

The economic incidence of smoking laws

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Although laws restricting smoking in restaurants are becoming commonplace, most research has focused on either the health benefits that laws may provide customers and workers or whether laws harm owners. But while smoking laws may directly alter profits, owners may alter prices, output, and other business attributes in ways that affect the welfare of customers and workers. This study examines whether restaurant and bar owners alter prices, entertainment, hours of operation and other business attributes in response to local smoking laws. Substantial support is found for these attribute changes in the Wisconsin hospitality industry. One implication is that an overall assessment of the desirability of smoking laws should consider economic effects imposed on owners, customers and workers, as well as health benefits that follow laws.

I. INTRODUCTION

Laws that ban or restrict smoking in restaurants are becoming more prevalent. Public health groups advocate such laws on the basis of controlling second-hand smoke and/or possible health benefits to non-smoking customers and workers. However, in order to examine the overall impact of smoking restrictions, the economic effects of these policies should also be examined. These laws may directly alter profits and changes in business environments may lead owners to alter prices, output, and other business attributes in ways that affect the welfare of all customers and workers.

An overall assessment of the desirability of smoking laws then should consider all of these effects. While a few studies examine the effects of smoking laws on restaurant owners, there is little research that examines the economic effects imposed on customers and workers. This paper examines the economic effects imposed on owners, customers and workers in roughly 1,000 restaurants and bars in Wisconsin. Wisconsin provides a good case study because its adult smoking rate is 23.7%, which is similar to the median smoking rate of 22.8% for all states.¹ The data

set contains detailed information at the individual business level and provides data on establishments that have been subjected to local smoking laws as well as those that currently operate without them. The analysis therefore examines whether there are significant differences between the actual and predicted effects of laws. This comparison is important for assessing predictions made concerning the extension of laws onto other localities.

The paper begins with a survey of the literature on the economic effects of smoking laws on restaurants and bars. Next, a series of hypotheses on the relationship between smoking laws and owners, customers and employees are developed, followed by the presentation of data and an empirical model. An overall assessment of the evidence concludes the paper.

II. PREVIOUS LITERATURE

Most of the literature in this area addresses whether or not smoking bans lower the revenues (as a proxy for profits) of restaurants and bars. This literature follows one of two directions. One direction focuses on impacts on individual

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¹ 1999 data obtained from the Centers for Disease Control and Prevention. Wisconsin ranks 35th out of 50 states when listed from lowest to highest adult smoking rates.

owners. Dunham and Marlow (2000b) examined the distribution of expected effects of smoking laws on revenues using data from a nationwide survey of 1,300 restaurants and bars. For restaurants, 6% of owners predicted that bans raise revenues, 39% predicted lower revenues, and 55% predicted no changes. For bars and taverns, a ban was predicted to raise revenues by 2% of owners, lower revenues by 83%, and produce no change by 13%. Predictions of gains, losses and no effects on revenues are found to be consistent with how owners allocate seating within their establishments. That is, the lower was seating allocated to non-smoking use, the higher the probability that an owner predicted that a smoking ban lowered revenues. This result indicates that seating allocations are made on the basis of profits, as is consistent with an efficient private accommodation market.

The other research direction aggregates all establishments into one 'community-wide' impact. A number of studies have concluded that businesses do not suffer reduced sales as a result of bans. Glantz and Smith (1994) compare 15 cities with smoking laws with 15 matched control group cities. They conclude: '[L]egislators and government officials can enact such health and safety requirements to protect patrons and employees in restaurants from the toxins in second-hand tobacco smoke without the fear of adverse economic consequences.' In their study of smoking laws in North Carolina, Goldstein and Sobel (1998) conclude: 'Even in the number one tobacco-producing state in the U.S., ETS regulations present no adverse economic impact, and there is no need for exceptions to the ordinances based on such fears.' Sciacca and Ratliff (1998) conclude in their study of Arizona firms that: 'This study seems to indicate that prohibiting smoking in all Flagstaff restaurants has had no effect on total restaurant sales.'

Dunham and Winegarden (1999) examined data from the 1996 survey of restaurant owners discussed above in Dunham and Marlow (2000b) and found that customers patronize hospitality establishments in order to placate three distinct needs: the desire for food, the desire for social companionship and the desire to seek status. Smoking bans appear to positively impact restaurants that supply the first need, while harming those that supply the other two. The authors conclude that the actual impact of the smoking ban on a particular restaurant depends on how that establishment meets the three needs.

The literature review indicates three important research issues that will extend the overall understanding of the welfare effects of smoking laws. First, most studies have only considered the welfare of owners, either individually or collectively, thus missing possible effects imposed on customers and workers. Second, in addition to focusing

on the economic effect on businesses, the existing literature tends to examine revenues, or sales taxes, rather than business profits or consumer costs, thus providing an incomplete measure of economic welfare. Third, studies of individual owners have focused on expected rather than actual effects of laws because of limitations of data collection. Biases that complicate the understanding of the economic effects of smoking laws may arise when expected and actual effects of laws differ. As discussed below, the data examined in this study address these three problem areas.

III. THE EFFECTS OF SMOKING LAWS ON BUSINESSES AND CONSUMERS

Governments have justified the imposition of smoking restrictions by claiming that smoking creates negative externalities and harms the health of non-smokers.² While the issue of externalities is clearly important for public policy, this paper concentrates on the economic effects that smoking laws may exert on owners, customers and workers in the restaurant and bar industries. Examination of economic effects provides another piece to the overall assessment of the desirability of smoking laws.

In the absence of smoking laws, smoking policies are set by owners who determine air space allocation within their establishments. That is, owners decide in which areas smoking will be allowed, as well as whether to invest in smoking patios, partitions that separate smokers from non-smokers, and air filtration. Coase (1960) provides a general framework that may be applied to how private owners allocate their air space in cases where externalities may be present.³

Coase (1960) argued that resources could be allocated efficiently as long as they are privately owned, transferable and transactions costs are trivial. This appears to be the case with air space within private establishments. The space in the restaurant is privately owned and, in effect, owners rent it to customers who value these resources the most. Smokers and non-smokers compete for the scarce resources and owners will allocate space to the demander with the highest bid. The same process is consistent with other allocation decisions of businesses. Department stores allocate space between men's clothing and women's garments, grocery stores allocate space between meats and vegetables, and theatres allocate between comedy and drama. In the case of restaurants, owners determine what smoking policies are consistent with maximum profits by taking into account the competing demands of smoking and non-smoking customers. More air space will be smoke-free as

² Gravelle and Zimmerman (1994) argue that passive smoke risk is over-estimated by OSHA.

³ Boyes and Marlow (1996) provide a discussion of how the Coase Theorem may be applied to smoking within restaurants and bars.

non-smokers out-bid smokers, and *vice versa*. Whether owners cater solely to smokers, to nonsmokers, or accommodate both, depends on customer preferences and the marginal costs of accommodation.⁴

The other condition presented by Coase is that transactions costs be trivial. At first glance, it would appear highly unlikely that smoking and non-smoking customers could separately negotiate over the air space because this might mean that policies change by the hour or day, or that customers must declare how they value the air space. However, owners intermediate between smoking and non-smoking customers thus eliminating the need for costly negotiations. Owners have profit incentives to allocate resources efficiently and air space allocation will be efficient when they cannot change smoking policies and raise profits at the same time.

An important implication of the resource allocation process is that owners will not adopt uniform smoking policies when customers exhibit diverse smoking preferences and owners face diverse marginal costs of accommodation. Marginal accommodation costs are likely to differ between establishments because some buildings may be more easily adapted to physical separations and air filtration systems. Moreover, some owners may face customers who believe that separations or air filtration systems are effective in removing smoke and others may have customers who believe that smoking should be forbidden. The basic point remains that a diverse set of smoking policies exists prior to smoking laws because a one-size-fits-all policy is not efficient when customers display diverse smoking preferences and owners face different marginal costs of accommodation.⁵

Smoking laws shift ownership of the air space from business owners to individuals who prefer that government restrictions or bans take place. However, restaurant owners are now forbidden from 'selling' resources to smokers, even if they could out-bid non-smokers. Air space resources are therefore no longer transferable and profits may fall unless business owners somehow fully shift burdens of the law onto customers or workers. Of course, cases may arise where laws are consistent with pre-law policies, but these events may be uncommon in locations where smoking preferences and marginal accommodation costs vary considerably across businesses.

The discussion thus far suggests the hypothesis that smoking laws exert three possible effects on profits, assuming that owners profit-maximized prior to government restrictions. One, profits fall when laws lower demand and/or raise costs. Two, profits increase when laws raise demand and/or lower costs. Three, profits do not change

when laws do not affect demand or costs, or changes in demand are equal and opposite to changes in costs.

Another hypothesis is that bars are more likely to experience profit declines than restaurants. Dunham and Marlow (2000b) report evidence indicating that bars are more than twice as likely to experience revenue drops as restaurants. Unlike patrons in restaurants, bar customers often participate in dining, drinking, listening to music, dancing, and playing pool or darts whereby they roam during visits interacting with other patrons. Bar owners may also find it more costly to separate smokers and nonsmokers because it is too costly to provide separate bands, dance floors, poolrooms, etc., for both smokers and non-smokers.

As discussed above, previous studies do not address whether the economic effects of smoking laws extend well beyond effects on individual owners when burdens are shifted onto their customers and workers. A smoking law may represent a cost for restaurants and bars and, as with any cost, owners have incentives to attempt to shift burdens onto others. Food and drink prices may rise or fall and meal portions, hours of operation, service quality are other attributes that might undergo change. Owners may also shift burdens onto workers through lower compensation or added responsibilities.⁶

It is hypothesized that owners will not follow identical strategies when they attempt to shift burdens onto others. For example, owners with price elastic demands may tend to raise prices less often than owners facing price inelastic demands. Profit changes and the manner and extent to which burdens are shifted onto consumers and workers may be influenced by many factors including: age and size of business, type of business, the percentage of customers who smoke, and the competitive nature and size of local markets.

An important implication of this discussion is that simple observation of sales or profit changes following a smoking law may offer a limited picture of the true welfare effects. Higher profits, for instance, may be consistent with higher prices and lower compensation for workers thus clouding the issue of how desirable a smoking law is for society. Clearly, there are many possible changes when we consider effects imposed on individual owners, customers and workers.

IV. DESCRIPTION AND SUMMARY OF SURVEY DATA

A total of 978 owners of restaurants, bars and taverns in Wisconsin were surveyed by ETC Institute of Olathe,

⁴The importance of accommodating nonsmokers is evident in industry trade magazines. See for example, Walter (1994) and Fruchtmann (1992).

⁵See Dunham and Marlow (2000a) and Dunham and Marlow (2003).

⁶Owners may also attempt to shift burdens onto vendors or landlords by lowering payments or rents.

Table 1. *Effects of restrictions on profits (actual and predicted)*

	All restaurants (<i>n</i> = 550)	Restaurants with govt restrictions or bans (<i>n</i> = 172)	Restaurants with no restrictions (<i>n</i> = 378)	All bars (<i>n</i> = 428)
Decrease	54% (296)	38% (66)	61% (148)	81% (345)
Increase	3% (18)	5% (8)	3% (10)	1% (2)
No change	37% (206)	50% (86)	32% (120)	13% (55)
Don't know	5% (30)	7% (12)	5% (18)	6% (26)

Kansas, during February and March 2001.⁷ Of those surveyed, 56% consisted of restaurant owners (550) and 44% consisted of bar and tavern owners (428). This sample represents precision of at least $\pm 3.3\%$ at the 95% level of confidence.

Potential for bias is always a concern with survey data.⁸ Owners may oppose smoking laws for personal reasons and, as a result, exaggerate profit losses and changes in prices, hours of operation and other business attributes. Those who favour laws may also exaggerate profit gains, falsely report no changes in profits, or in other ways indicate incorrect information regarding other issues. With no information on the likelihood of misinformation, it remains unclear whether personal views would over-ride preferences for maximizing the value of firms.

This study is the first to examine both predictions and actual changes regarding profits and other variables. Owners subject to smoking restrictions and bans reported actual effects, while those who were not subject to laws reported predictions. Thirty-one percent of restaurant owners, and virtually no bar owners, were subject to restrictions or bans, thus providing information on actual effects of smoking laws. Information on predictions and actual changes will be compared to determine if significant differences between these two groups exist.

Even without biased responses related to personal views of owners, it is likely that significant differences will exist between responses by those subject to government laws and those who are not. Dunham and Marlow (2000a) support this prediction when they conclude that smoking laws are passed in states with relatively few smokers and therefore businesses subject to such laws are less likely to experience lower profits simply because they service fewer smokers. This prediction is consistent with the survey data examined here because the average percentage of smoking customers is 28% for restaurants with laws and 40% for those

without.⁹ In other words, restaurants located in areas that do not have smoking restrictions service 43% more smoking customers than those in locations with them. As the analysis shows, businesses serving relatively few smokers will experience less harm than businesses serving relatively many.

Responses also support the view that the private market provides a diverse array of smoking policies – thus supporting the prediction that profit changes will not be uniform across establishments. For example, 18% of restaurants, but only 0.2% of bars, provide smoke-free facilities, while 34% of restaurants allow smoking throughout, and 97% of bars allow smoking throughout. On average, 44% of seating in restaurants is non-smoking.¹⁰ For restaurants with smoking restrictions, average non-smoking seating use is 56% and, for those without restrictions, average non-smoking seating is 34%.

V. EFFECTS ON OWNERS

Table 1 displays responses in four categories to the question of how profits would change following a smoking ban: all restaurant owners, restaurant owners currently subject to bans or restrictions, owners not subject to bans or restrictions, and all bar owners. Responses for restaurant owners without any bans or restrictions and for bar owners are predictions of impacts, while responses for those subject to bans or restrictions are actual impacts.

Responses are consistent with previous studies that indicate that smoking bans do not impose identical economic effects across establishments. Profit gains are the least common response, as indicated by 5% or fewer owners, thus indicating that bans provide relatively few economic benefits. Lower profits are indicated by 38% of restaurant owners currently subjected to bans, 61% of restaurant owners

⁷ The survey was funded by Philip Morris Management Corp., however, this was not disclosed to respondents.

⁸ See Berrens *et al.* (1997) and Kerkvliet (1994) for concerns with survey data.

⁹ The difference in means is significant at the .01 level.

¹⁰ In restaurants that restrict smoking to certain areas, 34% allowed smoking in bar areas, 31% in separate smoking areas, 29% in non-smoking sections, 16% in outdoor areas, 14% in separate rooms, and 4% in separately ventilated rooms (multiple responses allowed).

Table 2. *Logit estimations of profit reduction*

	All restaurants	Restaurants with restrictions or bans	Restaurants without restrictions or bans
constant	0.60	-0.10	0.80
	2.47	0.20	2.72
ns _i , non-smoking seating	-0.02*	-0.01**	-0.02*
	7.68	2.54	6.76
alcohol _i , % alcohol revenues	0.02*	0.02***	0.01*
	3.41	1.66	2.75
chain _i , chain dummy	-0.21	-0.20	-0.29
	0.60	0.40	0.60
age _i , years in business	0.0001	0.004	-0.003
	0.02	0.50	0.43
seats _i , number of seats	0.002**	0.002***	0.003***
	2.44	1.75	1.80
Log likelihood	-276.47	-90.11	-229.50
Observations	496	149	347
Obs. with dep = 0	218	88	130
Obs. with dep = 1	278	61	217

Notes: *t*-statistics below estimated coefficients; *, **, and *** denote significant at 0.01, 0.05, and 0.10 levels, respectively.

with no restrictions, and 81% of bar owners. Responses support the above prediction that owners not subject to laws predict profit losses more often than those currently subject to smoking laws. The higher percentage of bar owners predicting profit losses than restaurant owners is also consistent with Dunham and Marlow (2000b).

A qualitative choice model estimates the probability that a restaurant owner with a given set of attributes reports that bans lower profits. Bar owners are excluded here because a vast majority (81%) of their responses indicated lower profits. The following logit model is estimated and follows the model estimated in Dunham and Marlow (2000b):¹¹

$$\text{profitchange}_i = f(\text{ns}_i, \text{alcohol}_i, \text{chain}_i, \text{age}_i, \text{seats}_i) \quad (1)$$

where ns_i = percentage of seating allocated to non-smoking use, alcohol_i = share of revenues from alcohol, chain_i = 1 if firm is a member of a corporate chain; 0 otherwise, age_i = years owner has been in business, seats_i = number of seats.

The dependent variable profitchange_i = 0 if owner has experienced or expects no change or a rise in profit, and = 1 if profit falls. As discussed above, previous studies of individual owners focused on revenues or sales and, because they do not measure profits, do not provide clear measurement of economic effects on owners.

The percentage of seating allocated to non-smoking use ns_i is expected to exert a negative influence on the probability that profits fall since this variable indicates how many non-smokers are served. Profit losses are predicted to be more likely the lower the share of non-smoking seating.

The share of revenues from alcohol, alcohol_i, is expected to exert a positive influence on the likelihood of profits falling because higher alcohol revenues indicate a more 'bar-like' atmosphere that is more social. As discussed above, bar owners have been found to be much more likely to experience profit reduction thus suggesting that losses are more likely in restaurants that are more 'bar-like' than other restaurants.

Membership in a chain is measured by chain_i and equals 1 if firm is a member of a corporate chain, and equals 0 otherwise. Whether a business is part of a corporate chain is also expected to influence responses if chain members offer greater accommodation of smokers and nonsmokers as an element of overall corporate strategy. This view suggests that chain members are less likely to experience profit reduction with the expected sign on chain_i being negative.

Age of business, age_i, is hypothesized to positively affect probabilities of profit reduction as accommodation costs may be positively related to age of buildings and older firms may accommodate less, given that they tend to cater to more established and stable customer bases than newer businesses.

Number of seats, seats_i, is expected to exert a positive influence when scale economies exist in accommodation when, for instance, it may be cheaper to separate smokers from nonsmokers in larger establishments. Larger restaurants then are predicted to experience profit loss more often because they are more likely to have accommodated relatively more smokers prior to a government ban.

Table 2 displays logit estimations for three samples: all restaurant owners, owners subject to smoking laws (actual

¹¹ Dunham and Marlow (2000b) find non-smoking seating (negative), chain (negative), age (positive) variables exerting significant influences on their logit model of whether or not an owner experiences a fall in revenues.

Table 3. *Attribute changes (observations in parentheses)*

	Restaurants with govt restrictions or bans (<i>n</i> = 172)	Restaurants with no restrictions (<i>n</i> = 378)	All bars (<i>n</i> = 428)
Effects on consumers			
Raise prices	20% (35)	31% (118)	34% (145)
Lower prices	3% (5)	2% (7)	7% (28)
Introduce promotions	22% (37)	31% (116)	35% (151)
More entertainment	2% (4)	7% (25)	19% (79)
Less entertainment	3% (6)	5% (18)	11% (48)
Lengthen hours	3% (6)	4% (15)	4% (19)
Lower hours	7% (12)	21% (78)	29% (124)
Effects on workers			
Lower benefits	7% (12)	17% (65)	16% (68)
Raise responsibilities	9% (16)	14% (52)	10% (42)

changes) and owners not subject to laws (predictions). Estimation supports expectations concerning non-smoking seating, alcohol revenues and number of seats. Higher shares of non-smoking seating lower the probability that owners expect adverse revenue effects while higher revenue shares from alcohol raise the probability. These effects are significant for all three samples, but are weaker in cases of owners subject to laws. As discussed above, profit losses are less likely for owners subject to laws simply because their customers would tend to be more favorable to those restrictions in the first place than communities that have not adopted such laws. Number of seats exerts a positive influence on the likelihood of profit loss in all three estimations. Membership in a corporate chain and age of business exert no significant effects on the probability of profit loss in any of three estimations.

In sum, logit estimations indicate three significant influences on the likelihood that an owner reports lower profits following a smoking ban: shares of seating devoted to non-smoking use, share of revenues from alcohol, and number of seats.

VI. EFFECTS ON CUSTOMERS AND WORKERS

Consumers can also be affected when owners re-arrange their businesses in response to smoking laws. Table 3 displays economic effects stemming from whether owners raise or lower prices, introduce promotions, raise or lower entertainment, and raise or lower hours of operation. Responses are displayed for three groups: restaurant owners subject to smoking laws (actual responses), restaurant owners not subject to laws (predictions), and all bar owners. Twenty percent of restaurant owners subject to bans,

31% of owners without laws, and 34% of bar owners indicate that bans cause price hikes. In contrast, 3% of restaurant owners subject to laws, 2% of owners without laws, and 7% of bar owners indicate that bans cause price reductions.

Twenty-two percent of restaurant owners subject to laws, 31% of restaurant owners without laws, and 35% of bar owners indicate that bans cause them to introduce promotions. Few restaurant owners indicate that bans cause them to raise or lower entertainment; however, bar owners were more likely to indicate entertainment changes.¹² Finally, only 3–4% of all owners indicate that they would stay open longer, but from 7–29% would reduce hours of operation.

Table 3 also displays effects imposed on workers following a smoking ban. Seven percent of owners subject to laws, 17% of owners without laws, and 16% of bar owners indicate that a smoking ban causes them to lower benefits to workers. Nine percent of restaurant owners subject to laws, 14% of restaurant owners not subject to laws, and 10% of bar owners indicate that they have or would raise responsibilities of workers.

An important implication here is that evidence of gains or no change in profits indicate only that laws exert no adverse economic effects on owners, but reveals nothing about attribute changes that influence the welfare of customers and workers. Table 4 summarizes the results of logit estimations where attribute changes are regressed against a variable indicating whether or not an owner experiences a profit reduction. A ‘+’ effect indicates that owners with profit reductions are more likely to undertake a given attribute, while a ‘–’ effect indicates that they are less likely to pursue it. No effects, or blanks in the table, indicate that pursuit of a given attribute is unrelated to whether an owner experiences falling profits.

¹² Nineteen percent would raise entertainment and 11% would lower entertainment.

Table 4. Summary of whether owners with profit losses undertake attribute changes more often than other owners (+ or - effects, when significant)

	Restaurants with govt restrictions or bans (n = 172)	Restaurants with no restrictions (n = 378)	All bars (n = 428)
Effects on consumers			
Raise prices	+*	+*	+*
Lower prices			
Introduce promotions	+*	+*	+*
More entertainment		+**	
Less entertainment	+***	+***	+**
Lengthen hours			
Lower hours	+*	+*	+*
Effects on workers			
Lower benefits	+**	+*	+*
Raise responsibilities		+*	

Notes: *t*-statistics below estimated coefficients; *, **, and *** denote significant at 0.01, 0.05, and 0.10 levels, respectively.

Logit estimations indicate that, for all establishments, profit reductions significantly raise the likelihood that an owner raises prices, introduces promotions, lowers entertainment, and lowers hours of operation. Only restaurant owners not subject to smoking laws indicate that profit reduction raises the likelihood of increasing entertainment. Lower benefits to workers are more likely to arise when establishments suffer profit reductions, but only restaurant owners not subject to smoking laws are more likely to raise responsibilities when profits fall. Probabilities of undertaking price drops and lengthening hours of operation are unrelated to whether or not there is a profit reduction.

VII. CONCLUSIONS

This study is an initial attempt at uncovering the economic effects of smoking laws experienced by owners, customers and workers. While previous research by public health advocates has focused on health benefits enjoyed by non-smoking customers and restaurant workers, a thorough assessment of the effects of smoking laws should also include economic benefits and costs that extend to owners, customers and workers.

This examination of Wisconsin restaurants and bars indicates that smoking bans exert effects on profits that vary by establishment, and that bars are much more likely to experience profit losses than restaurants. Owners not subject to laws more often stated that bans lower profits, but this result is consistent with the view that locations with smoking laws service relatively few smokers. This suggests that predictions of profit loss are likely to be understated when they are projected onto other localities because

locations with laws tend to service relatively fewer smokers than locations without laws.

Economic effects experienced by owners extend beyond those who cater to many smoking customers. In addition to seating devoted to non-smoking use, which measures importance of smoking customers, alcohol sales and size of restaurant influence the probability of lower profits. Owners of larger 'bar-like' restaurants are more likely to experience lower profits than others, holding constant the degree to which they cater to smokers.

Economic effects are also found to extend beyond owners as bans lead to changes in prices, promotions, entertainment, hours of operation, and benefits and responsibilities of workers. Most actions were found to be more likely when establishments experience a profit reduction, and effects are not isolated to smokers.

ACKNOWLEDGEMENTS

This paper is based in part on a study conducted for Philip Morris Management Corp. The authors thank Jason Enia, Hyeyeon Park, Mike Stojavljevich and Wayne Winegarden for their helpful comments.

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