Sex composition of children as a determinant of marriage disruption and marriage formation: evidence from Swedish register data

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Sex composition of children as a determinant of marriage disruption and marriage formation: evidence from Swedish register data

by Gunnar Andersson *
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Abstract. In this paper, we investigate whether there are any effects of the sex composition of children on the propensity of Swedish mothers to enter into and exit from marriage. We use Swedish population-register data in order to estimate relative risks of marriage formation and marriage dissolution for mothers with different numbers and sexes of their children. The magnitude of our data allows us to get a very accurate picture of possible relationships of that nature even if they are relatively weak. Morgan et al. (1988) used survey data for the US and claimed to have found that one- and two-child parents in that country have lower divorce risks if they have sons than if they have daughters. For Sweden, we only find a minor effect in the same direction for three-child mothers. For two-child mothers, we instead find that the divorce risk is slightly reduced if a woman has one child of each sex. The divorce risk of one-child mothers is not at all affected by the sex of their child. Finally, we examine whether there are any effects of the sex composition of children on the propensity of Swedish mothers to enter the married state. We find that this is not the case.

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1. Introduction

The main purpose of this paper is to examine whether there is any effect of the sex composition of children on divorce risks of Swedish parents. While the characteristics and number of children are found to be very important determinants of marital stability and thus are included as covariates of various forms in practically every study on divorce risks, we do not really expect a sex-composition factor to have any major impact on such risks. A variable of such a kind is only rarely used in conventional divorce-risk studies: we have only found a limited number of studies examining the relationship between children’s sex and their parents’ propensity to divorce (see the following paragraphs). However, some investigators claim to have found an effect of children’s sex on divorce behavior and, consequently, we find it desirable to determine whether there really can be such an effect on divorce risks in a country like Sweden. We have been encouraged to perform our analysis by the fact that we have access to a data set that, because of its magnitude and its reliability, is extremely appropriate for any investigation of a relationship that we expect to be of a minor magnitude. Our data stem from the Swedish population registers and are thus based on the entire Swedish population. If there is any effect at all from a demographic variable that can be created from the information contained in this data set, then we will get an accurate picture of that effect.

Our attention was initially drawn to this issue by an article by Morgan et al. (1988) who found an association between the sex of children and their parents’ risk of marital dissolution when they estimated divorce risks from a set of US survey data. They used a model that forced the effect of each child’s sex to be the same in families with different numbers of children and then found that each boy reduced the divorce risk by 9 percent more than did a girl. They interpreted their finding as a result of a more committed paternal involvement in families with sons than in families with daughters and also presented data which suggested that American fathers indeed are more involved in childrearing if they have kids of their own sex. Thus, fathers with sons might invest more in “marriage-specific capital”, to speak in terms of Becker (1981). This particular finding has been cited quite extensively in the demographic literature; in a review of research on determinants of divorce for the 1980s, White (1990, p. 907) even mentioned it as “[p]erhaps the most interesting finding of the
decade”. However, subsequently there has been an apparent lack of further findings of the same nature as reported by the literature of the 1990s. At least for developed countries, it is hard to find any other convincing support of a finding like that of Morgan et al. (1988). For Germany, for example, Wagner (1997) reports a negative effect on divorce risks of a first-born boy as compared to a first-born girl but concludes that this pattern is only firmly established for older cohorts of parents in Western Germany. For Australia, Bracher et al. (1993, p.417) reported that “despite carefully testing the effect of the sex composition of children” they found no effect of that kind on marital stability.

The possibility of an effect of children’s gender on marital stability has also been addressed in a few studies pertaining to developing countries. In these cases, investigators see a possible sex-composition effect as a reflection of different types of general gender preferences for children in different societies. Merrill and Casterline (1989) used WFS data from five developing countries and found some evidence of lower divorce risks during the first years of marriage for couples with one son as compared to couples with one daughter in four of the countries they examined. In a more comprehensive report on gender preferences for children, based on DHS data from 44 different countries, Arnold (1997a) presents some further evidence of effects of the gender composition of children on divorce behavior by comparing the fractions of separated among mothers with only daughters with similar fractions among mothers with sons only. With such a simple procedure, he found no evidence of any universal pattern of sex-specific divorce behavior. He found a statistically higher fraction of divorcées in daughters-only families in only four countries: Cameroon, Senegal, Bangladesh, and India.

The existence of any general patterns of gender preferences for children is otherwise often studied through examinations of differentials in fertility levels and/or childbearing intentions between parents with different sex compositions of already existing children, with separate comparisons preferably made at each parity progression. The most common result from such examinations is the finding of a preference for children of both sexes. In some developing countries, a desire for sons might be superimposed on the desire for children of both sexes but even there the latter type of preference tends to dominate the former (Arnold, 1997a,b; Bongaarts, 1998). For contemporary Europe, Hank and Kohler (2000) similarly found a
dominance of preferences for at least one child of each sex by studying the birth outcomes and stated preferences for continued childbearing in two-child families. They used the information as reported by respondents of the Fertility and Family Surveys of 17 different European countries and found that couples with two children of the same sex generally have higher fertility levels than couples with one child of each sex. Other similar findings of mixed-sex preferences are reported for the US by Yamaguchi and Ferguson (1995), for Canada by Marleau and Saucier (1996), and for Denmark by Jacobsen et al. (1999). The latter study is based on large-scale register data for Denmark and thus avoids the problem of possible random effects in one direction or the other. A study of parity progression rates by the sex composition of existing children also exists for Sweden: Schullström (1996) used the information from the Swedish population register and likewise found a pattern of higher fertility rates, at each parity, for women with children of only one sex. She found no evidence of any specific gender preferences in the propensity to give birth in that the sex-composition effect of existing children was completely gender symmetric. Consequently, for mothers with only one child she found no effect at all of that child’s gender on the progression to a second birth.

In the study of any outcome of couple dynamics, it is important to be aware that the preferences of the two partners might be radically different from each other. Marleau and Maheu (1998) present a review of studies, mostly from North America, where men and women have had to state a preference for the sex of their child if they were allowed to have only one child. Men were found to state a preference for a child of their own sex very often while the picture for women was less clear. In the situation of different gender preferences of men and women, one has thus also to consider power differentials between the partners in various decision processes of couples. In any case, if gender preferences for children have an impact on the marital stability of parents, we might expect a pattern of sex-specific divorce risks corresponding to that of sex-specific parity-progression rates as reported above. Thus, for Sweden our results might perhaps correspond to those reported by Schullström (1996) and then indicate a slightly lower propensity to divorce for women with children of mixed sexes than for women with children of only one sex, but no further impact of children’s gender by itself. Such a pattern would thus reflect the combined effect of
the gender preferences of men and women as well as any differentials in the actual impact of each partners’ preferences on marital stability.

This being said, we do not necessarily have to find that differentials in divorce risks correspond to preferences as expressed in decisions to have yet another child. Preferences and behaviors of men and women might have different impacts on different family-transformation events. If an increased paternal involvement in family affairs is conducive to marital stability and if men devote more time to such affairs when they have children of their own sex, we could indeed find a sex-specific pattern in divorce risks like that reported by Morgan et al. (1988). Because of cumulation, a possible effect of this nature might perhaps be more pronounced in bigger families than in families with only a few children. The need for a more committed paternal involvement should at least be felt more strongly by the mother when more children ask for more time input.

In the present study, it is not really our intention to sort out the underlying mechanisms behind any possible pattern of child-sex-specific divorce risks. We have the more modest goal of establishing whether there exists any effect at all of children’s sex on marital stability in Sweden and, if so, we want to get an accurate picture of that effect. In any case, we do not expect a very large effect from such a factor, if any effect at all. Since very little support has materialized subsequently for the finding of Morgan et al. (1988), one might suspect that their finding was mostly a result of random variation in their data. One has always to be aware that even when there is no real effect of a variable in a population, then every 20th sample or so based on that population will produce a statistically significant finding if investigators report their findings at a probability level of 5 percent. In addition, since scientific journals are more willing to publish material that report positive findings than material that report the absence of effects, it is the former type of results that will appear to the public.

When we expect the effect of a certain variable to be fairly small, we have two ideal ways of examining it. The first approach is that used by Hank and Kohler (2000) in their investigation of patterns in gender preferences as they show up in fertility behavior in various countries. By using a large number of surveys, like the various FFS surveys of countries in Europe, they can detect more firmly the existence of any general pattern of gender preferences in the area they investigate. By examining a
large number of countries with different social contexts they have also the possibility
to detect any meaningful differences in patterns between the countries they study. The
second approach would be to use a single large-scale data set as the basis for the
analyses so that one can avoid any problem of random variation in the data. The ideal
data source would be one that covers a whole national population like a data set
derived from a national population-registration system can do. In our case, we have
access to a data set of this nature, namely for Sweden, and we will use it in order to
estimate divorce risks by the sex composition of children of all married women in
Sweden during 1971-1995. The former approach will instead be used by Diekmann
and Schmidheiny (2000), who are about to estimate similar types of divorce risks for
respondents of the various European Fertility and Family Surveys.

We calculate relative risks of divorce in a first marriage for mothers with
different numbers and genders of their children. In our calculations, we also include a
number of other demographic variables that are known to be important determinants
of divorce. We use these factors merely as control variables in order to avoid any
possible confounding effects on the divorce outcome. In addition, we use these
variables in various interaction models together with our sex-composition factor in
order to detect any possible differences in the impact of the latter factor between
different demographic subgroups of the married population. The impact of these
control variables on divorce risks is described in more detail by Andersson (1997),
who studied the role of more conventional demographic variables in Swedish divorce
dynamics.

In the present paper, we also complement our study of child-sex-specific
divorce risks with an examination of the existence of any effects of children’s gender
on risks of first-marriage formation. In Sweden, childbearing nowadays often precedes
marriage so that nearly half of all first marriages are formed by couples who already
have children. In such a situation, any existing gender preferences for children could
turn out to be visible also in patterns of this type of family-transformation event. We
are not aware of any other existing study in any country of a relationship of such a
type. (For information on general patterns in marriage formation in Sweden, see
Andersson, 1998). This latter examination of ours will complete our story since,
together with the study of Schullström (1996), we will then have an accurate picture
of the effects of the sex composition of children on patterns in childbearing, first-marriage formation, and first-marriage disruption in Sweden.

2. Data and method

As we have noted already, the data for our calculations are derived from the Swedish population-register system, which covers the whole Swedish population and its vital events with a very high degree of accuracy. The raw data have been organized into longitudinal histories containing information on all dates of childbearing, marriage formation, and divorce for all women born in Sweden from 1946 onwards. Additional information on dates of emigration, widowhood, and own death is provided so that we are able to censor our observations at appropriate points in time. For the present calculations of risks of marriage formation and marriage disruption, we follow all mothers under risk of either entry into or exit from a first marriage in 1971-1995. We have found around 100,000 divorces to mothers in a first marriage and around 280,000 cases where a first marriage was formed by a mother during that period. We relate these events to the proper risk populations so that we can calculate risks of (first) marriage formation and divorce by a number of basic demographic variables, including one that describes the number and sexes of the children a woman has. We exclude mothers of twins from our analyses since they probably are more affected by the twin status of their children than by the gender composition among them. We also censor our observations at the birth of a fourth child since we do not expect to get very meaningful risk patterns for the relatively few mothers who have more than three children in our data. For further information about our data and its organization, see Andersson (1997, 1998).

We compute our divorce-risk measures by estimating a proportional-hazards (intensity-regression) model where the intensity of divorce for individual $i$ is given by the formula:

$$\mu_i(t) = \mu_0(t) \exp\{\sum \beta_j x_{ij}\}.$$
Here, $\mu_0(t)$ is the baseline intensity of our model, representing the piecewise constant effect of time since marriage formation at durations in the intervals 1, 2, 3, 4-6, 7-10, and 11-15 years from marriage formation. Our further explanatory variables are also treated as categorical factors. We include age at marriage with categories 16-19, 20-23, 24-28, 29-35, and 36-49 years at marriage formation, an indicator of premarital childbearing (with categories yes and no) also fixed at marriage formation, a time-varying factor describing the age of the youngest child (with age groups 0, 1-2, 3-5, 6-8, and 9 or more years), another time-varying factor to pick up trends over calendar years, grouped to represent the periods 1971-73, 1974\(^1\), 1975-81, 1982-88, 1989-92, and 1993-95, and, finally, a time-varying combination factor that describes both the number and the sex composition of the children a woman has. This latter factor is our main variable of interest and has the categories “one boy” and “one girl” at parity 1, “two boys”, “a boy and a girl”, and “two girls” at parity 2, “three boys”, “two boys and a girl”, “a boy and two girls”, and “three girls” at parity 3.

We present the (exponentiated) regression results for this child factor expressed as relative risks of divorce for women at each category of the factor, i.e., the risks are given relative to that of a baseline level of the same factor. We present the risks relative to a common baseline level for all parities of women and also relative to a baseline level within each parity group so that we better can see the true effect of the sex composition of children on divorce behavior. We use all other variables of our model merely as control variables, which means that we standardize for the various effects of these factors on the divorce risks we present. These control variables all have a very strong impact on the divorce risks, but we simply refer to Andersson (1997) for a detailed discussion of their impact on the general divorce behavior in Sweden. The purpose of the present paper is to give a picture of the sex-composition effects of children on divorce risks, and here it should be enough to mention that the effects of our control variables are not affected at all by the inclusion of a new sex-composition variable in our model.

In a parallel manner, we estimate an intensity-regression model for the risk of marriage formation for never-married mothers, taking account of the numbers and sexes of their children. In this case, we use a baseline intensity to represent the

\(^1\)In 1974, the number of divorces peaked due to a number of changes in the legislation concerning marriage and divorce that then became effective and, among other things, made it easier to divorce.
piecewise constant effect of *age of mother*, given at two-year age groups from ages 18-19 to ages 46-47 years, a time-varying factor picking up the effect of *calendar year*, given by single-year groups from 1971 onwards\(^2\), and, finally, a time-varying combination factor that describes the number and the sex composition of children in exactly the same way as in our divorce-risk model. Relative risks of marriage formation are presented for this factor in the same way as we described above, and we refer to Andersson (1998) for other general information on patterns in marriage formation in Sweden.

In all of our models, we test for the significance of any differences in calculated risks between women with different gender compositions of their children, with separate comparisons made in each parity group. For a data set as huge as ours, we will mostly find that any visible difference in divorce/marriage risks will turn out to be significant. Thus, we also like to see a meaningful pattern in any observed differences before we draw any conclusions about effects of children’s sex on family-demographic behavior. We therefore complement our significance testing by a number of interaction models to describe the various interaction effects between our sex-composition variable and other demographic covariates. This will reveal whether any patterns that we find in child-sex-specific risks are persistent across demographic subgroups of mothers. In our significance testing, we also use lower probability levels than the conventional 5-percent level, and we report instead whether differences are significant at the probability levels of 2.5 and 0.5 percent. In any case, we can be confident about any absence of effect of our gender-composition variable if we do not find a risk difference to be significant when we use this data set. In such a case, we feel free to state that there really is no effect of a variable on the risks of the family-transformation event we study.

\(^2\) In our calculations of risks of marriage formation, we exclude all observations pertaining to the year 1989. In this year, an unusually large numbers of marriages were formed in Sweden in response to the implementation of new rules of eligibility for public widow’s pensions (see Hoem, 1991). The characteristics of those who married in this year were quite different from those who marry in more normal years so we choose to leave out this group when we make studies of general patterns in marriage formation in Sweden. We have just checked that there were no interesting effects of the sex composition of children on marriage-formation intensities in that year before we excluded it from our presentation.
3. The impact of the sex composition of children on divorce risks in Sweden

Our calculated relative risks of divorce for first-married Swedish mothers, given for all combinations of numbers (1-3) and genders (boy-girl) of their children and controlled for the additional effects of age at marriage, premarital childbearing, calendar-year period, duration of marriage, and age of the youngest child can be found in Table 1. Here are our conclusions. First, divorce risks are around forty percent lower for women with two or three children than they are for one-child mothers, but they do not differ much between two- and three-child mothers. This fits well with previous findings for Sweden. What is more interesting for our purpose, we find in addition that the effects of the gender composition of children on marital stability are not terribly impressive. Some minor effects do indeed appear, and these turn out to be a bit different at different parities.

For one-child mothers, there is really no effect at all of the sex of their single child on their propensity to divorce. For two-child mothers, we find a minor effect of the sex-composition of their children but this effect is not related to one or the other of the two sexes. Instead, it appears as a four-percent higher risk of divorce in families where the two children are of the same sex, be they boys or girls, than in families who have one child of each sex. Together, the results for women at parities one and two are consistent with the notion of a preference for having at least one child of each sex but not with any further preference for a specific sex of the children. For women who have passed beyond the Swedish norm of having two children, there seems instead to be a real effect of children’s gender on divorce risks. At this parity, the divorce risk increases gradually with the number of girls in the family, and it is twelve percent higher in families with three daughters than it is in families with three sons. The number of families in Sweden with three children is lower than the number of two-child families but this finding is nevertheless significant also at a probability level of 0.5 percent.

In order to examine whether these patterns of child-sex-specific divorce risks are consistent across subgroups of women or whether there is some meaningful pattern of risk differentials between subgroups of women, we have run a number of

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3 Table 1 actually reports a one-percent higher risk of divorce for families with a daughter than for families with a son, but this difference is not significant at any reasonable probability level.
interactions between our gender-composition factor and our other variables. Such an exercise reveals that the patterns reported above indeed are very persistent for all subgroups of women (not shown). The patterns are more or less the same for women with and without premarital children, for women with their youngest child at different ages, for women who married at different ages, for women at different durations of marriage, and also in different calendar-year periods.

4. The impact of the sex composition of children on first-marriage risks in Sweden

The relative risks of first-marriage formation for Swedish-born mothers in Sweden are given in Table 2. We find only a minor effect of parity on the propensity of a mother to enter first marriage and no real effects of the gender composition of existing children on marriage-formation intensities. For women with one and two children, who are the overwhelming majority of the never-married mothers, we find absolutely no effect at all of the gender(s) of their children. For three-child mothers, there seems to be some minor differences in risks between women with different numbers of sons and daughters but the number of never-married women with three children is rather small so these differences are of a more random nature. None of the differences in marriage-formation risks are significant at the probability level we use (p= 2.5 %). In addition, the pattern of risks of three-child mothers seems to be quite erratic. In order to check on our conclusion of an absence of effects of the gender composition of children on marriage intensities, we have also examined whether there are any interaction effects between our child variable and the two other variables of our model. When we run such models, we find no meaningful patterns in marriage-formation risks by the sex composition of children (not shown).
5. Conclusions

In conclusion, we found no impact of the gender composition of children on Swedish mothers’ first-marriage-formation intensities and only a minor effect on their divorce risks. The patterns in divorce risks of one- and two-child mothers indicate a slightly higher marital stability in families with one child of each sex but no differences in risks between families with boys as compared to families with girls. This finding fits nicely with a previous study on parity-progression rates for Sweden indicating that parents there tend to strive for at least one child of each sex (Schullström, 1996). We do also find that daughters to mothers of three children are related to slightly higher divorce risks than are sons, and this complicates our picture a bit. This latter result points in the same direction as the famous study by Morgan et al. (1988) for the US, even though the divorce-stimulating effect of having girls in our case is much weaker than in the American study. Morgan and his collaborators interpreted their finding as being a result of a stronger paternal involvement in families with sons than in families with daughters. If such an effect really manages to become evident in patterns of divorce risks in Sweden, we might perhaps expect it to show up in the marital stability of families with many children rather than in the divorce behavior of, for example, conventional two-child families and this is what we find. A larger number of children might really make the issue of paternal – as well as maternal – involvement in childrearing a much more critical condition for the stability of a marriage.

Nevertheless, the main impression of our study is that there is little general support for the notion of daughters being related to higher divorce risks than sons. If the finding for US really reflects the true state of affairs in that country, this may perhaps be an expression of a less gender-equal society in the US than in Sweden. However, we are reluctant to make much out of speculations of this kind. As we have suggested earlier in our paper, we are more inclined to suspect that the finding for the US might rather be an expression of random variation showing up in their survey data. As a comparison, it will be instructive to see the results of a study based on a relatively large number of surveys, as that of Diekmann and Schmidheiny (2000), who analyze a large number of European Family and Fertility Surveys. If no further support for the notion of a decisive effect of children’s gender on divorce risks turns out to
materialize, we would recommend that valuable research energy instead be spent on other more important topics in family demography.

Acknowledgements

We are grateful to Statistics Sweden, and in particular to Britta Hoem, for organizing and cleaning the raw data used for this study.

References


**Table 1:** Relative risk of divorce. Swedish mothers in their first marriage, 1971-1995, by number and sex composition of their children. Standardized for age at marriage, premarital-child status, calendar year, marriage duration, and age of youngest child.

<table>
<thead>
<tr>
<th>Parity 1</th>
<th>Risk rel. to parity 1, 1 boy</th>
<th>Risk rel. to a baseline level within each parity group</th>
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</thead>
<tbody>
<tr>
<td>1 boy</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1 girl</td>
<td>1.01</td>
<td>1.01</td>
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</table>

<table>
<thead>
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<th>Parity 2</th>
<th>Risk rel. to parity 1, 1 boy</th>
<th>Risk rel. to a baseline level within each parity group</th>
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</thead>
<tbody>
<tr>
<td>2 boys</td>
<td>0.59</td>
<td>1.04**</td>
</tr>
<tr>
<td>1 boy &amp; 1 girl</td>
<td>0.57</td>
<td>1</td>
</tr>
<tr>
<td>2 girls</td>
<td>0.59</td>
<td>1.04**</td>
</tr>
</tbody>
</table>

<table>
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<th>Risk rel. to parity 1, 1 boy</th>
<th>Risk rel. to a baseline level within each parity group</th>
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<td>3 boys</td>
<td>0.55</td>
<td>1</td>
</tr>
<tr>
<td>2 boys &amp; 1 girl</td>
<td>0.58</td>
<td>1.05</td>
</tr>
<tr>
<td>1 boy &amp; 2 girls</td>
<td>0.59</td>
<td>1.07*</td>
</tr>
<tr>
<td>3 girls</td>
<td>0.62</td>
<td>1.12**</td>
</tr>
</tbody>
</table>

* = significantly different from 1 at a probability level of 2.5 %

** = significantly different from 1 at a probability level of 0.5 %

<table>
<thead>
<tr>
<th>Parity</th>
<th>Risk rel. to parity 1, 1 boy</th>
<th>Risk rel. to a baseline level within each parity group</th>
</tr>
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<tbody>
<tr>
<td>Parity 1</td>
<td></td>
<td></td>
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<tr>
<td>1 boy</td>
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<td>1</td>
</tr>
<tr>
<td>1 girl</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>Parity 2</td>
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<td></td>
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<tr>
<td>2 boys</td>
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<td>1.00</td>
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<td>1</td>
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<td>2 girls</td>
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<td>0.97</td>
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