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MIGRATION AND INTER-REGIONAL PUBLIC POLICY

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Migration and Inter-regional Public Policy

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Abstract

This paper develops a model of centralized public spending when the regional pivotal voters change as a result of an exogenous migration policy. Decision over public spending is made by bargaining by the regional representatives. Migration changes the median voters inside regions. We study how these changes either mitigate or deteriorate inter-jurisdictional redistributive conflicts and how they influence the size of government.

Key words: Demographic Changes; Government Spending; Inequality; Redistribution; Bargaining; Political Economy Theory.

JEL Classifications: D30, D78, H0, H41, H50.

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1 Introduction

Interregional redistributive conflicts shape the nature of public spending in any representative democracy. The outcome of a democratic collective choice mechanism may change as a consequence of changes in the composition of voting populace. The underlying political process that determines public policy formation is usually a result of bargaining among regional representatives which aims at resolving these conflicts. Therefore, a deeper understanding of this kind of interregional decision-making process is essential to predicting the changing nature and intensity of government spending in the presence of a changing voting populace.

This paper considers an economy with two jurisdictions. The jurisdictional median voters form a centralized government where they negotiate over a common policy. Demographic variations bring about a change the median voters income relative to the mean income of the economy. We see how this change either mitigates or deteriorates inter-jurisdictional redistributive conflicts and how that in turn affects the size of the government. In case of migration, for instance, we assume that a fraction of the people who move acquires the right to vote in the local district in which they end up. This, in turn, implies that the jurisdictional median voters change as a consequence of migration.[1] Thus, we focus on how migration influences inter-jurisdictional conflicts due to income inequality and affects centralized policy formation within a bargaining framework.

Our theory complements the classic theory of the determinants of the size of government and fiscal redistribution which depends on the level of income inequality. Meltzer and Richard (1981, 1983) showed that in a one-jurisdictional polity the more skewed the distribution of income, the larger is the difference between the median and the mean income and the higher will be the size of government. Giuranno (2009) showed that in two-jurisdiction structure the larger is the inter-regional income inequality, the lower will be the government size. Thus, there are two conflicting effects. One is due to the intra-regional inequality as in Meltzer and Richard (1981) and the other to the inter-regional inequality as in Giuranno (2009). Furthermore, as discussed in Giuranno (2009) the two effects may interact, but Giuranno does not provide an explicit model to show this relation. In this paper we address this issue formally by building up a model that internalizes this interactive effect.

Related literature: to be written. Some of the most relevant papers in this field are Acemoglu and Robinson (2000), Ben-Gad (2004), Dolmas and Huffman (2004), Epple and Romer (1991), Armenter and Ortega (2010), Ortega (2005), Ortega (2006), Ortega (2010), Rosen (1979), Storesletten (2000), Bertocchi and Strozzi (2010).

The paper is organized as follows. The next section defines a benchmark model and reproduces a standard result first due to Meltzer and Richard (1981). Section three extends the model to a two-jurisdiction state. Section four presents the legislature bargaining equilibrium, section five the results and six the conclusions. The

[1] For example, in Canada migration policies are sometimes explicitly used to influence the electoral outcomes as in the province of Quebec where there is a strong separatist movement.

appendix contains derivations and proofs.

2 The benchmark model

We start by recalling a benchmark model of public finance in which we derive the classical Meltzer and Richard (1981) result as presented in Persson and Tabellini (2000, p. 48) and Giuranno (2009).

Consider a one-region state with N individuals where N is normalized to one. There are two goods in this economy, a public good g and a private good y, which can be thought as individual income or initial endowment.

The government levies a proportional income-tax t, bounded by $0 \leq t \leq 1$, on individual income y in order to finance the provision of g. The average income is $\overline{y} = \sum_{h=1}^{N} y^h/N$. We assume, for simplicity, that the unit cost of the public sector is one, so that if the size is g the cost of the public sector is just one times g. The government budget constraint is then simply

$$t\overline{y} = g. \tag{1}$$

Each citizen h has the same quasi-linear preferences over private consumption, $(1-t)\,y^h$, and publicly provided goods g. We can now write the policy preferences of a citizen h as follows,

$$u^h = (1-t)\,y^h + H\left(g\right) = \left(\overline{y} - g\right)\frac{y^h}{\overline{y}} + H\left(g\right), \tag{2}$$

where the public spending benefit function $H(g)$ is increasing, smooth concave and satisfies the endpoint Inada condition. We assume that government spending is provided equally to everyone, so that $g^h = g \geq 0$.

Individual preferences are concave in policy, implying that every citizen has a unique preferred policy, which satisfies the following individual first order condition

$$-\frac{y^h}{\overline{y}} + H'\left(g^h\right) = 0. \tag{3}$$

Under majority voting, the voter with median income is decisive. It is easy to verify that for the median voter the following comparative static holds:

$$dg/d\left(y/\overline{y}\right) < 0, \tag{4}$$

where y is the median voter income. Now, given that income is the only dimension of heterogeneity among citizens, the median-mean income ratio, $y/\overline{y}$, is decisive in this kind of collective decision making model. According to condition (4) an increase in mean income relative to the income of the median voter increases government size (Meltzer and Richard,1981). Meltzer and Richard (1981 and 1983) assume that median voter's income is lower than the average income, hence she desires greater redistribution since everybody pays the same tax rate t. Therefore, more inequality represented by a lower ratio $y/\overline{y}$ leads to a larger public sector.

In the next section, we extend the benchmark framework to a two-jurisdiction polity as in Giuranno (2009) and introduce mobility in order to address the relation between migration and collective choices.

3 A two-jurisdiction economy

Consider two jurisdictions, or regions, comprising a state.[2] In jurisdiction 1 there are N_1 people and in jurisdiction 2 N_2 people, with $N_1 + N_2 = N$. The distribution of income differs between the two jurisdictions and we assume, to simplify the exposition, that the following relation always holds: $\overline{y} \geq y_1 \geq y_2$. This assumption implies that income of median voter of region 1, y_1, is greater than that of the median voter of region 2, y_2,[3] and that both median voters have income below the average income of the whole economy, $\overline{y}$.[4]

The regional median voters form the centralized legislature, which has to determine the size of the public sector to be financed by a proportional income tax across jurisdictions.

Once the legislature decides the dimension of g, the government budget constraint is automatically determined by setting

$$t\overline{y} = g, \tag{5}$$

Accordingly, the tax paid by median voter i is $ty_i = \frac{y_i}{\overline{y}} g$, with $i = 1, 2$.

The utility function of median voter i is:

$$u_i = y_i - \frac{y_i}{\overline{y}} g + H(g), \qquad \text{with } i = 1, 2. \tag{6}$$

We denote by γ_i the ratio between the income of median voter i and the mean income, $\frac{y_i}{\overline{y}}$, such that $\gamma_1 > \gamma_2$. We assume that γ_i is affected by an exogenous variable $m > 0$, which captures the change of the voting population due to migration or other demographic changes. For instance, m can be thought as the number of yearly accepted migrants who acquire the voting rights. Assume that there is a continuous relation between m and γ and denote with $\gamma(m)$ a function that explains this relation. We assume that $\frac{\partial \gamma}{\partial m} \lesseqgtr 0$. Mobility changes the median voters of the two jurisdictions by changing the median mean income ratios. Thus, when $\frac{\partial \gamma}{\partial m} > 0$

[2] Here, we focus on the territorial dimension of the two groups. Alternatively, we can think about two distinct ethnic, religious, incomes or other kinds of groups.

[3] In case of violation of this condition we have a symmetric situation.

[4] This condition could be violated by median voter 1. In this case more cases need to be considered. We leave them out for future work.

means that an increase in m results in a median voter with a higher income ratio and vice versa. Changes in m leads to the following four analytical cases:

1) $\gamma_1'(m) > 0$ and $\gamma_2'(m) > 0$;
2) $\gamma_1'(m) < 0$ and $\gamma_2'(m) < 0$;
3) $\gamma_1'(m) > 0$ and $\gamma_2'(m) < 0$;
4) $\gamma_1'(m) < 0$ and $\gamma_2'(m) > 0$.

The first best policy for median voter i is the unique solution to the following equation:

$$H'\left(g_i^D\right) = \frac{y_i}{\overline{y}} = \gamma_i(m), \qquad \text{with } i = 1, 2. \tag{7}$$

Solution (7) states that if median voter i is, let us say, a non-benevolent dictator she would choose g_i such that her private marginal cost is equal to her private marginal benefit. The non benevolent dictator is a free-rider. She always reduces public expenditure when her private marginal cost increases; that is, $\partial g_i^D / \partial \gamma_i < 0$. She increases the provision of g when either the mean income increases or her private income declines because this reduces her marginal cost.
Now, we turn to the efficient policy outcome, which can be interpreted as the central planner solution. Here, we suppose that the benevolent dictator maximizes an additive social welfare function as follows:

$$\max_{g^e} \sum_{h=1}^{N} u^h, \tag{8}$$

where u^h denotes the utility of individual h.[5] The efficient government size, g^e, satisfies the familiar Samuelsonian condition,

$$-\frac{\sum y^h}{\overline{y}} + NH'(g^e) = 0, \tag{9}$$

which means that the social marginal benefit is equal to the social marginal cost. The Samuelsonian condition leads to the following equation

$$H'(g^e) = 1, \tag{10}$$

which means that, in equilibrium, the marginal benefit is equal to the marginal cost.

Clearly, the distribution of income does not influence the central planner's provision of public goods.

[5] As in Besley and Coate (2003), we assume that the endowments of the median voters and of all the taxpayers are large enough to meet their tax obligations.

4 The legislature bargaining equilibrium

In this section we will analyze the public policy outcome when decisions are not made by a central planner or a non-benevolent dictator, but directly by the median voters of the two jurisdictions. In this case, median voters form a government and choose policy through negotiation.

We assume that if no agreement is achieved, the government will not be able to implement any public good, i.e., $g = 0$. Therefore, the utility each representative obtains in the event of disagreement is $u_i^d = y_i$, with $i = 1, 2$. That is, everybody consumes entirely their private income. In order to reach an agreement, median voters must have positive gains from implementing g. In formula, it must be $u_i - u_i^d > 0$, which implies $-\gamma_i(m) g + H(g) > 0$.

We denote the gain from reaching an agreement of median voter i with the symbol ϕ_i, such that

$$\phi_i = u_i - u_i^d = -\gamma_i(m) g + H(g). \tag{11}$$

The gain from reaching an agreement is equal to the net private benefit minus the net private cost and represents the private net benefit if an agreement is reached on g. Note that the marginal gain from cooperation is equal to the marginal utility, denoted as Mu_i; i.e.:

$$\frac{\partial \phi_i}{\partial g} = -\gamma_i(m) + H'(g) = Mu_i. \tag{12}$$

Representatives choose the government size g by bargaining. We show that by maximizing the following Nash bargaining condition:

$$\underset{g}{max}\left[\ln\left(-\gamma_1(m) g + H(g)\right) + \ln\left(-\gamma_2(m) g + H(g)\right)\right] \tag{13}$$

The first order condition is:

$$\frac{-\gamma_1(m) + H'(g)}{-\gamma_1(m) g + H(g)} + \frac{-\gamma_2(m) + H'(g)}{-\gamma_2(m) g + H(g)} = 0. \tag{14}$$

Since the two denominators are positive, it turns out that $Mu_1 < 0$ and $Mu_2 > 0$ because marginal cost is higher for median voter 1. This proves that the bargaining equilibrium is a compromise between median voters' most preferred policy; that is, in equilibrium, median voter 1 would like to consume less g and median voter 2 would like to consume more of it.

The first order condition can be written in the following form:

$$\epsilon_1 = -\epsilon_2, \tag{15}$$

where,

$$\epsilon_i = g\frac{-\gamma_i(m) + H'(g)}{-\gamma_i(m) g + H(g)}, \text{ with } i = 1, 2, \tag{16}$$

is the elasticity with respect to g of the net gain from bargaining for median voter i; i.e. $\frac{Mu_i}{\phi_i}g$. It is easy to verify that ϵ_i is negative for median voter 1 and positive for median voter 2; i.e. $\epsilon_1 < 0$ and $\epsilon_2 > 0$. The elasticity measures the percent change in gain from reaching an agreement relative to the percent change in public spending. Note that when γ_i increases, median voter i becomes more rigid in the negotiation; i.e., $\frac{\partial \epsilon_i}{\partial \gamma_i} < 0$.

5 Inter-regional public spending with migration

Assume that a uniform rate of migration m is exogenously determined, for example, by law and that people who move also acquire the right to vote. Migration changes the distribution of income inside the jurisdictions. As a consequence, the pivotal voters also change and the new pivotal voters may have either a lower or higher median/mean income ratio, γ_i. Therefore, the conflict of interest between regions can assume a different form and intensity. The following Lemma is the key to solving the inter-regional negotiation game.

Lemma 1 *The government increases the size of the public sector when exogenous migration rate increases only when the following relations hold:*

$$\frac{dg^*}{dm} > 0 \begin{cases} \text{if } \gamma_1'(m)\,\phi_2 - \gamma_2'(m)\,\phi_1 > 0 \text{ and } \epsilon_1 > \frac{\gamma_1'(m)\phi_2+\gamma_2'(m)\phi_1}{\gamma_1'(m)\phi_2-\gamma_2'(m)\phi_1} \\ \text{if } \gamma_1'(m)\,\phi_2 - \gamma_2'(m)\,\phi_1 < 0 \text{ and } \epsilon_1 < \frac{\gamma_1'(m)\phi_2+\gamma_2'(m)\phi_1}{\gamma_1'(m)\phi_2-\gamma_2'(m)\phi_1} \end{cases} \tag{17}$$

The proof is in the Appendix.[6]

The Lemma is important because it shows that in order to identify the nexus between the migration level m and public policy g we need to consider that regions react differently to changes in m. Regional median voters can be more or less elastic in the negotiation and the marginal change in the elasticity can also be more or less intense. Since, in equilibrium, both median voters must have the same elasticity in absolute value, the intensity in the elasticity changes that are needed to restore the equilibrium are going to determine the sign of the changes in the size of g.

We use the above Lemma to understand the impact of a change in m on the size of g for the four conceivable cases, which are summarised in the following two Propositions.

In particular, the first Proposition considers the case in which both median voters have become richer relatively to the mean income voter and the opposite case in which they have become relatively poorer.

Proposition 1 *An increase in m, which leads to richer regional median voters relative to the national average, causes a decrease in g. Similarly, an increase in m,*

[6] According to the equilibrium condition (15), the formulas in the Lemma can easily be rewritten in terms of the elasticity of median voter 2, ϵ_2.

which leads to poorer regional median voters relative to the national average, leads to an increase in g. In formulas,

$$\frac{dg^*}{dm} < 0 \text{ when } \gamma_1'(m) > 0 \text{ and } \gamma_2'(m) > 0 \tag{18}$$

and

$$\frac{dg^*}{dm} > 0 \text{ when } \gamma_1'(m) < 0 \text{ and } \gamma_2'(m) < 0. \tag{19}$$

The proof is in the Appendix.

The above Proposition considers the two cases in which there is no conflict of interests between regions. In the first case, median voters have become more rigid with respect to public spending and want to reduce it. In the second case, they want more redistribution and, therefore, a bigger government. This Proposition states that when there is no conflict of interest between median voters the classical Meltzer and Richard (1981) result replicates in a multi-juridisction economy.

Now, we analyse a special case in which the marginal change of the income ratio is the same for the two median voters in absolute value.

Proposition 2 *Consider the case in which $|\gamma_1'| = |\gamma_2'|$, an increase in m, which reduces the income gap between the two regional median voters leads to an increase in the size of g. On the contrary, an increase in m, which increases the income gap between the two regional median voters reduces the size of g. In symbols,*

$$\frac{dg^*}{dm} > 0 \text{ when } \gamma_1'(m) < 0 \text{ and } \gamma_2'(m) > 0 \tag{20}$$

and

$$\frac{dg^*}{dm} < 0 \text{ when } \gamma_1'(m) > 0 \text{ and } \gamma_2'(m) < 0. \tag{21}$$

The proof is in the Appendix.

The case presented in the above proposition replicates the result in Giuranno (2009).[7]

The following two Propositions consider the remaining two cases in which a change in m causes a conflict of interest between regional median voters whose solution is not straightforward. From now on we assume $|\gamma_1'| \neq |\gamma_2'|$.

Proposition 3 *Consider the case $\gamma_1'(m) > 0$ and $\gamma_2'(m) < 0$, in which an increase in m leads the rich median voter to be a voter with a higher relative income with*

[7] To be completed: explane the difference between the gamma in this paper and in Giuranno (2009), why the case $|\gamma_1'| = |\gamma_2'|$ is equivalent to Giuranno (2009) and how this paper provides a reason why the income gap changes.

respect to the average income and the poor median voter to be one with a lower relative income, the following comparative statics results apply:

$$\frac{dg^*}{dm} < 0 \text{ if } |\gamma_1'(m)| > |\gamma_2'(m)|, \tag{22}$$

$$\frac{dg^*}{dm} < 0 \text{ if } |\gamma_1'(m)| < |\gamma_2'(m)| \text{ and } \gamma_1'(m)\phi_2 + \gamma_2'(m)\phi_1 > 0, \tag{23}$$

$$\frac{dg^*}{dm} \lesseqgtr 0 \text{ if } |\gamma_1'(m)| < |\gamma_2'(m)| \text{ and } \gamma_1'(m)\phi_2 + \gamma_2'(m)\phi_1 < 0. \tag{24}$$

The proof is a straightforward application of Lemma 1.

In the case in which $\gamma_1'(m) < 0$ and $\gamma_2'(m) > 0$, median voter 1 is poorer with respect to the mean and median voter 2 is richer. In this situation, median voter 1 would like to increase the size of g because her marginal cost is now declining. Instead, median voter 2 has a conflict of interest. On the one hand she would like to increase g. However, on the other, her marginal cost is now higher and she is receiving less redistribution from public spending. Clearly, if the marginal change in γ is bigger for median voter 1, i.e. $|\gamma_1'(m)| > |\gamma_2'(m)|$, than g increases. A bigger change in the gamma means a bigger change in the bargaining points of threat, which determine the utility median voters receive in the case of disagreements. As the relative income of the rich median voter declines, her gains from cooperating increase and she becomes more willing to cooperate over g. We recall that in equilibrium the poorer median voter would like a higher g and the rich median voter a lower size. Therefore, if the rich median voter is now willing to increase g, she will certainly obtain this increase as long as this does not cause a conflict of interest for the poorer median voter. The conflict of interest for the poorer median voter arises when $|\gamma_1'(m)| < |\gamma_2'(m)|$. In this situation, the change in the marginal cost is more relevant for median voter 2. Besides, the marginal cost is also increasing for median voter 2 who has to balance her willingness to have more g with a higher marginal cost. Therefore, the final outcome is ambiguous.

TO BE COMPLETED...

Proposition 4 *Consider the case $\gamma_1'(m) < 0$ and $\gamma_2'(m) > 0$ in which an increase in m leads the rich median voter to be a voter with a lower relative income with respect to the average income and the rich median voter to be one with higher relative income, the following results apply:*

$$\frac{dg^*}{dm} > 0 \text{ if } |\gamma_1'(m)| > |\gamma_2'(m)|, \tag{25}$$

$$\frac{dg^*}{dm} > 0 \text{ if } |\gamma_1'(m)| < |\gamma_2'(m)| \text{ and } \gamma_1'(m)\phi_2 + \gamma_2'(m)\phi_1 > 0, \tag{26}$$

$$\frac{dg^*}{dm} \lesseqgtr 0 \text{ if } |\gamma_1'(m)| < |\gamma_2'(m)| \text{ and } \gamma_1'(m)\phi_2 + \gamma_2'(m)\phi_1 < 0. \tag{27}$$

The proof is a straightforward application of Lemma 1.

TO BE COMPLETED...

6 Conclusion

In this paper we have developed a model of centralized public spending when the pivotal voter changes as a result of an exogenous migration policy. We find that public spending unambiguously increases when the median voters in the jurisdictions become simultaneously richer because of migration policies. Conversely, public spending declines when they both become poorer. These cases are straightforward in terms of policy implementation because there is no conflict of interest between the median voters coming out of the exogenous migration policy.

However, the conflict of interest arises when the income gap between median voters declines or increases because of policy implementation. When the income gap declines, public spending increases when the median mean income ratio is more sensitive or equally so for the rich median voter compared to its poorer counterpart.

When the income gap increases, public spending declines when the median mean income ratio is more sensitive or equally so for the rich median voter compared to its poorer counterpart.

As future work, we will compare results with the outcome of both the benevolent and the non-benevolent dictators; compare results with Meltzer and Richard (1981) and Giuranno (2009); Study the case $y_1 \geq \overline{y} \geq y_2$; consider m as and endogenous choice variable.

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7 Appendix

Proof of Lemma 1. Denote with F the first order condition (14),

$$F = \frac{-\gamma_1(m) + H'(g)}{-\gamma_1(m) g + H(g)} + \frac{-\gamma_2(m) + H'(g)}{-\gamma_2(m) g + H(g)} = 0. \tag{28}$$

We want to study $\frac{dg^*}{dm} \equiv -\frac{F_m}{F_g}$. It is straightforward to verify that $F_g < 0$, while the numerator is

$$F_m = \frac{-\gamma_1'(m)\phi_1 + \gamma_1'(m) g\phi_1'}{\phi_1^2} + \frac{-\gamma_2'(m)\phi_2 + \gamma_2'(m) g\phi_2'}{\phi_2^2}. \tag{29}$$

We use the equilibrium condition (15) to rewrite the F_m function as follows,

$$F_m = -\frac{\gamma_1'(m)}{\phi_1} + \frac{\gamma_1'(m)\epsilon_1}{\phi_1} - \frac{\gamma_2'(m)}{\phi_2} - \frac{\gamma_2'(m)\epsilon_1}{\phi_2}. \tag{30}$$

F_m is positive when

$$\left(\frac{\gamma_1'(m)}{\phi_1} - \frac{\gamma_2'(m)}{\phi_2}\right)\epsilon_1 > \frac{\gamma_2'(m)}{\phi_2} + \frac{\gamma_1'(m)}{\phi_1},$$

which proves the Lemma.

Proof of Proposition 1. In order to prove the Proposition, we rewrite condition (29), which leads to Lemma 1, under the following form

$$F_m = \left(\frac{\gamma_1'(m)}{\phi_1^2} + \frac{\gamma_2'(m)}{\phi_2^2}\right)\left(-H(g) + gH'(g)\right). \tag{31}$$

Here, $(gH'(g) - H(g))$ is negative because the marginal benefit is smaller than the average benefit, i.e. $H'(g) < H(g)/g$.[8] We conclude that F_m is positive when $\left(\frac{\gamma_1'(m)}{\phi_1^2} + \frac{\gamma_2'(m)}{\phi_2^2}\right)$ is negative. This proves the Proposition.

Proof of Proposition 2. We first study the sign of equation (29) when $\gamma_1'(m) < 0$ and $\gamma_2'(m) > 0$, which gives

$$F_m > 0 \Rightarrow \frac{\phi_1 - g\phi_1'}{\phi_1^2} + \frac{-\phi_2 + g\phi_2'}{\phi_2^2} > 0 \Rightarrow -\epsilon_1\left(\frac{1}{\phi_1} + \frac{1}{\phi_2}\right) > \frac{1}{\phi_2} - \frac{1}{\phi_1} \Longrightarrow \epsilon_1 < \frac{\phi_2 - \phi_1}{\phi_2 + \phi_1}. \tag{32}$$

Similarly, the sign of equation (29) when $\gamma_1'(m) > 0$ and $\gamma_2'(m) < 0$ is given by

$$F_m > 0 \Rightarrow \frac{-\phi_1 + g\phi_1'}{\phi_1^2} + \frac{\phi_2 - g\phi_2'}{\phi_2^2} > 0 \Rightarrow \epsilon_1\left(\frac{1}{\phi_1} + \frac{1}{\phi_2}\right) > \frac{1}{\phi_1} - \frac{1}{\phi_2} \Rightarrow \epsilon_1 > \frac{\phi_2 - \phi_1}{\phi_2 + \phi_1}. \tag{33}$$

We know that ϵ_1 is negative in equilibrium and that $\phi_2 - \phi_1 > 0$. This proves the Proposition.

[8] For a standard proof see Chiang (1984, pp. 192-3).

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