social mobility atomizes social structures and social cohesion, as areas marked by intense in-migration are prime areas for cultural clashes. Therefore, Felix (2002) argues that net-migration is positively related to property offences, as a result of frustrated material expectations and socioeconomic privation. Migrants compared to local dwellers tend to display lower income and educational levels, besides living in awful housing conditions, claim the author.

But despite its apparent logic, this reasoning suffers from a serious methodological limitation, as it only works when one explores the relationship between social exclusion/in-migration and urban crime at the aggregated level. Paixão (1990), and Benevides and Fischer (1993) are critic of this "fallacious" relationship, as the direct association between poverty and urban crime is, according to them, an overly simplified and narrow-minded statement. After all, not every member of the underclass engages in illicit acts, much less in violence. This study seeks to contribute to this debate, by exploring, at the municipal level, the interplay between urban crime and in-migration.

3. Study area

Minas Gerais is one of the 26 Brazilian States, encompassing an area of 587.172 km^2 (Figure 1). The population of Minas Gerais is the second largest in the country (17 million inhabitants) spread over 853 municipalities, of which 70 % live in urban areas. The capital, Belo Horizonte, is situated in the central area of the state and has a population of about 2 million.

The state holds huge reserves of iron, and sizeable reserves of gold and gemstones, including emerald, topaz and aquamarine mines. Minas Gerais was formed mainly by colonists who searched for veins of gold and gems, and later diamonds. These helped to boost occupation of the inner lands, and led to the foundation of several villages. Minas Gerais has long led the country in iron-ore mining and steel production, and today it continues to produce more than half of Brazil's mineral wealth.

Minas Gerais is a major producer of milk, coffee and other rural commodities. Eletronics and automobiles are also produced in the state. However, pronounced economic discrepancies mark the State. The southern part of Minas Gerais (near São Paulo and Rio de Janeiro state borders) has several mid-sized cities with solid industrial basis. The northeastern region is marked by poverty, but a few cities attract foreign traders for its semi-precious gems such as topaz and sapphire.

The central region of the state (where Belo Horizonte city is located) has big reserves of iron (and to a lower extend, gold) still being actively mined, besides holding numerous steel, automobile, and food processing industrial plants, and a thriving tertiary sector. The western part, is less densely

populated than the rest of the state, and it is now a focus of biotechnology investment, with leading research and production of cattle, soy and corn cultures.

4. Methods

Before we get any further, it is important to operationally define "urban violence". Without engaging in philosophical debates about the multi-meaning notion of "violence", this study adopts the concept of "violent crime", adopted by the Military Police of Minas Gerais State, as indicator of urban violence. Due to their gravity, dimension and impact, these crimes are easily recognizable by the population, making their identification and classification more precise. The definition of violent crime involves the following types of crimes (Minas Gerais, 2001):

- Personal offences
    - completed homicide
    - attempted homicide
    - completed rape
    - attempted rape

- Property offences
    - robbery
    - armed robbery
    - motor vehicle robbery
    - motor vehicle armed robbery

The primary source of information of this work is the crime registration system developed by the Military State Police of Minas Gerais, named *Sistema de Informações de Segurança Pública* (SM20). The system registers and organizes all crime reports and police actions on line, and offers longitudinal data on various types of crime, for all 853 *municípios* of Minas Gerais State (FJP, 1998).

The latest Brazilian census also constitutes an important source of information. Its micro-data version furnishes information on the number of in-migrants arriving at each *município* between 1996 and 2000. Migrants were classified in terms of their origim, and three groups were created: total, intra and inter-state migrants.

Raw data were converted into crime rates per 100.000, and migration rates per 1.000, based on 2000 municipal populations. Spearman's[5] nonparametric correlations (Blalock, 1979) were deployed to explore the interplay between crime and migration, and choropletic maps illustrate the spatial distribution of the phenomena under scrutiny.

5. Results

5.1 Spatial association

The spatial analysis of in-migration and crime rates reveal clear distribution patterns. Intra-state migration rates tend to benefit, disproportionately, the central areas of Minas Gerais State, especially the area around the capital city of Belo Horizonte (Figure 2). On the other hand, inter-state migration rates display a remarkably different spatial pattern, as the municípios located at or near the State border were the ones with the highest rates (Figure 3). When working with the total number of immigrants (intra and inter-state), one has a different picture, in which two important concentration areas appear: west and northwest Minas Gerais and the central area, where Belo Horizonte city is located (Figure 4).

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[5] Spearman's correlation coefficient was used due to the impossibility of relaxing the supposition that crime and migration are independent phenomena (Blalock, 1979).

Figures 5 and 6 provide the first evidence of a possible association between in-migration rates and urban crime. Notice how robbery and armed robbery rates are more intense in the regions marked by high rates of in-migration (west, northwest, and central Minas Gerais). A similar spatial pattern is also found for motor vehicle robbery, and motor vehicle armed robbery which is also concentrated in the west and central portions of Minas Gerais (Figures 7 and 8).

It is important to stress the fact that property offences and personal offences display a different spatial distribution. Notice how personal offences are more prevalent in the northeastern portions of the State, where one finds the highest incidence of attempted and completed homicides and rapes (Figures 9,10,11, and 12).

The spatial approach suggests that personal offences does not appear to be related to in-migration rates, as their spatial manifestations are significantly different; however, only statistical results will prove this supposition unequivocally.

5.2 Statistical results

Spearman's correlation coefficients reveal an intriguing picture, partially confirming the hypothetical association between crime and migration. Among the types of crime under scrutiny, property offences (robbery, armed robbery, motor vehicle robbery, and motor vehicle armed robbery) presented positive, although weak, associations with total, intra and inter-state in-migration rates (Table 3).

Table 3
Spearman's Correlation Coefficient

Independent Variables	Total in-migration	Inter-state in-migration	Intra-state in-migration
Robbery	0.132 **	0.124 **	0.076*
Motor vehicle robbery	0.101 **	0.088 **	.
Armed robbery	0.234 **	0.102 **	0.203**
Motor vehicle armed robbery	0.207**	0.135 **	0.138**
Completed homicide	.	.	.
Attempted homicide	.	-0.092 **	.
Completed rape	.	.	.
Attempted rape	-0.097 **	.	-0.074*

* significant at 0.05 level
** significant at 0.01 level

At this juncture it is worth recalling that this analysis was build on aggregated data and depicts the socioeconomic context in which migration and criminality take place. Therefore, as Paixão (1990), and Benevides and Fischer (1993) argue, any attempt to blame individuals or groups of individuals (intra and inter-state migrants, i.e.) is a pure manifestation of prejudice, once the majority of the urban poor does not engage in delinquent acts.

The positive relationship between in-migration and property offences may be partially explained by the line of thought presented by Paixão (1983) and Felix (2002). Urban centers subjected to intense migratory movements are locus of social clashes, disorganization and, consequently, weak social cohesion. Moreover, migratory movements tend to congregate large masses in peripheral areas of Brazilian urban centers, under conditions of poverty and social disarray, giving rise to socioeconomic privations and frustrations. This social context may give rise to urban crime.

Another possible explanation for the positive relationships between property offences and in-migration is the presence of a series of intervening variables. The fact that property offences are related to in-migration rates may be induced by the fact that both phenomena are inherently related

to socioeconomic measures of development and material well-being. Recall from section 3 that west and central Minas Gerais are the more prosperous areas of state, attracting many migrants. After all, Ravenstein (1885 and 1889) postulated over a century ago that the primary motivation behind migratory movements in times of peace is, indisputably, economic in nature (search for better working conditions, higher wages and quality of life), which are invariably present in more developed contexts. But one cannot overlook the fact that it is exactly within more developed contexts that the highest volume of wealth is generated, and, consequently, the highest numbers of opportunities and motivations for crime are present.

It is also noteworthy the negative relationship between total and intra-state in-migration rates and attempted rape. In the same directions follows the relationship between attempted homicide and inter-state in-migration. Despite weak, these associations partially disprove the hypothetical association of crime and migration, deserving a closer look (Table 3). The literature on urban crime reveal that in less developed contexts, marked by large masses of illiterate population with low levels of education, violence tends to be deployed as a means to mediate social conflicts (Beato, 1998).

A quick look at figures 3 and 4 reveal that such crimes are concentrated in areas of Minas Gerais State historically marked by low levels of quality of life and economic and human development, as demonstrated in section 3. Conversely, it is exactly in these areas that in-migration rates are lowest or inexistent, generating negative correlations. Therefore, one witnesses the presence of intervening variables behind the correlation coefficients.

6. Conclusions

The present work contributes to the debate on the relationship between social exclusion and urban crime, by exploring the interplay between in-migration rates and violent crime among the 853 *municípios* of Minas Gerais States, for the year 2000. The study revealed clear spatial patterns for in-migration and urban crime.

Another aspect worth mentioning is the positive relationship between property offences and in-migration rates. On the other hand, personal offences do not hold, except for completed rape and attempted homicide, any relationship with in-migration rates.

Therefore, the reality of Minas Gerais supports partially the thesis that urban crime is related to in-migration. The working hypothesis that areas marked by intense in-migration favors the incidence of criminal activity, due to constant cultural clashes, social disorganization and weak social cohesion deserves a deeper evaluation. As demonstrated, despite the apparent positive association between property offences and in-migration, this association may have been generated by intervenient variables (development and material wealth indicators), as property offences and in-migration rates are positively related to these indicators.

In future studies I shall be exploring the relative weight of these socioeconomic and development indicators in presence of in-migration rates as independent variables in linear modeling of violent crime, with the goal of further testing this hypothesis and advancing our knowledge on the association between social exclusion and migration.

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Figure 1

MINAS GERAIS STATE LOCATION MAP

Figure 2

MINAS GERAIS
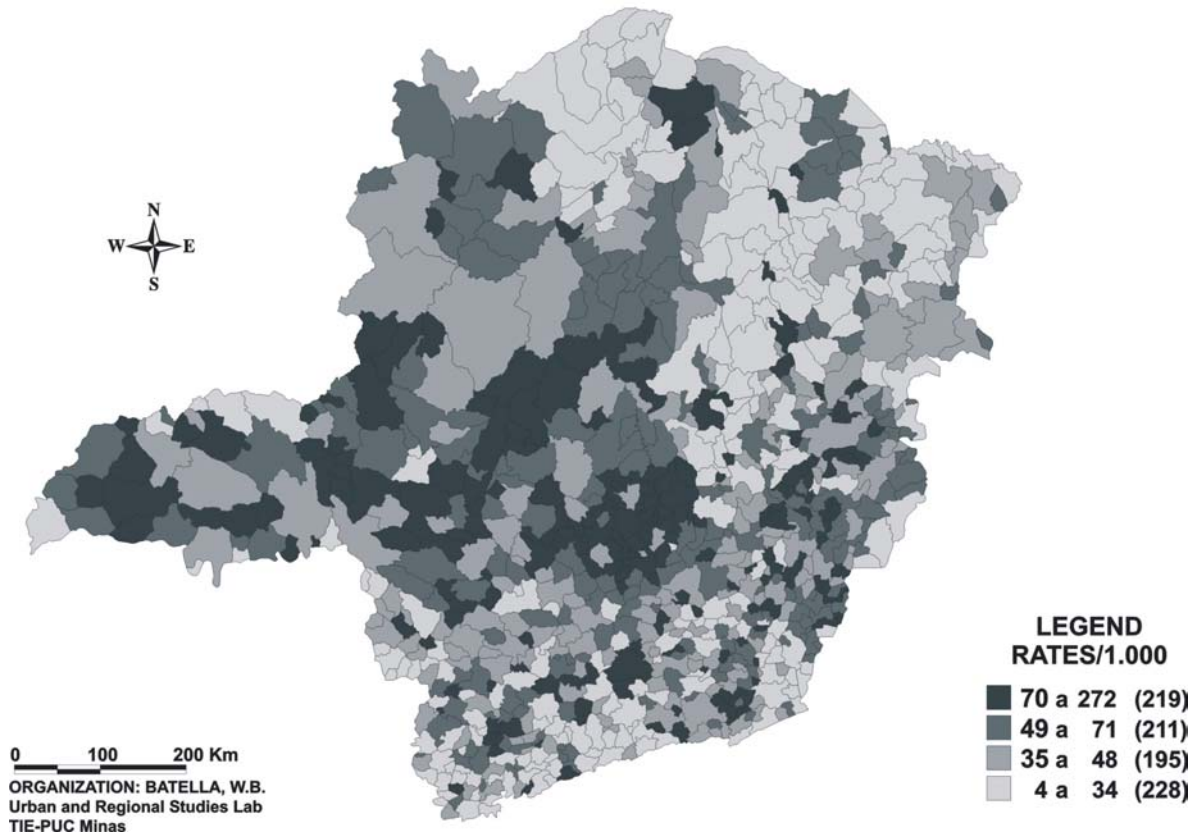# INTRA-STATE IN-MIGRATION RATES: 1996-2000

N
W E
S

0   100   200 Km

ORGANIZATION: BATELLA, W.B.
Urban and Regional Studies Lab
TIE-PUC Minas

LEGEND
RATES/1.000

■ 70 a 272 (219)
■ 49 a 71 (211)
■ 35 a 48 (195)
□ 4 a 34 (228)

Figure 3

MINAS GERAIS
INTER-STATE IN-MIGRATION RATES: 1996-2000

LEGEND
RATES/1.000

■	33,6 a 154,3	(207)
■	19,4 a 33,5	(210)
■	10 a 19,3	(212)
■	0,6 a 9,9	(211)
□	0	(13)

0   100   200 Km

ORGANIZATION: BATELLA, W.B.
Urban and Regional Studies Lab
TIE-PUC Minas
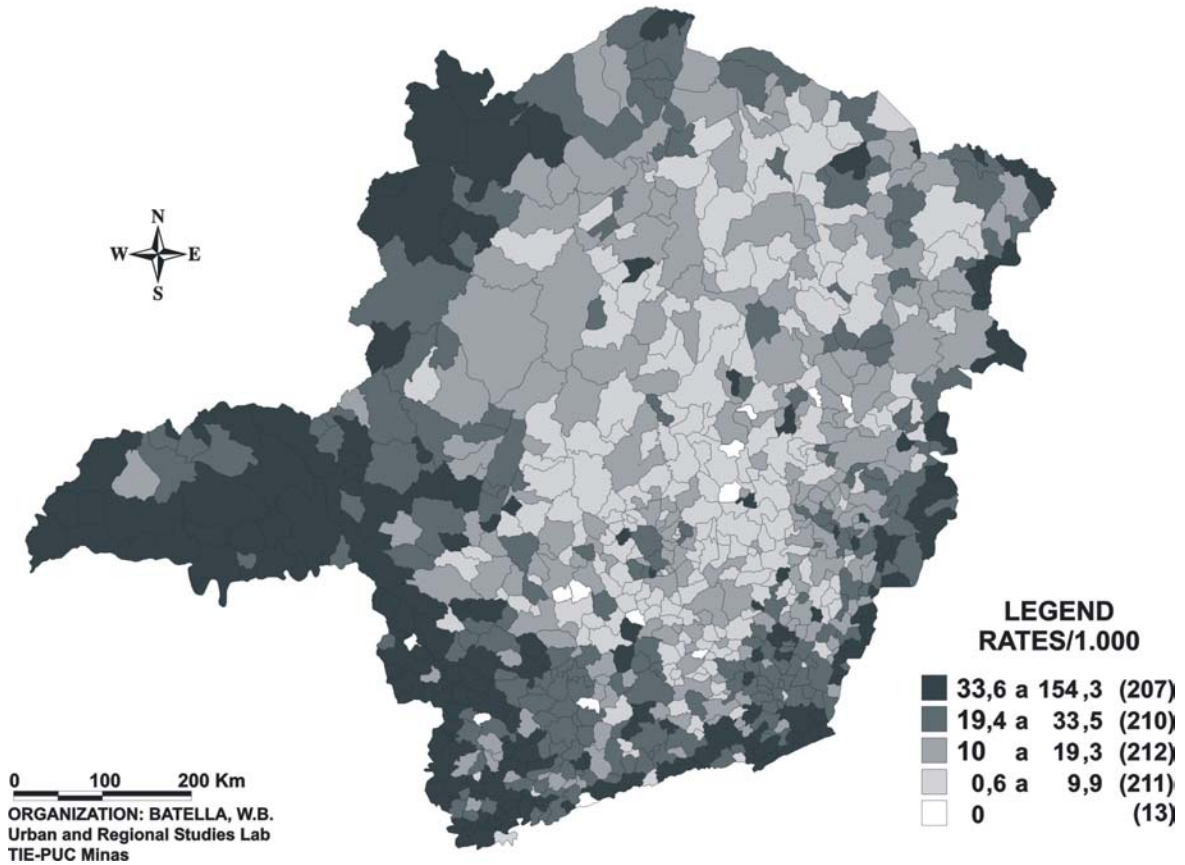
Figure 4

MINAS GERAIS
TOTAL IN-MIGRATIONS RATES: 1996-2000

LEGEND
RATES/1.000

- 101 a 300 (222)
- 74 a 100 (204)
- 55 a 73 (195)
- 10 a 54 (232)

0   100   200 Km

ORGANIZATION: BATELLA, W.B.
Urban and Regional Studies Lab
TIE-PUC Minas
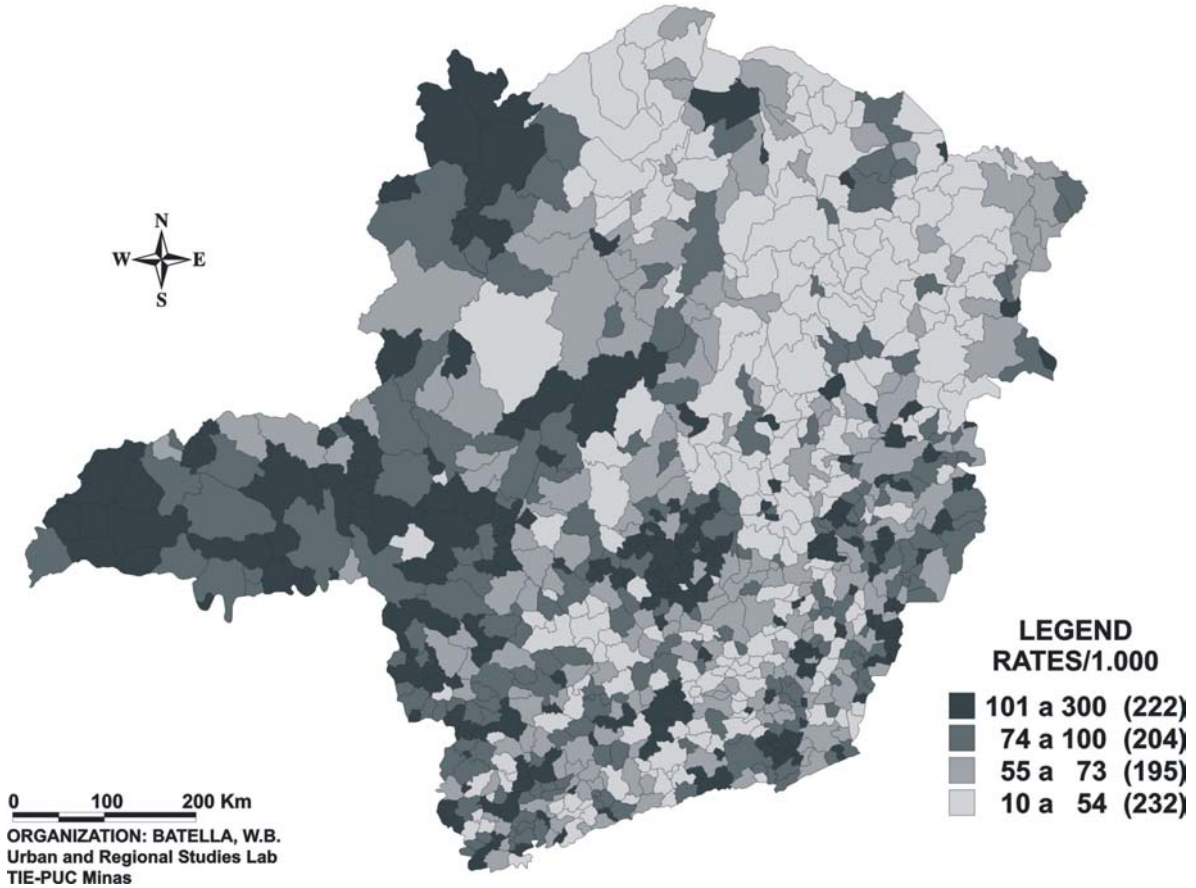
Figure 5

MINAS GERAIS ROBBERY RATES: 2000

LEGEND
RATES/100.000

- 37 a 239 (110)
- 23 a 36 (95)
- 14 a 22 (106)
- 2 a 13 (116)
- 0 (426)

0   100   200 Km

ORGANIZATION: BATELLA, W.B.
Urban and Regional Studies Lab
TIE-PUC Minas
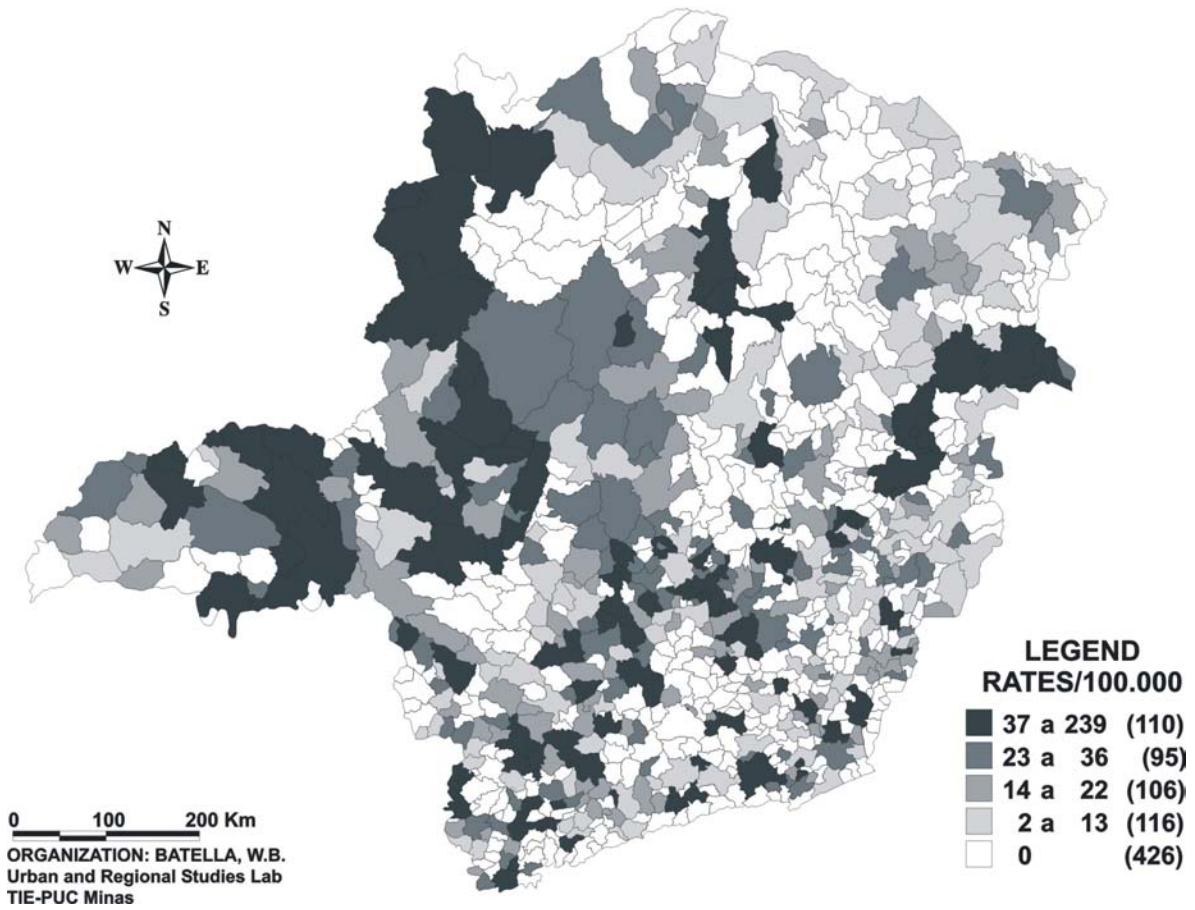
Figure 6

MINAS GERAIS ARMED ROBBERY RATES: 2000

LEGEND
RATES/100.000

- 42 a 878 (127)
- 25 a 41 (106)
- 16 a 24 (99)
- 2 a 15 (131)
- 0 (390)

0   100   200 Km

ORGANIZATION: BATELLA, W.B.
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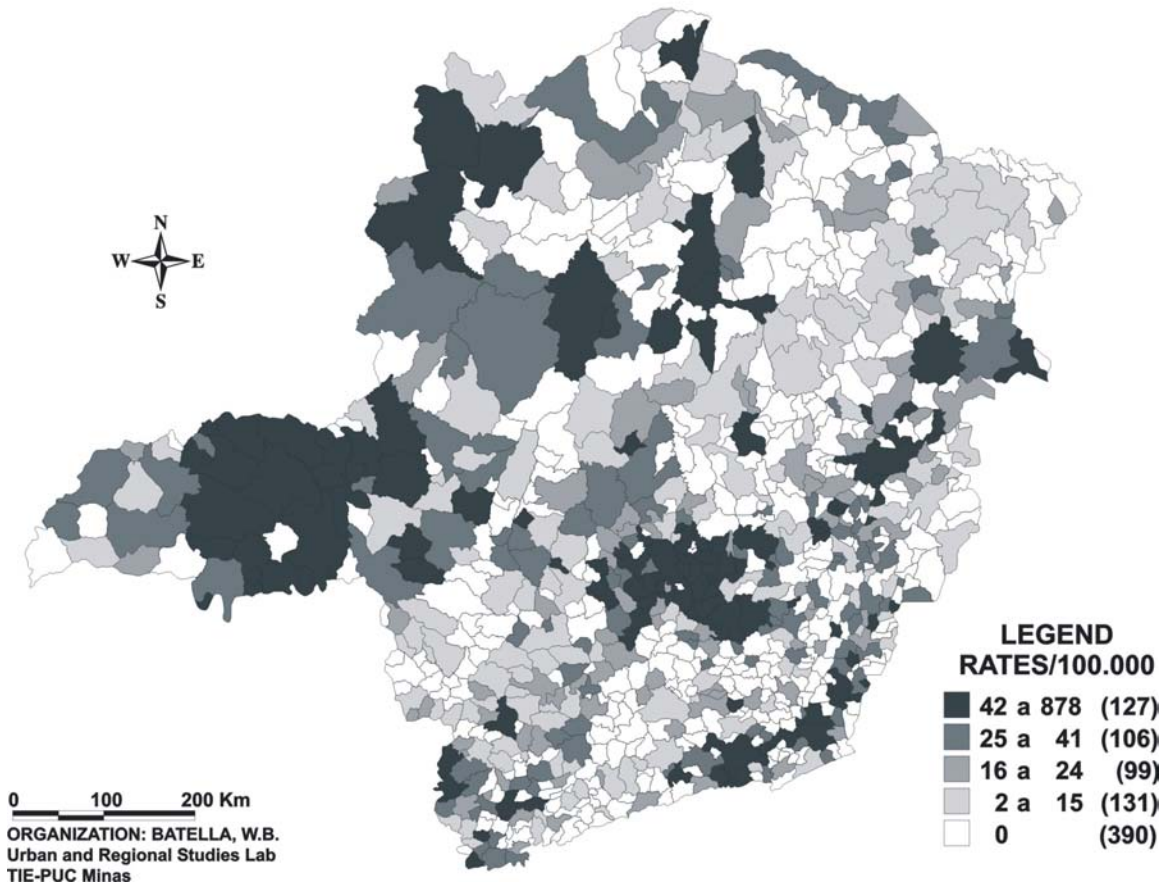
Figure 7

MINAS GERAIS MOTOR VEHICLE
ROBBERY RATES: 2000

LEGEND
RATES/100.000

- 11,2 a 46,6 (23)
- 2,1 a 11,1 (23)
- 0,3 a 2,0 (23)
- 0   (783)

0   100   200 Km

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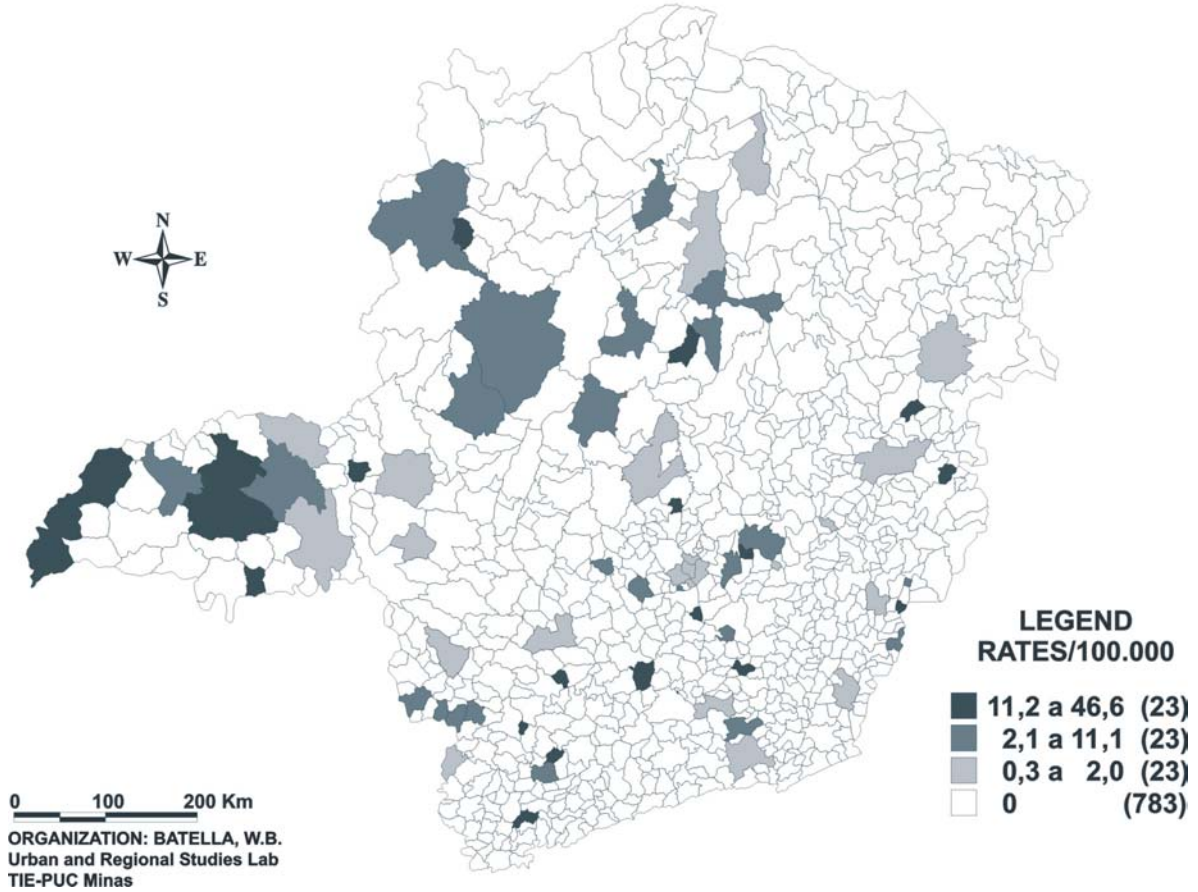
Figure 8

MINAS GERAIS MOTOR VEHICLE ARMED ROBBERY RATES: 2000

N
W E
S

LEGEND
RATES/100.000

15 a 118 (67)
 8 a 14 (51)
 1 a   7 (77)
 0   (658)

0   100   200 Km

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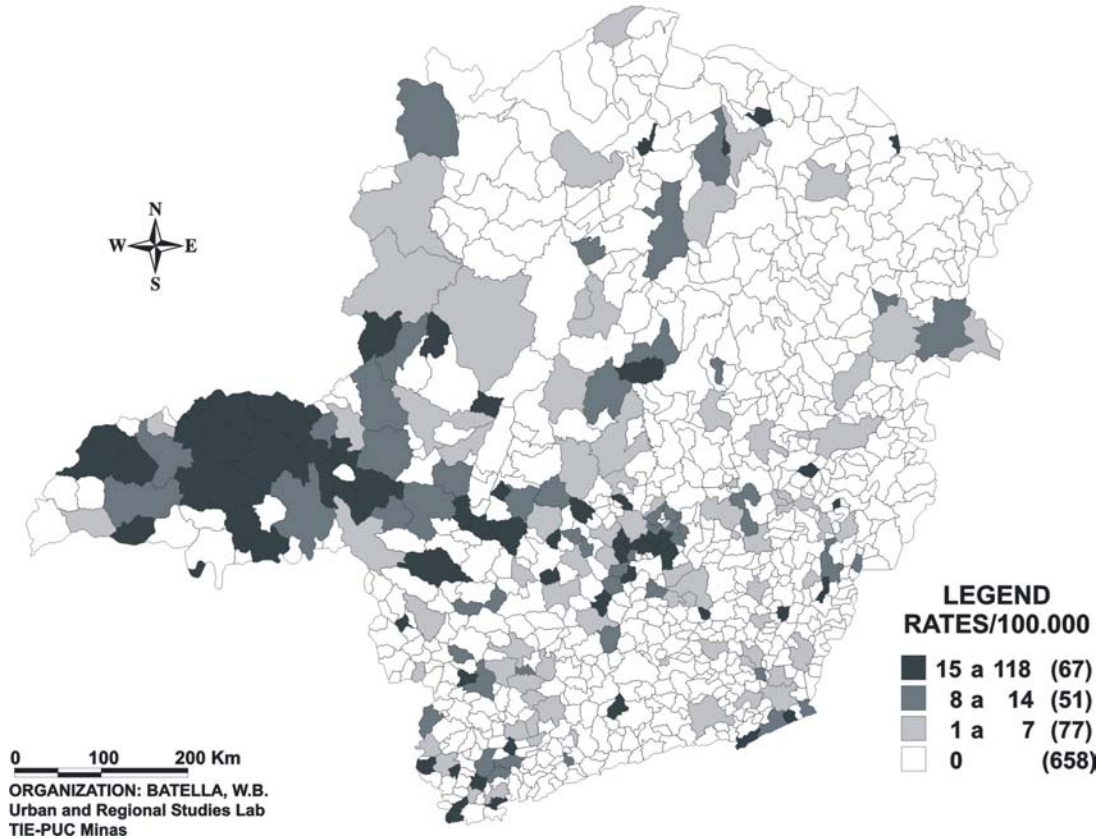
Figure 9

MINAS GERAIS ATTEMPTED HOMICIDE RATES: 2000

LEGEND
RATES/100.000

- 49 a 243 (179)
- 32 a 48 (135)
- 20 a 31 (140)
- 3 a 19 (179)
- 0 (220)

0   100   200 Km

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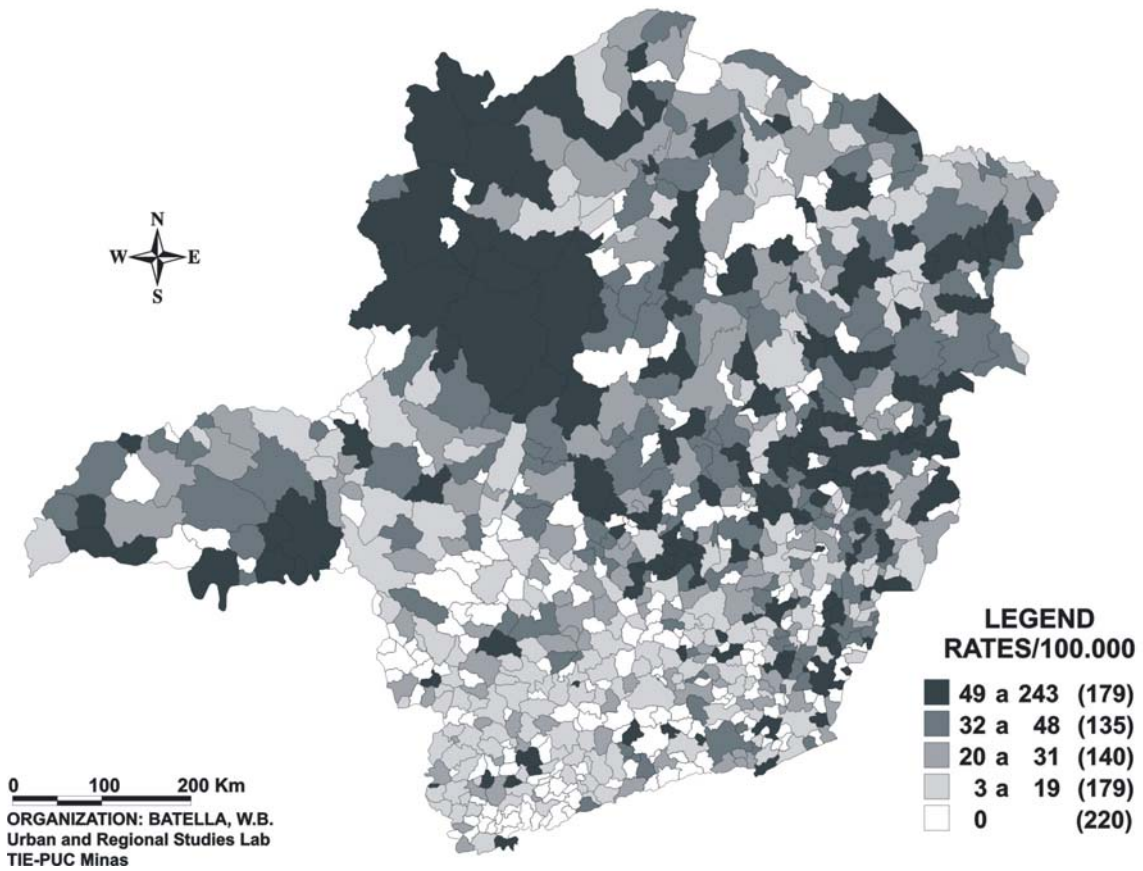
Figure 10

MINAS GERAIS COMPLETED HOMICIDE RATES: 2000

LEGEND
RATES/100.000

- ■ 22,2 a 77,0 (108)
- ▨ 14 a 22,1 (107)
- ▨ 8,3 a 13,9 (110)
- ▨ 0,9 a 8,2 (110)
- □ 0 (418)

0 100 200 Km

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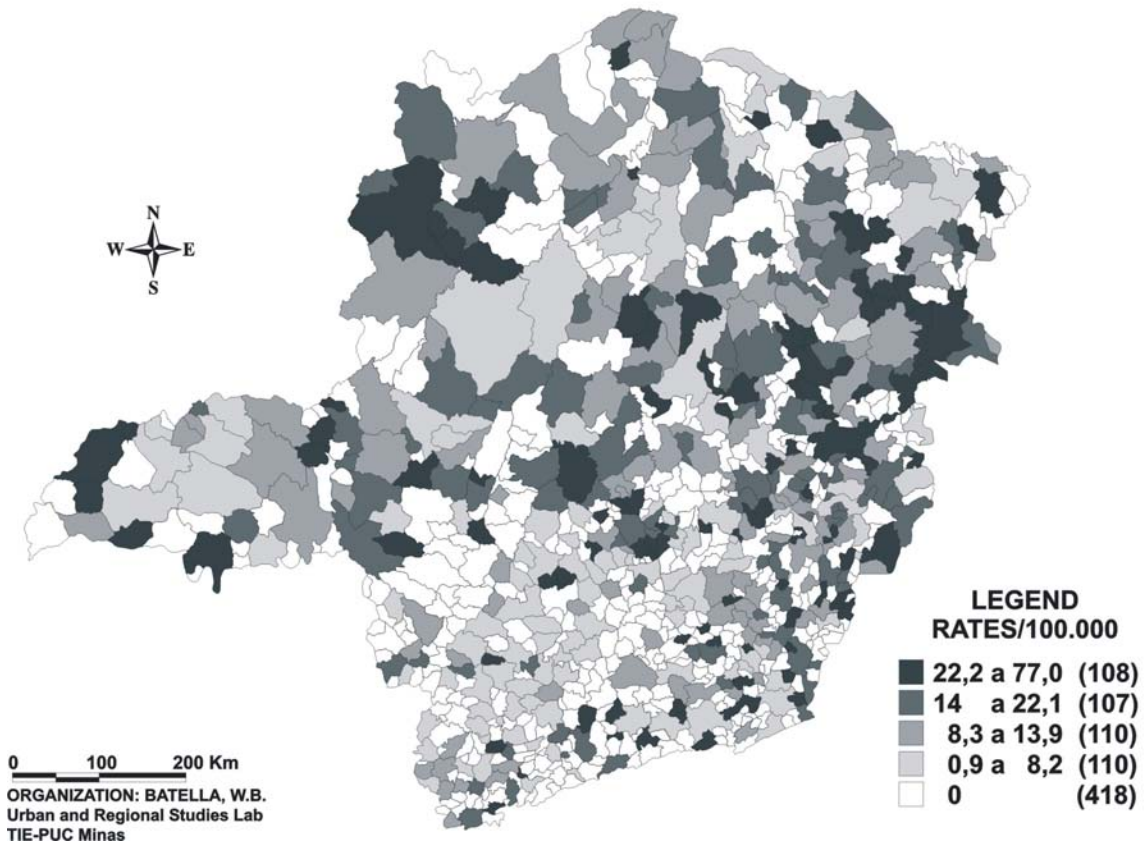
Figure 11

MINAS GERAIS ATTEMPTED RAPE RATES: 2000

LEGEND
RATES/100.000

- 15 a 122 (115)
- 9 a 14 (93)
- 1 a 8 (141)
- 0 (504)

0   100   200 Km

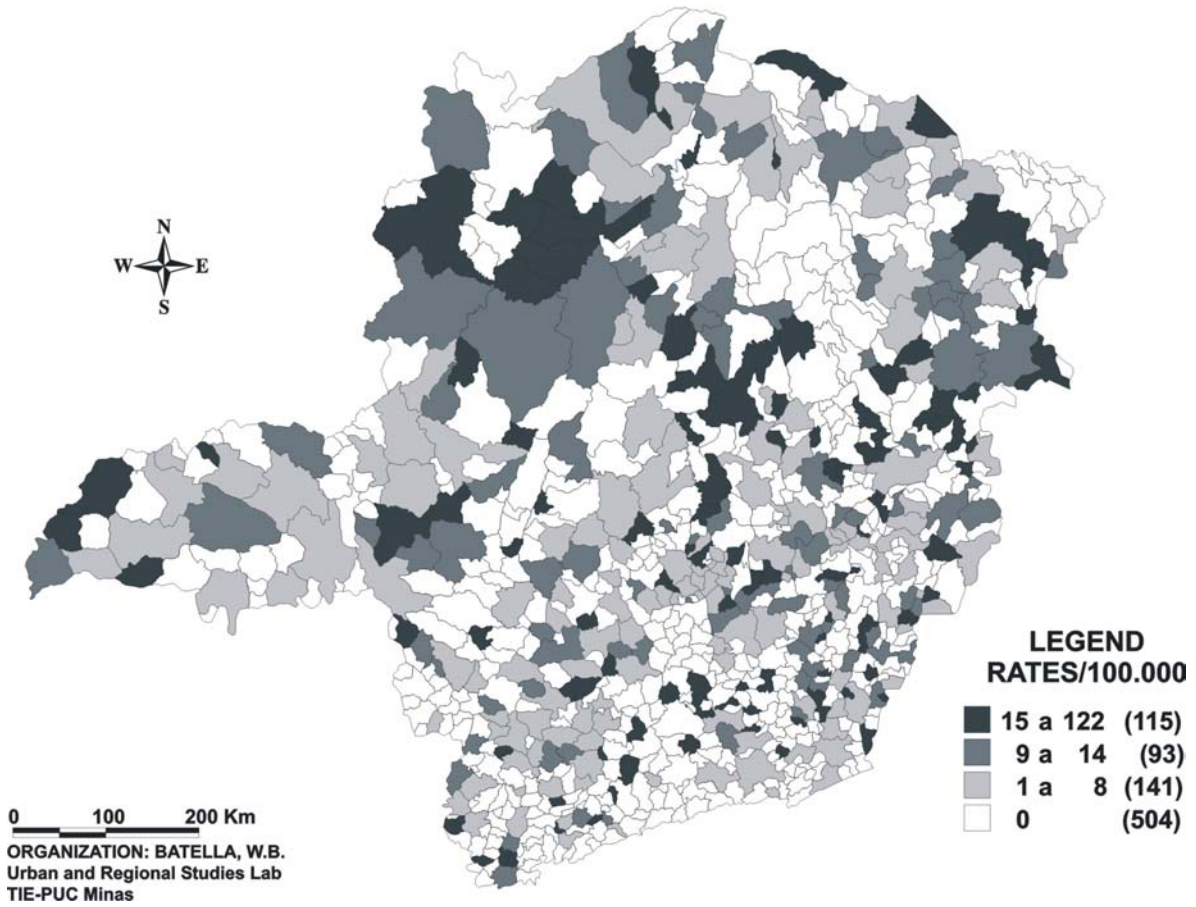ORGANIZATION: BATELLA, W.B.
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Figure 12

MINAS GERAIS COMPLETED RAPE RATES: 2000

LEGEND
RATES/100.000

■	13,74 a 61,10 (93)
■	6,21 a 13,73 (92)
▨	0,93 a 6,20 (95)
□	0 (573)

0   100   200 Km

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